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Editor

Norman C. Sigmond
Kutztown University of Pennsylvania

**NATIONAL ASSOCIATION OF BUSINESS, ECONOMICS AND TECHNOLOGY
(NABET)**

PROCEEDINGS of the 45th ANNUAL MEETING

Editors' Page

Throughout the 45-year history of the NABET/APUBEF Conference, we have striven to compile and publish the authors' papers which were presented at each of the respective conferences. Since 2013, the NABET Conference Proceedings has been upgraded to peer-reviewed status. Throughout the history of the NABET/APUBEF Proceedings, we have benefited from the services of an exceptional group of reviewers and editors.

For the 2022 Conference Proceedings, four professors and the editor participated in the peer-review process. Each of the reviewers worked diligently at the task of meticulously reviewing the various scholarly works that are presented in this Proceedings publication.

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Kutztown University of Pennsylvania

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(NABET)**

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INTRODUCTION

The National Association of Business, Economics and Technology (NABET) is in its forty-fifth year of existence. It was originally known as the Association of Pennsylvania University Business and Economics Faculty (APUBEF). It was founded by a group of economics and business professors from the fourteen state universities comprising the Pennsylvania System of Higher Education. Their goal was to provide a platform for sharing and encouraging scholarly work among the business faculty of the fourteen state universities. As a result of their efforts, the organization has grown and has sponsored an academic conference each year for the past 45 years.

In 2019 NABET became national in scope. At the 45th Annual Meeting the scholarly works of authors from fourteen states, and the countries of China and Hong Kong, Botswana, Gambia, Iran, Mexico and Singapore representing 51 colleges and universities were presented.

At NABET, we encourage conference presenters to complete their papers and submit them for publication for this peer-reviewed Proceedings publication. Of the 71 papers presented at the 45th Annual Meeting, this publication contains those papers that were completed by the authors and submitted to the Proceedings editor. Each paper has gone through a thorough review/edit process. *The Official Conference Program* of the 45th Annual Meeting including the abstract of each paper that was presented is also included.

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THE PCAOB AT WORK – AN INSPECTIONS AND ENFORCEMENT UPDATE

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Liam Fitzgerald, The College of New Jersey

ABSTRACT

In this study, we review the PCAOB inspections and enforcement actions for eight firms (Big-4 and four second-tier firms) from 2009-2020 to assess the level of regulatory oversight and whether the scrutiny seen in the early years is maintained. Our analysis revealed a gradual decrease in the percentage of audits showing deficiencies, the severity of deficiencies, the number of firms that fail to address quality control criticisms satisfactorily, and the extent of enforcement actions. We also noticed a downward trend in the frequency with which common weaknesses occur. The downward trend may suggest an improvement in audit quality over time.

INTRODUCTION

The Public Company Accounting Oversight Board (PCAOB) came into existence in 2003 to oversee the work product of firms auditing public companies. Through its inspection of completed audit engagements and enforcement actions, the PCAOB seeks to improve audit quality and thereby protect investors by improving the accuracy and reliability of corporate financial disclosures. With twenty years of oversight and authority over the auditing profession, it is essential to review and understand the PCAOB's activities as it continues to shape the auditing profession. This paper provides an update on PCAOB activities for the past ten years (see Abernathy, Barnes, and Stefaniak, 2013 for a summary of the first ten years of PCAOB existence).

We examine the PCAOB inspection reports and enforcement actions over the past ten years, from 2009-2020. Prior studies have mostly examined one or the other, not both. Our sample consists of the "Big-4" firms and four second-tier firms. The Big-4 audit approximately half of all public companies; the top ten account for approximately sixty-seven percent of the audits of public companies in 2021 (Murphy, 2021).

BACKGROUND

As part of its oversight, the PCAOB conducts annual inspections of public accounting firms that perform audits for more than 100 publicly traded companies (clients) and at least triennially for firms with 100 or fewer issuer clients (Daugherty & Pittman, 2009). The PCAOB inspection teams select audits for inspection using a risk-based approach or randomly from the completed audits of the inspected firm. The reviewers often focus on areas of greater audit complexity, greater significance, heightened risk of material misstatement, and recurring audit deficiencies. These inspections and selection methods aim to identify any audit deficiencies in the audits of inspected firms. Any audit deficiencies found are communicated to the inspected firm to determine if they have sufficient and acceptable justification for the identified deficiencies. Each review concludes with an inspection report summarizing the findings. The first part of the report includes significant audit deficiencies that inspected firm could not adequately explain and are publicly available. The second part of the report discusses a firm's quality controls and is typically nonpublic. However, the second part of the report can become public if the audit firm fails to correct these quality control deficiencies within twelve months of the inspection report issuance date (Nagy, 2014). The inspections and related enforcement actions are designed to increase overall audit effectiveness and ensure that external users have confidence in the integrity of issued financial statements.

The PCAOB audits the Big-4 firms annually. In comparison, smaller firms are audited triennially (Tanyi & Litt, 2017). This creates a two-tier system where smaller firms receive less frequent feedback than more prominent firms and have a slower learning curve than annually inspected firms that can improve their approach to meet the PCAOB specifications. Church and Shefchik (2011) studied PCAOB inspection reports of annually inspected accounting firms issued from 2004 to 2009 for eight of the largest accounting firms (including Big-4 firms). The data comprised 48 inspection reports and audit deficiencies. An audit deficiency occurs when the inspection team believes that the inspected firm did not obtain a "sufficient, competent evidential matter" to support the firm's audit opinion (PCAOB, 2009). Not all audit deficiencies are the same, however. The study analyzed the severity and nature of each deficiency and the account(s) impacted. The PCAOB identified a total of 664 deficiencies, representing a "significant, downward linear trend in the total number of audit deficiencies" (Church & Shefchik, 2011, pg. 43). The number of deficiencies in 2009 (n=86) was 44.8% of those in 2004 (n=192) suggesting improvement over time (Church & Shefchik, 2011,

pg. 53). These improvements perhaps reflect firms were becoming more familiar with the PCAOB's process and expectations. Over 90% of the audit deficiencies found were common to most firms in the industry, with revenues being the most impacted income statement accounts (Church & Shefchik, 2011).

Hollingsworth and Irving (2021) examined the PCAOB's enforcement program from 2005 to 2017 instead of its inspection reports. During this period, the PCAOB issued over 250 disciplinary orders. The number of disciplinary orders increased each year from 2008 with only slight increases in enforcement spending, perhaps pointing to gains in PCAOB's efficiency and effectiveness. A large number of violations (70%) were related to not following audit principles and responsibilities, lack of audit evidence, and inadequate review and communication.

Prasad and Webster (2020) also examined inspection reports ($n = 2,985$) over an extended period (2004–2018) and found that 1,551 contained audit deficiencies (~52%). Audit deficiencies fell in one of three categories related to (1) Generally Accepted Accounting Principles (GAAP), Generally Accepted Auditing Standard (GAAS), or Internal Controls over Financial Reporting (ICFR). GAAP deficiencies were the most common of the 1,551 inspection reports containing audit deficiencies, then GAAS deficiencies, and finally ICFR deficiencies. The results also varied by firm size, i.e., whether annually or triennially inspected firms. For 74% of triennially inspected U.S. firms, audit deficiencies were due to a failure to follow GAAP, while 17% of annual audit deficiencies were from ICFR deficiencies (Prasad & Webster, 2020). The annually inspected firms deal with larger clients than triennially inspected firms.

DATA

We collected 2009–2020 data on eight firms (the Big-4 and four second-tier firms) from the PCAOB website, <https://pcaobus.org>. The sample was limited to eight firms primarily because the Big-4 firms conduct approximately 50 percent of total audits. The firms selected are Deloitte & Touche, Ernst & Young, KPMG, PricewaterhouseCoopers, Grant Thornton, Crowe, Moss Adams, and RSM. The data for secondary analyses were culled from the “Firm Inspection Reports,” “Enforcement Actions,” and “Annual Report.” The inspection reports identify deficiencies (non-compliance with established standards).

The data include the number of audits examined per firm, number of audits containing deficiencies, audit impacted, severity and number of deficiencies in audits, auditing standards failed, and others. Additionally, we collected enforcement data from 2009–2020 in terms of enforcement spending, disciplinary orders settled, the severity of disciplinary action, and the group impacted by these orders. In the spirit of continuous improvement, we expect a gradual decrease in the severity and number of audit deficiencies along with a reduction in the severity and amount of enforcement actions over time.

ANALYSIS & RESULTS

The inspection reports from 2009–2020 show that the PCAOB changed the format and content of its reports to improve the quality of information. Essentially, the inspection reports are useful for the public only if they are understandable. For example, before 2018, the PCAOB used a primitive, albeit difficult-to-read, format for its inspection reports.

EXHIBIT 1

INSPECTION PROCEDURES AND CERTAIN OBSERVATIONS

Members of the Board's inspection staff ("the inspection team") conducted primary procedures for the inspection from October 2008 through October 2009. The inspection team performed field work at the Firm's National Office and at 34 of its approximately 61 U.S. assurance practice offices.

Board inspections are designed to identify and address weaknesses and deficiencies related to how a firm conducts audits.³⁷ To achieve that goal, Board inspections include reviews of certain aspects of selected audits performed by the firm and reviews of other matters related to the firm's quality control system. Appendix B to this report provides a description of the steps the inspection team took with respect to the review of audits and the review of certain firm-wide quality control processes.

In the course of reviewing aspects of selected audits, an inspection may identify ways in which a particular audit is deficient, including failures by the firm to identify, or to address appropriately, respects in which an issuer's financial statements do not present fairly the financial position, results of operations, or cash flows of the issuer in conformity with GAAP.³⁸ It is not the purpose of an inspection, however, to review all of a firm's audits or to identify every respect in which a reviewed audit is deficient. Accordingly, a Board inspection report should not be understood to provide any assurance that the firm's audits, or its issuer clients' financial statements or reporting on internal control, are free of any deficiencies not specifically described in an inspection report.

Exhibit 1, on the next page, shows a small portion of PricewaterhouseCoopers' (PWC) 2009 inspection report containing several pages of voluminous text, which is time-consuming for readers. In 2018, the sentence-dominated format gave way to a more visual chart-based format. In addition, the length of inspection reports also decreased. As a result, the inspection reports became more user-friendly and understandable, as can be seen in Exhibit 2 - PWC's 2020 Inspection Report.

EXHIBIT 2

	2020	2019	2018
Total audits reviewed			
Total audits reviewed	52	60	55
Selection method			
Risk-based selections	37	41	45
Random selections	13	14	10
Target team selections ²	2	5	0
Total audits reviewed	52	60	55
Principal auditor			
Audits in which the firm was the principal auditor	51	58	54
Audits in which the firm was not the principal auditor	1	2	1
Total audits reviewed	52	60	55
Audit type			
Integrated audits of financial statements and ICFR	50	52	45
Financial statement audits only	2	8	10
Total audits reviewed	52	60	55

FIRM REGISTRATION

An audit firm is required to be registered with the PCAOB if it wants to audit public companies.

FIGURE 1

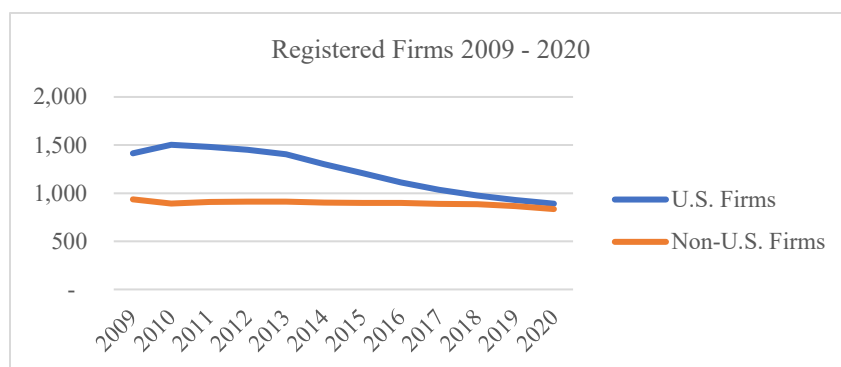
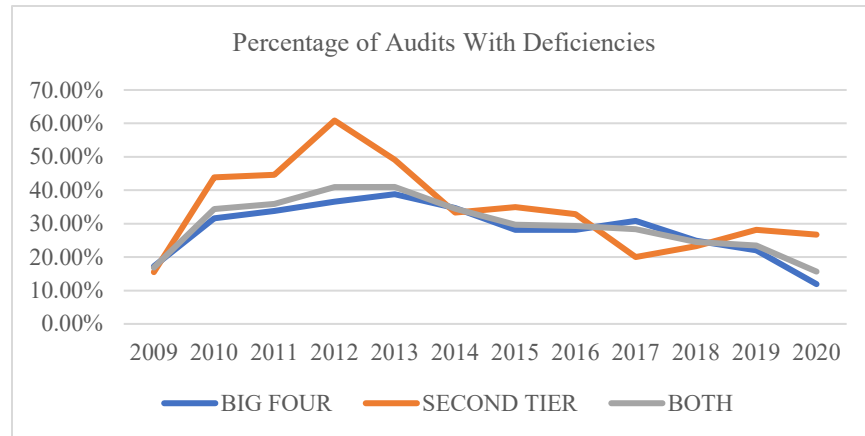


Figure 1 shows that from its peak in 2010 at 2,397 firms, the number of U.S. registered firms decreased yearly, with only 1,726 firms registered as of 2020. The number of non-U.S. registered firms remained relatively constant over time. The decline in registered firms suggests that those firms unable to meet the new PCAOB standards exited the audit market. The compliance burden eliminated resource-strapped smaller firms from the PCAOB roster, leaving the public company audits to large and more resourceful firms.

AUDIT DEFICIENCIES

From 2009-2020, the PCAOB reviewed the audits of 3,465 public companies across 86 inspection reports for the eight firms in our sample. For the Big-4, the number of completed audits reviewed annually ranged from 50-75 per firm. For the second-tier firms, the number of audits reviewed annually ranged from 8-40. Of the 3,465 audits examined, 1,012 (~29.2%) contained audit deficiencies. Figure 2 illustrates the percentage of audits with deficiencies over time.

FIGURE 2



Following the “Great Recession” of 2008, greater oversight led to the overall rise in percentages of audits with deficiencies from 2009–2012. It is noteworthy that while both Big-4 and second-tier firm audits with deficiencies increased, the Big-4 rate increased significantly less, indicating superior ability to meet the PCAOB’s standards. Once audit firms become accustomed to new regulations, the number of deficiencies decreases pointing to improved audit quality over the last ten years. As firms receive more frequent feedback, audit quality tends to improve.

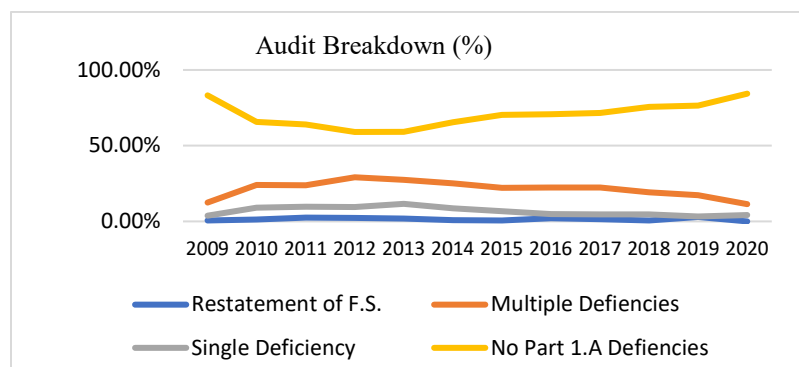
SEVERITY OF DEFICIENCIES

While the PCAOB identified 1,012 audits with deficiencies within the framework of this study, the severity of these deficiencies is not the same. The 3,465 audits inspected fell under one of four general categories: 1) audits with an incorrect opinion on financial statements, 2) audits with multiple deficiencies, 3) audits with a single deficiency, and 4) audits without part 1A deficiencies.

Part 1A deficiencies relate to a lack of sufficient or appropriate audit evidence supporting the audit firm’s opinion(s) on the issuer’s financial statements or Internal Controls over Financial Reporting (ICFR), also known as audits with unsupported opinions. Audits with an incorrect opinion on financial statements mean that the audit failed to identify significant misstatements resulting in the public company having to restate its financial statements. Figure 3 presents the overall trends for the eight firms.

Figure 3 shows positive developments in audit quality over the last decade. For example, from 2012 to 2020, the percentage of audits containing no deficiency increased from 59.06% to 84.34%. At the same time, the rate of audits having multiple deficiencies decreased from 29.13% to 11.39%, and the percentage of audits containing a single deficiency decreased from 9.45% to 4.27%.

FIGURE 3



Notably, the most severe type of audit deficiency (resulting in a restatement of financial statements) accounted for less than 3.00%. Overall, this data demonstrates a decrease in the severity of audit deficiencies over time. In addition, the frequency of audits with multiple deficiencies and incorrect opinions is also decreasing. This trend demonstrates that the PCAOB is positively impacting not only the number of deficiencies but also the severity of deficiencies when they occur.

AREA OF DEFICIENCIES

The SEC requires public companies with over one hundred million dollars in revenue to produce a financial statement and internal control over the financial reporting (ICFR) audit. The PCAOB is responsible for monitoring the quality and accuracy of both (*Firm inspection reports, 2022*).

FIGURE 4

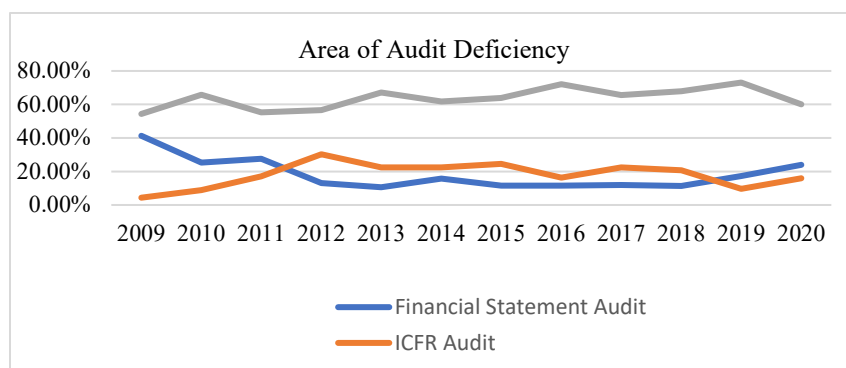


Figure 4 shows a breakdown of deficiencies by area for the Big-4 firms from 2009-2020. The percentage of deficiencies involving both audits slightly increased over the last decade (54.35% to 60.00%). From 2012-2019, a higher percentage of deficiencies were in the ICFR audit than in the financial statement audit.

Figure 5 shows the deficiencies by area for the second-tier firms with no clear pattern. However, a decrease in the overall percentage of deficiencies impacted both audit areas (81.82% to 68.42%). Ideally, audits would contain no deficiencies. A more practical expectation, however, is that deficiencies should be minor and rare instead of major and widespread.

FIGURE 5

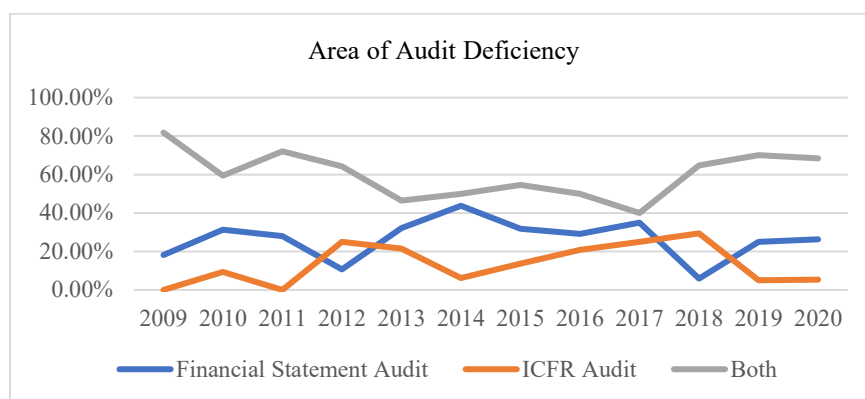
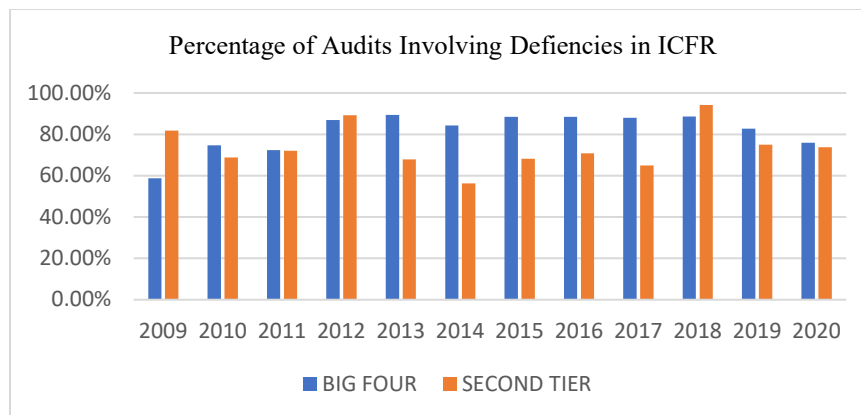


Figure 6 presents a side-by-side comparison of the percentage of audits with deficiencies that impact the ICFR audit. It highlights the difference between Big-4 firms and second-tier firms. Seven out of the last eight years, the Big-4 had

a higher percentage of ICFR audits containing deficiencies than the second-tier firms. As expected, the Big-4 have a higher rate as they audit more complex and global internal controls challenges. The difficulty of auditing the internal controls of a fortune-500 company is exponentially more remarkable than auditing a smaller company.

FIGURE 6



IMPACTED STANDARDS

In 2013, the PCAOB started including more information about the auditing standards associated with Part 1A deficiencies (e.g., how often a particular violation occurs). Therefore, we use data from the 2013-2020 inspection reports to identify the most frequent auditing standards associated with deficiencies and whether there is an improvement over time.

FIGURE 7

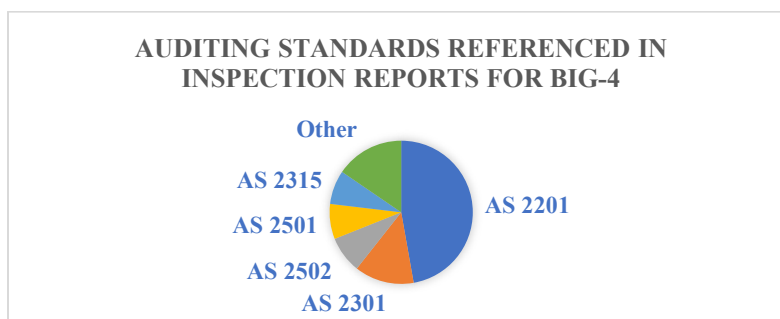


FIGURE 8

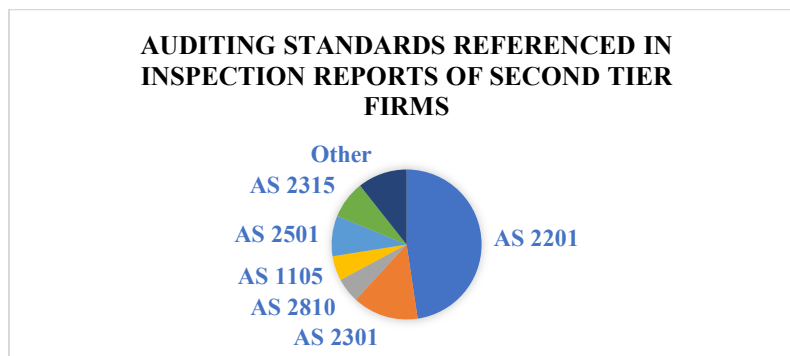
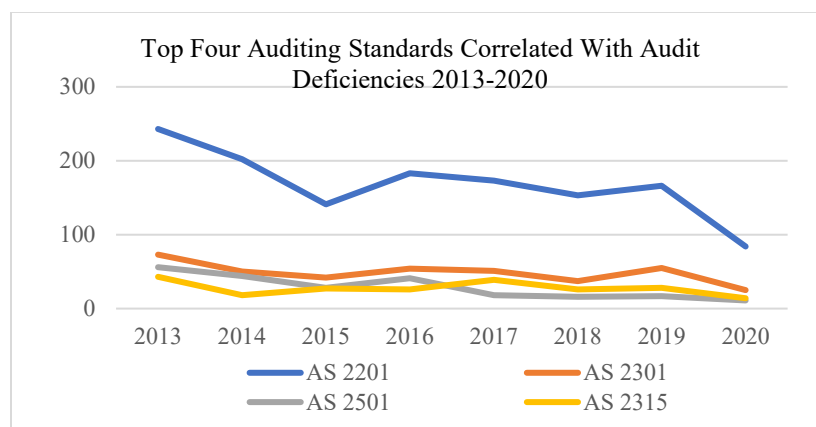


Figure 7 and Figure 8 show the five auditing standards most frequently cited in association with audit deficiencies for the Big-4 and second-tier firms

Auditing standard AS 2201 (An Audit of Internal Control Over Financial Reporting Integrated with An Audit of Financial Statements) deals with the audit of management’s assessment of the effectiveness of internal controls over financial reporting. It was mentioned 2,167 times for Big-4 firms accounting for 47% of all deficiencies. The second most common standard mentioned is AS 2301: The Auditor’s Responses to the Risks of Material Misstatement, which accounted for 13% of deficiencies. The following three standards mentioned in order of frequency are AS 2502: Auditing Fair Value Measurements and Disclosures, AS 2501: Auditing Accounting Estimates, and AS 2315: Audit Sampling. Finally, the remaining sixteen auditing standards accounted for only 15% of the deficiencies.

For the second-tier firms, AS 2201 was the most common auditing standard cited 676 times in association with deficiencies. Similar to the Big-4, AS 2201 accounted for 48% of standards mentioned in association with audit deficiencies. The other top five most frequently mentioned auditing standards are AS 2301-The Auditor’s Responses to the Risks of Material Misstatement (14%); AS 2501-Auditing Accounting Estimates (9%); AS 2315-Audit Sampling (8%); AS 1105-Audit evidence (5%); and AS 2810-Evaluating Audit Results (8%). The other nine auditing standards were responsible for the remaining 11%. The main takeaway from these two charts is that audit deficiencies occur in both the Big-4 firms and the second-tier firms, with AS2201 being the most frequently cited auditing standard as Figure 9 illustrates.

FIGURE 9



The trend in Figure 9 shows a decline in deficiency citations associated with all four audit standards over time. These trends suggest that the PCAOB is helping improve audits, as identifiable problems are being addressed.

QUALITY CONTROL ISSUES

Inspection reports issued by the PCAOB contain two parts. Part one is public and has audit deficiencies that the PCAOB considers significant. Part two is nonpublic and identifies quality control criticisms. Part two data is not publicly released unless the firm does not satisfactorily “remediate” the PCAOB’s quality control criticisms (*Firm inspection reports*, 2022). At first, the PCAOB withholds this information but releases data on the number of firms that fail to “remediate” by the twelve-month mark. Figure 10 shows the number of firms that failed to address their quality control issues identified in PCAOB inspections.

Figure 10 shows a decreasing number of firms failing to meet the PCAOB quality control expectations. A firm’s quality control system impacts the quality of its audits; therefore, improving these systems is essential in the PCAOB’s mission to improve audits of public companies.

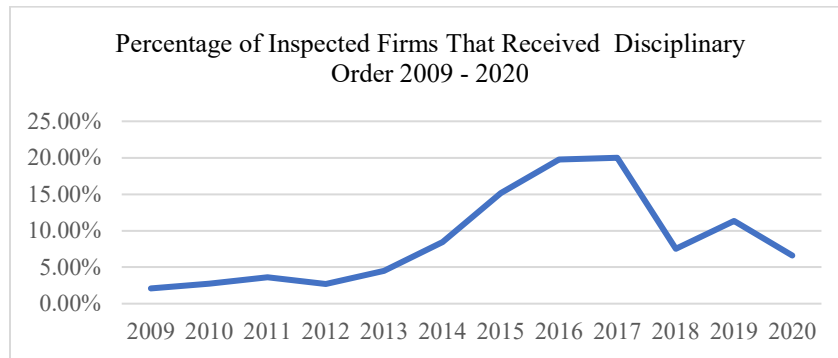
FIGURE 10



ENFORCEMENT

Another tool at PCAOB's disposal is enforcement actions. Some examples of enforcement actions are fines imposed on individuals and firms, revocation of registration (temporary or permanent), and termination of bars. Figure 11 shows the percentage of firms receiving a disciplinary order. Coincidentally, there is a sharp decline in disciplinary orders just as the new, regulation-averse regime came to Washington in 2017.

FIGURE 11



However, one may argue that the disciplinary orders would decrease over time as firms learn and develop more effective compliance protocols and that the PCAOB is functioning as envisioned. The number of disciplinary orders settled increased from 2009-2016 followed by a decline in 2018, as shown in Table 1.

Table 1 (on the next page) presents the PCAOB's enforcement spending from 2009-2020. The amount of enforcement spending increased gradually until 2015 when it began to plateau and remained at about 22 million dollars per year. Corresponding to the increase in enforcement spending, the number of settled disciplinary orders also increased.

According to the PCAOB, the increase in enforcement spending was mainly attributable to new staff hires (*Annual report, 2022*). The increased enforcement also sends a message that the probability of being flagged for failure to meet the PCAOB standards was growing, thus, motivating firms to improve operations. As a result, the PCAOB found fewer instances warranting disciplinary action, demonstrating an overall, industry-wide improvement.

TABLE 1

Year	Enforcement Spending (in millions)	Disciplinary Orders Settled	Year	Enforcement Spending (in millions)	Disciplinary Orders Settled
2009	13.1	6	2015	22.1	44
2010	15.6	7	2016	22.1	54
2011	17.9	8	2017	22.2	54
2012	19.1	8	2018	22.7	20
2013	20.0	13	2019	21.8	30
2014	20.2	24	2020	22.6	17

CONCLUSIONS

This study provides insight into the impact of PCAOB on audits of some of the biggest registered auditing firms from 2009 – 2020. PCAOB came into existence to restore public confidence in the capital markets and continues to function in that capacity. However, the PCAOB has seen a decline of 623 registered firms from 2009 – 2020. Firms deregistering demonstrates that the PCAOB’s standards and regulations were too burdensome for smaller, resource-strapped firms, prompting them to exit the public company audit market. Since 2012, the PCAOB has also seen a decline in deficiencies for Big-4 and Second-Tier firms. Correspondingly, the severity of the deficiencies has decreased. The percentage of audits with multiple deficiencies or a deficiency requiring a restatement of financial statements has also decreased.

Another indicator of the PCAOB’s success is that the number of firms failing to satisfactorily address quality control criticisms decreased from 2009 to 2020. In other words, when the PCAOB finds quality control issues, the percentage of audit firms addressing them by the end of the twelve months has increased. In enforcement actions, the number of disciplinary actions issued has gone down in the last three years. Overall, the PCAOB has seen a decline in the number, severity, and frequency of deficiencies and disciplinary orders and increasing compliance.

For all firms, the auditing standards most often cited in audit deficiencies are AS 2201, AS 2301, AS 2315, and AS 2501. While these four auditing standards have remained the most cited, the frequency of deficiencies linked to these standards has decreased every year since 2013.

Another improvement the PCAOB has made is in its presentation and readability of reports. Starting in 2018, the PCAOB released a new inspection report format, which switched from a sentenced-based account to a more visual, chart and graph-based. In addition, the new reporting format provides data from the previous two years, allowing for year-to-year comparisons.

This study builds on prior research on regulatory oversight and adds to the body of literature with results from the second decade of PCAOB’s existence. We contend that PCAOB continues to have a positive impact on audits of public companies, as seen in declining deficiencies and enforcement actions. However, what is not clear is whether these are a sign of improved audit quality or a diminished appetite for regulatory oversight on the part of the PCAOB.

REFERENCES

- Abernathy, J., M. Barnes, and C. Stefaniak (2013). A summary of 10 years of PCAOB research: what have we learned? *Journal of Accounting Literature*, 32(1) 60-90.
- Annual report. PCAOB. (n.d.). <https://pcaobus.org/about/annual-report>
- Church, B. K., & Shefchik, L. B. (2011). PCAOB Inspections and Large Accounting Firms. *Accounting Horizons*, 26(1), 43-63.
- Coates, J. C. (2007). The Goals and Promise of the Sarbanes–Oxley Act. *Journal of Economic Perspectives*, 21(1), 91–116.
- Daugherty, B., & Pitman, M. K. (2009). Auditing the Auditors: A Case on PCAOB Inspection Reports of Registered Public Accounting Firms. *Current Issues in Auditing*, 3(1), B1–B18.
- Daugherty, B., & Tervo, W. (2010). PCAOB Inspections of Smaller CPA Firms: The Perspective of Inspected Firms. *Accounting Horizons*, 24(2), 189–219.
- Enforcement actions. PCAOB. (n.d.). <https://pcaobus.org/oversight/enforcement/enforcement-actions>
- Firm inspection reports. PCAOB. (n.d.). <https://pcaobus.org/oversight/inspections/firm-inspection-reports>
- Gilbertson, D. L., & Herron, T. L. (2009). PCAOB Enforcement: A Review of the First Three Years. *Current Issues in Auditing*, 3(2), A15–A34
- Hollingsworth, C. W., & Irving, J. H. (2021). A Review of the PCAOB’s Enforcement Program: 2005–2017. *Current Issues in Auditing*, 15(1), A1–A18.
- Kinney, W. R. (2005). Twenty-Five Years of Audit Deregulation and Re-Regulation: What Does it Mean for 2005 and Beyond? *Auditing: A Journal of Practice & Theory*, 24(2005), 89–109.
- Löhlein, L. (2016). From peer review to PCAOB inspections: Regulating for audit quality in the U.S. *Journal of Accounting Literature*, 36(2016), 28–47.
- Murphy, M. L (2021). Study: Big-4 audit hold still strong despite 2021 dip. Compliance Week. [Study: Big-4 audit hold still strong despite 2021 dip | Article | Compliance Week](#)
- Nagy, A. L. (2014). PCAOB Quality Control Inspection Reports and Auditor Reputation. *Auditing: A Journal of Practice & Theory*, 33(3), 87–104.
- PCAOB. (n.d.). *PCAOB Inspection Procedures: What Does the PCAOB Inspect and How Are Inspections Conducted?* <https://pcaobus.org/oversight/inspections/inspection-procedures>
- Prasad, A. L., & Webster, J. C. (2020). What Are the Trends in PCAOB Inspections and the Reported Audit Deficiencies? *Journal of Accounting, Auditing & Finance*, 1.
- Tanyi, P., & Litt, B. (2017). The Unintended Consequences of the Frequency of PCAOB Inspection. *Journal of Business Finance & Accounting*, 44(1/2), 116–153.

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CODIFICATION RESEARCH AND MEMO WRITING IN A FINANCIAL ACCOUNTING AND REPORTING COURSE

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ABSTRACT

The AICPA has a core competency framework that suggests skills important for all accounting majors entering the profession. However, accounting curriculum often requires inclusion of so much technical knowledge that it can be challenging to devote class time towards development of these other skills. The purpose of this paper is to provide an overview of a series of research assignments given to 165 students in the Intermediate Accounting course over three semesters and seven sections. The assignments required students to use the Codification to research an answer to a client's accounting questions and answer the questions by writing a memo. This assignment had the advantage of supplementing required content while taking little time away from lecture. Surveys distributed to students show that generally, students reported these assignments increased their confidence in writing memos, searching through the Codification, and summarizing their findings.

INTRODUCTION

The importance of communication skills for those entering the accounting profession cannot be overstated. In fact, communication was listed by the American Institute of Certified Public Accountants (AICPA) as one of the core competencies that all students entering accounting should master (AICPA, 2019b), and was defined as the ability to "actively listen and effectively deliver information in multiple formats tailored to the intended audience." Furthermore, demonstrating competence in written communication is required on the CPA exam (AICPA, 2019a).

Incorporating exercises designed to enhance communication skills can be difficult, as the typical accounting curriculum requires such a large focus on technical knowledge that it can become challenging to devote precious time towards other activities. Therefore, the purpose of this paper is to outline an approach that may be taken within a financial accounting and reporting course to ensure that students are more comfortable and familiar with how to write a memo. Specifically, students were given questions assumed to come from an accounting client, researched the Codification for an answer, and wrote a memo to that client summarizing their findings. This approach was utilized by the authors over three semesters. It took minimal time away from lectures, provided students with a better understanding of the importance of written communication, and allowed them to hone their memo-writing skills, thereby increasing confidence (and possibly reducing apprehension) in their writing ability. It also had the additional bonus of exposing them to the FASB Codification and incorporating research skills.

After using these assignments, students reported significant average increases between the beginning and the end of the semester with respect to their knowledge and understanding of the Codification, as well as their perceived ability to search through the Codification and effectively summarize their findings in a memo. Students also tended to report these increases occurred because of these assignments.

The remainder of this paper will first address prior literature on communication and research skills, and their importance to the accounting major. Next will be a discussion on the assignment itself and its learning objectives. Third will be the methodology of how this assignment was incorporated into the class. Fourth is an overview of findings with respect to a survey distributed at the beginning and end of the semester, and the final section will conclude.

LITERATURE REVIEW

Writing in the Accounting Curriculum

For decades, research has stressed the importance of communication skills for accountants. This has been shown in surveys given to educators and practitioners (e.g., Albrecht & Sack, 2000 and Blanthorne et al., 2005), and to accounting students (e.g., Kavanagh & Drennan, 2008). Sharifi et al. (2009) provided a summary of reports

undertaken by professional organizations to improve accounting curricula and found that all reports emphasized communication as an essential competency (181).

Lin et al. (2010) distributed a survey to 231 accounting professionals and reported that on a scale of 1-5 (with 5 indicating “strongly agree”), that the average score on the statement “weak writing skills are a major disadvantage for an accountant who wants to advance in the field” was 4.41. Bui & Porter (2010) conducted eleven interviews with partners or human resource managers from nine different accounting firms in New Zealand. All the interviewees stated that communication skills (including written) should be possessed by accounting graduates. Boyle et al. (2014) surveyed 119 public accounting professionals and asked them to rank the importance of written communication skills on a scale of 1-7 (with 7 indicating “critically important”). The authors found the average ranking of 5.39 at the staff level, 6.38 at the manager level, and 6.51 at the partner level, indicating that the importance of written communication increased as accountants are promoted.

Riley & Simons (2013) reviewed over 100 published articles focusing on writing skills as related to the accounting curriculum. Their review demonstrated that practitioners typically ranked writing skills as either the most important or one of the most important skills required of an accounting professional. Similarly, academics and students ranked writing skills as being highly necessary to be successful in an accounting career. Furthermore, Riley & Simons (2016) conducted a faculty survey of 50 US universities and 200 practitioners (ranging from staff to partner) and compiled data from 88 faculty and 136 practitioner participants. Results indicated that 83.6 percent of practitioners and academics deemed written communication skills as “essential” or “very important” for entry level accounting graduates. In addition, 53.6 percent of practitioners cited written communication skills as “always” or “often” a factor when interviewing accounting graduates for entry level positions.

Despite the importance of communication skills, some research has indicated that accounting graduates are deficient in this area. Jones (2011) sent surveys to firms with a history of employing accounting graduates from the author’s institution, and compiled responses of 46 accounting employers. With respect to a list of communication competencies, this study reported that “on the whole, employers were only marginally satisfied with new hire preparation levels” (259). With respect to written communication skills, clear writing and outlining tied for the lowest satisfaction levels, followed by the ability to organize information into effective sentences and paragraphs. Camacho (2015) interviewed human resource managers of seven different accounting firms, and all firms “...agreed that most students lack the necessary skills to write at a professional level that would represent the firm properly” (323). Five of the seven firms stated that employees spend 20-30 percent of their time writing. The sixth firm reported 5-10 percent, and the seventh stated that their tax team spent 5-10 percent of their time writing but the percent for the audit team was 20-30 percent. One suggestion made by a firm was that students should practice writing skills while still at school (323).

Taken together, communication skills are extremely important among accounting majors who wish to advance in their field. To assist practitioners and accounting students with respect to writing skills in the profession, May & May (2015) have authored numerous editions of “Effective Writing: A Handbook for Accountants,” which included a discussion of different types of business communication, tips, and practice exercises. In addition, Holmes et al. (2019) provided a list of four criteria that can be used to gauge effective writing of a business memo (i.e., organization, development, expression, and content).

One possible way to improve accountants’ communication skills is to incorporate writing assignments into the curriculum. This idea is reinforced by the AICPA, who promote communication skills as a key for success in accounting. The AICPA website shows a Pre-Certification Core Competency Framework, which is described as “developed through collaboration of accounting professionals and educators, defines a set of skills-based competencies needed by all students entering the accounting profession, regardless of the career path they choose (public/industry/government/nonprofit) or the specific accounting services they will perform” (AICPA, 2019b). The website suggests that this guide may be used for faculty “to know the relevant topics you can incorporate into your curriculum,” with many of the listed competencies not necessarily covered in traditional, content-driven accounting curriculum. The competencies are arranged under three “pillars”: Accounting (technical competencies of the profession that add value to business and contribute to a prosperous society), Business (Broad business environment in which accounting professionals work), and Professional (the skills, attitudes, and behaviors of accounting professionals).

Within this framework are two complementary competencies that lend themselves to written communication assignments:

- 1) Reporting (under the Accounting pillar), defined as “identify the appropriate content and communicate clearly and objectively to the intended audience the work performed and the results as governed by professional standards, required by law or dictated by the business environment,”
- 2) Communication (under the Professional pillar), defined as “actively listen and effectively deliver information in multiple formats tailored to the intended audience.”

In addition, incorporating communication into the curriculum may be useful practice for the CPA exam. The AICPA website discusses what is expected on the “Written Communication Tasks” portion of the exam:

“For each of three written communication tasks, you must read a scenario and then write a suitable document relating to the scenario. The instructions state what form the document should take (such as a memo or letter) and its focus. Your response should provide the correct information in writing that is clear, complete and professional” (AICPA, 2019a).

Prior research has also provided support for including writing exercises within the curriculum. The Writing Across the Curriculum (WAC) movement asserted that writing skills should be addressed across a variety of courses and not just in English/Literature classes. As described by McLeod & Soven (1992), there were two overlapping approaches to WAC: “writing to learn” and “learning to write”. Writing to learn entailed that as students write, they were also learning the material they were writing about. In addition, students were provided with feedback regarding their comprehension of the material and writing skills. The second approach, learning to write, taught students how to write appropriately in their discipline. As an example for accounting students, this may involve the writing of memos or reports.

Various studies have emphasized that the WAC movement had a positive effect on accounting higher education outcomes. An early empirical study on improving accounting students’ writing skills was conducted by Mohrweis (1991). Students were assigned to write three memos. Based on a pretest/posttest analysis consisting of Graduate Management Admissions Test (GMAT) questions, the study reported writing skills improved. In addition, when compared to a control group who did not write the memos, results indicated that completing short writing assignments and receiving constructive feedback improved writing skills.

As another example, Riordan et al. (2000) incorporated a structured writing curriculum into Intermediate, Tax, and Cost Accounting courses. Professors included lectures on writing skills, students completed accounting workplace themed writing exercises and quizzes, and wrote letters and memos. Pretest and posttest analysis suggested that students’ writing skills improved significantly, and students who participated in a structured writing program improved their writing skills more than students in a control group.

Further studies have demonstrated the value of including writing components in accounting classes. For example, Ashbaugh et al. (2002) developed a writing initiative which required accounting students to complete eight assignments over a two-year period. Students researched an accounting issue and prepared memos or reports. Based on the authors’ analyses, these assignments improved writing skills. Christensen et al. (2004) analyzed writing skills using a pretest/posttest design and found that writing skills improved for accounting students after they completed a series of writing assignments over a semester, and most students confirmed that they believed that their writing skills had improved. Dehning Grimm (2015) required students to apply accounting concepts to real world situations. For example, students were required to write a whistleblower letter alleging fraud. Study results indicated that students perceived that the assignments helped them to learn accounting concepts and that assignments related to quantitative exam questions significantly improved exam scores. Craig & McKinney (2010) developed a writing program which emphasized five competencies: organization, grammar, style, professional writing, and case writing. Pretest and posttest results of students completing the assignments as well as a comparison with a control group indicated that writing skills significantly improved. Furthermore, survey results indicated that students perceived the writing program as beneficial.

Overall, previous research has indicated that including writing in the curriculum can improve students' writing skills. However, one challenge to incorporating writing assignments in the curriculum is students' self-efficacy and writing apprehension. Bandura (1977) coined the term self-efficacy and defined it as an individual's perception as to whether they were capable of performing a particular skill. Daly (1979) described an individual with high writing apprehension as one "who finds the experience of writing more punishing than rewarding and, as a consequence, avoids it". Marshall & Varnon (2009) studied writing apprehension in accounting seniors and found that students with high levels of writing apprehension did not benefit from additional writing assignments. Liu et al. (2019) opined that accounting students lack motivation to complete writing assignments partly because of writing self-efficacy, and recommended strategies to improve the writing self-efficacy of accounting students (57). Strategies included:

- Focus on smaller and more manageable writing goals.
- Establish clear grading rubrics and provide informative feedback.
- Turn failure into success by allowing repetition.
- Share success stories from accounting professionals.
- Incorporate peer samples to show improvement.
- Correct misconceptions about ability.
- Establish that success is a result of effort and strategy.
- Provide specific, properly framed, and sincere feedback.
- Acknowledge the issue of communication apprehension.
- Use peer review and non-graded or low-stake assignments.

It should be noted that the assignment in this paper was not developed with the specific goal of reducing writing apprehension. However, some of the strategies suggested above were found in this assignment, such as smaller and more manageable writing goals, clear grading rubric, and specific feedback.

Codification Research

Studies have asserted that assignments incorporating research into the FASB Codification can increase the student's perceived ability to use the Codification to solve accounting problems. Gujarathi (2012), McNellis et al. (2015), and Persellin et al. (2014) all incorporated Codification research assignments and from surveys collected, reported that students believed these exercises improved their ability to use the Codification.

McNellis (2018a and 2018b) assigned students a case that required Codification research, preparation of a preliminary outline or rough draft, and a day devoted to an in-class discussion of their findings, including the pros and cons of various possible answers. After the class discussion, students provided their final answers via a memo. According to distributed surveys, the students agreed that the assignment helped them advance their ability to use the Codification and communicate effectively. While these cases and the assignment used in this paper both included research and writing, the current paper offered an alternative approach. Instead of a comprehensive case on one major topic and incorporating classroom discussions on possible answers before the assignment was due, the current assignment focused on giving students two series of questions during the course of the semester. This approach was found to be a relatively easy way to expose students to the Codification, did not require taking up class time beyond the initial explanation, and allowed for creating research questions that were easily adapted to any accounting topic.

As mentioned earlier, in the Core Competency Framework, the AICPA promotes developing competencies of reporting and communication (AICPA, 2019b). Additional competencies that could be addressed by combining Codification research and memo writing included:

- 1) Research (under the Accounting pillar), defined as "identify, access and apply relevant professional frameworks, standards, and guidance, as well as other information for analysis and to make informed decisions,"

2) Technology and tools (under the Accounting pillar), defined as “identify and utilize relevant technology and tools to analyze data, efficiently and effectively perform assigned tasks as well as support other competencies,”

3) Customer Perspective (under the Business pillar), defined as “identify and respond to the needs of clients and customers and understand how relevant changes in the environment and marketplace have an impact on the organization.”

In sum, based on prior literature, developing communication skills and including Codification research will be likely to benefit the accounting student; therefore, students were assigned questions that would require them to research the Codification for an answer and provide their answer in a memo to a client.

THE ASSIGNMENT

Students were required to complete two memo assignments during the semester for the Intermediate Accounting III course. In order to tie the memos to the class material, each assignment related to one of the chapters covered during the semester from the Kieso, Weygandt, and Warfield (2016) textbook. In this particular class, in the first half of the semester, students learned about full disclosure, revenue recognition, and deferred taxes; in the second half, they learned about pensions, leases, and accounting changes. Students were assigned one memo from the first half of the class and one memo from the second half of the class. To keep the inflow of memos at a manageable level for grading purposes, during the first half, the students were assigned topics by thirds. In effect, one third of the class did a memo on full disclosure, one third on revenue recognition, and one third on deferred taxes. Similarly, during the second half, the students were assigned by thirds: one third did a memo on pensions, one third on leases, and one third on accounting changes.

For the first iteration of the course, questions assigned to the students were taken from the Intermediate Accounting textbook. The resources at the end of each chapter included questions entitled Codification Research Cases and Codification Exercises. The majority of the memo assignments came from or were inspired by these resources.

For future iterations, original questions were created. To develop these, an effective strategy was to start by skimming through various Codification sections until an interesting topic was found, selecting that topic as an “answer” for students to find, and using that answer, creating a question or series of questions that a client might ask. Questions were phrased as though they were coming directly from the client (i.e., use of “we”), in order to help emphasize that this was not just a research assignment but meant to be a correspondence with a real client.

To illustrate, for the chapter on deferred taxes, a section on the treatment of tax holidays was interesting. Using that information, the following client questions were assigned, from the perspective of the client:

1. Last year, we set up a new manufacturing facility in Pennsylvania. In exchange for selecting this state, the Pennsylvania Department of Revenue granted us a tax holiday for five years (i.e., we do not have to pay any state income or property taxes in Pennsylvania). This will create a material difference between our book and taxable income. Is it appropriate to create a deferred tax asset for this item?
2. What disclosures are necessary with respect to this tax holiday?

Previous research supported elements found in the current assignment. For example, Smart et al. (2012) drew from and compiled prior literature and advocated using “problem-based scenarios” to develop students’ business writing skills. The authors pointed out that traditional college writing assignments tend to focus on the students proving to the professor that they researched and learned about a topic, but this is not typical for workplace communication. Instead, the writing assignments should be short situational scenarios that introduced students to real-life situations that required a response. According to the authors, a problem-based scenario accomplished the following: 1) it will better prepare them for the workplace; 2) it prompted students to think critically about what they are writing and why; and 3) it made the need to write seem real (79).

Ashbaugh et al. (2002) provided a summary of theories on developing expertise in writing and urged using writing

assignments that are professionally relevant. Furthermore, the authors stated: “Professional writing experiences (e.g., writing a business memorandum summarizing a technical analysis) are more likely to improve students' writing skills than general writing experiences (e.g., a term paper) furthermore, these theories suggest that a close matching between educational writing experiences and professional writing can facilitate subsequent recall and application of writing skills” (125). They also stated that writing assignments need to be tailored to the specific course topics covered in each course (142).

In summary, the assignment discussed in this paper included the following: 1) incorporated research and technology; 2) included a problem that needed to be solved; 3) followed the format of a traditional form of business communication; 4) reinforced accounting knowledge; and 5) responded to the needs of a client.

Learning Objectives

The purpose of this assignment was to do the following:

1. Increase students' understanding on how to write a memo.
2. Increase familiarity with the Codification itself.
3. Increase ability to find information, summarize, and communicate it to a client.

METHODOLOGY

Introducing the Assignments

The assignment was given in three different semesters in an Intermediate Accounting III course (the class textbook was Intermediate Accounting by Kieso, Weygandt, and Warfield 16th edition and the material covers chapters 18 through 24). This was a required course for accounting majors and is taken only by accounting majors, most commonly in their senior years.

During the course of each semester, students turned in two assignments. They were given a series of questions from a hypothetical client, they researched answers from the Codification, and then they turned in their answers as though they were writing a memo to their client. These two assignments combined were approximately 7-8 percent of their course grade for the semester.

To prepare students, near the beginning of the semester each student received a handout providing an overview of the assignments. This handout was discussed during class time and took approximately 20-25 minutes.

The handout began by explaining the purpose of the assignments; mainly that the FASB has a Codification of its standards, citations of research that indicate that effective communication is important for the accounting profession, and the importance of Codification research and memo writing on the CPA exam. This was included to help make students interested in the importance of the assignment, and in improving and practicing their research and communication skills to help them in the future.

Other key inclusions in the handout were providing students with resources to review memo-writing (e.g., May & May, 2015, and Purdue Online Writing Lab (Memos), 2019), and how to log in to the Codification. Also included was a section ensuring the students knew their target audience. As supported by Catanach & Golen (1996), it was important that memos be evaluated from the perspective of the client. Students were told to assume that their audience was an accounting client (and not their accounting professor). Furthermore, the client had taken some accounting and finance classes, so basic terms did not need to be explained but beyond that, a layperson should be able to read and understand their responses without a need to contact them again to explain their answers. The client expected a direct answer to the questions with authoritative support. The purpose of these specific instructions was so that a) the students had a target audience in mind, and b) it required them to explain technical answers using familiar language.

Next, as supported by McNellis (2018a), a computer was used during class time to show students how to access and search through the Codification. A sample client question was used, and students were shown how to use the table of contents, the search engine, and the master glossary as potential starting points for doing research. A sample memo response for the question was also provided so that students could see an example of an answer written in friendly, lay-person language.

Finally, grading criteria was discussed. Holmes et al. (2019) found that providing the grading rubric ahead of time and including graded feedback is "...beneficial to student self-awareness and encourages students to significantly improve their written products" (25). This assignment included these elements so students would know what to expect and how they would be evaluated.

Overall, this took approximately 20-25 minutes of class time. The handout was not read verbatim but instead focused on the key takeaways, and students were strongly encouraged to read through the handout carefully before writing their first memos. Table 1 below provides a summary of how the handout may be used during class time. (see Table 1 in the appendix).

Certain portions of the handout may have changed or been reworded between semesters to add clarity or emphasis, but the overall message remained the same. For example, based on some responses from earlier semesters of using the assignment, the most recent iteration included increased emphasis in warning students not to include long paragraphs or descriptions of how they conducted their research, and to be careful about stopping their research too soon. The sample research question included in the handout had also been changed to a topic about which the students may be more familiar.

Grading Rubric

The instructor resources that accompanied the May & May (2012) text provided an instructor's check-sheet—a suggested list of criteria of effective writing on which students can be graded (117). This was used as a starting point but developed further for this assignment, leading to a final grading rubric that was similar but included some new items and some items being reworded or removed, resulting in a list of criteria and grade items identified by May & May as being important (see Table 2 in the appendix).

For each item listed above, students were assigned a score of either 0 (no or very little), 0.25 (not enough), 0.5 (mostly), or 0.75 (yes). The scores for each item were summed and they received a final score (out of a maximum possible score of nine points).

In addition, feedback highlighted what was good, and provided constructive criticism for various items that were lacking. While feedback was given for both memos, it was more comprehensive for their first memo to enable students to take the feedback into consideration before they did their second one later in the semester.

STUDENTS' RESPONSES TO THE ASSIGNMENT

Survey Administration

To determine how students' perceptions changed during the semester, a pretest and a posttest was given. Near the first day of the semester (and before going through the handout), students received a pretest with questions designed to gauge their preexisting experience and knowledge with respect to the Codification and memos. They also received a posttest at the end of the semester, after all memo assignments had been completed and feedback given. Except for open-ended and demographic questions, student responses were collected on a series of statements using a Likert-scale, ranging from 1 (strongly disagree) to 4 (neutral) to 7 (strongly agree).

A total of 165 responses were collected for the pretest, while 139 students completed the posttest. The data was collected across three semesters (and seven sections) of Intermediate III. With respect to demographics among those who completed the posttest, 50 were female, 75 were male, and 14 declined to answer. 29 were juniors and 97 were seniors and 13 did not indicate their academic year. The average age was 22.6 (ranged between 20 and 60, with median 21), and the average self-reported GPA was 3.51 (ranged between 2.58 and 4.0, with median 3.57).

Two questions were asked only on the pretest. The first of these questions was "Before the start of this class, I knew that Codification research was required on the CPA exam." The scores ranged from 1 to 7, with an average score of 3.22 (median 3, standard deviation 2.09). The second question was "Before the start of this class, I knew that professional writing was required on the CPA exam." Scores ranged from 1 to 7, with an average score of 4.37 (median 5, standard deviation 2.06). This seemed to indicate a wide variety of knowledge with respect to Codification and

memo writing on a CPA exam, but showed many of the respondents had at least some expectations on these items (more so on the professional writing than the Codification).

The data collected in this study was measured at the ordinal level and analyzed for the full sample (see Table 3, Panel A) and a matched sample (see Table 3, Panel B). For the full sample, the pretest and posttest were not matched by respondents; therefore, to compare the average scores on the pretest and posttest on Likert-scale responses, the parametric one-sample t-test was conducted by using the average pretest score as the population mean. For all the tests, a two-tailed test was conducted with a 95 percent confidence interval. Given the nature of the ordinal data, using the median values from the two groups found the same results for the nonparametric Sign test on the paired differences. In the matched sample design, the change in perception is tested with the same student; each student provided a pair of data values. Survey results were matched by self-reported birthdays (month and year). The sample size was reduced (n=127), but the variation between students is eliminated.

Analysis of Writing a Memo

Students were asked to respond to the question “I believe that I know how to write a high-quality business memo.” Consistent with the notion that undergraduate students lack confidence in business writing experience, the pretest score was relatively low. However, after the memo assignment, students showed an increase in confidence, as the average scores increased by 2.8. Due to the direction of the difference, it appeared that there was an improvement in student confidence related to memo writing. On a practical level, the increase was significant with an effect score of 2.9, which is considered a large effect size using Cohen’s d (Cohen 1988). Cohen’s d took the mean difference between the posttest group and the pretest group and divided it by the standard deviation from the pooled set of values from both groups. Effect sizes quantify the relative size of the difference between the pretest and posttest groups, measuring the significance of the differences. Therefore, an effect size of 2.9 would indicate that the average student's score in the posttest group is 2.9 standard deviations above the average student in the pretest group (Van Pelt, 2020).

Analysis of Awareness of the Codification

Next were two questions gauging students’ general awareness of the Codification. For the first of these, they were asked to respond to “Before the start of this class, I was aware that the FASB is developing Codification,” and on the posttest “I am aware that the FASB is developing Codification” (the first two semesters included FASB and GASB in this statement while the third only included reference to the FASB). The second question to determine awareness of the Codification was on the pretest “Before the start of this class, when I heard ‘accounting Codification,’ I knew what that meant”, and on the posttest, “When I hear about ‘accounting Codification, I know what that means.” The differences between pretests and posttests indicated that there was a significant increase in awareness of the Codification. On a practical level, these increases were significant with large effect scores of 2.5 and 2.7 (Cohen 1988).

Analysis of Practical Application: Searching the Codification and Preparing a Memo

The next question was the same on the pretest and posttest: “I know how to search through the Codification to find possible answers to an accounting question.” Students seemed to feel more comfortable in searching through the Codification by the end of the semester. On a practical level, the increase was significant with an effect score of 2.3 and the mean moved from a neutral response on the Likert scale (3-5), to an above neutral response (6-7).

Finally, students were asked on the pretest and posttest: “I know how to summarize and effectively communicate information found in the Codification.” The significant results indicated that students’ confidence in communicating information was increased. On a practical level, the increase was significant with an effect score of 2.2.

Assignment’s Perceived Value

Altogether, students’ confidence in writing memos, searching through the Codification, and summarizing their findings significantly increased during the course of the semester. A final series of questions were asked on only the posttest to determine the value of these assignments.

Two of these were asked with responses to be ranked using the Likert scale. The first question was “I believe that the activities engaged in during this course helped me in the future to be able to perform research using the Codification.” The average score was 6.2 (median 6, standard deviation 0.96). The second question was “I believe the activities engaged in during this course helped me in the future to be able to write effective business memos.” The average score was 6.17 (median 6, standard deviation 1.02).

CONCLUSION

Faced with the importance of developing effective communication skills for the accounting major, this paper outlined a relatively straightforward way to get students more familiar with Codification research and memo writing. The assignment used in this study required students—twice during the semester—to research the FASB Codification relating to material on a chapter they had studied, and to write a clear and concise memo about a specific aspect. The assignment was designed to supplement the lecture and textbook content through technical research. The memo writing assignment increased their confidence in writing a memo, familiarity with the Codification, and their perceived abilities to engage in accounting research and summarize their findings, which will be valuable skills for the CPA exam and for professional practice. The results further showed that the students believed that the activities engaged in this course helped prepare them for their futures.

Some limitations should be mentioned. First, the survey only asked students’ perceptions regarding their ability to research the Codification and write memos, which may differ from their actual skills in practice. Second, as the survey was anonymous and distributed and collected during class time, it was possible that some students may not have taken the survey seriously; given their responses adequate thought; or chosen to provide answers that they thought the professor wanted to see. Completion of the surveys was voluntary, so it was possible that there may be some self-selection biases among those who chose to take the surveys compared to those who did not. Next, as was to be expected, class attendance was greater earlier in the semester when pretests were given compared to later in the semester when the posttests were given, so it was possible there may be some results unique among those who continued to attend class regularly by the end of the semester. Finally, as discussed earlier in the paper, self-efficacy and writing apprehension may be an issue for some individuals, and this particular assignment was not developed with the specific goal of reducing writing apprehension (although some of the strategies suggested by previous research for reducing apprehension were found in the assignment, such as smaller and more manageable writing goals, clear grading rubric, and specific feedback). While this assignment did increase confidence (thereby possibly reducing writing apprehension), further research could be aimed to explore this specific topic in more depth. However, despite these potential limitations, on average, this assignment succeeded with respect to the stated learning objectives.

REFERENCES

- AICPA CPA Exam Study Materials Website. (AICPA 2019a). Retrieved from <https://www.aicpa.org/becomeacpa/cpaexam/examinationcontent.html>
- AICPA Pre-Certification Core Competency Framework Website (AICPA 2019b). Retrieved from <http://www.aicpa.org/interestareas/accountingeducation/resources/pages/corecompetency.aspx>
- Albrecht, E.S., & Sack, R.J. (2000). *Accounting education: Charting the course through a perilous future*. Sarasota, FL: American Accounting Association.
- Ashbaugh, H., Johnstone, K.M., & Warfield, T.D. (2002). Outcome assessment of a writing-skill improvement initiative: results and methodological implications. *Issues in Accounting Education*, 17(2), May, 123-148.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84(2), 191-215.
- Blanthorne, C., Bhamornsiri, S., & Guinn, R.E. (2005). Are technical skills still important? *CPA Journal*, 75(3), 64-65.
- Boyle, D.M., Mahoney, D.P., Carpenter, B.W., & Grambo, R.J. (2014). The importance of communication skills at different career levels. *The CPA Journal*, August, 40-45.
- Bui, B., & Porter, B. (2010). The expectation-performance gap in accounting education: An exploratory study. *Accounting Education: an international journal*, 19(1-2), February-April, 23-50.
- Camacho, L. (2015). The communication skills accounting firms desire in new hires. *Journal of Business & Finance Librarianship* 20, 318-329.
- Catanach, A.H., & S. Golen. (1996). A user-oriented focus to evaluating accountants' writing skills. *Business Communication Quarterly*, 59(4), 111-121.
- Christensen, D., Barnes, J., & Rees, D. (2004). Improving the writingskills of accounting students: An experiment. *Journal of College Teaching & Learning*, 1(1), 45-52.
- Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences (2e)*, Hillsdale, NJ: Lawrence Erlbaum.
- Craig, R., & McKinney, C.N. (2010). A successful competency-based writing skills development programme: Results of an experiment. *Accounting Education*, 19(3), 257-278.
- Daly, J. (1979). Writing apprehension in the classroom: Teacher role expectancies of the apprehensive writer. *Research in the Teaching of English*, 13(1), 37-44.
- Dehning, G.S. (2015). Learning logs: Incorporating writing-to-learn assignments into accounting courses. *Issues in Accounting Education*, 30(2), 79-104.
- Gujarathi, M.R. (2012). Super Electronics, Inc.: Financial reporting of sales incentives and vendor allowances using FASB Codification. *Issues in Accounting Education*, 27(2), 461-474.
- Holmes, A.F., Zhang, S., & Harris, B. (2019). An analysis of teaching strategies designed to improve written communication skills. *Accounting Education*, 28(1), 25-48.
- Jones, C.G. (2011). Written and computer-mediated accounting communication skills: an employer perspective. *Business Communication Quarterly*, 74(3), 247-271.

- Kavanagh, M.H., & Drennan, L. (2008). What skills and attributes does an accounting graduate need? Evidence from student perceptions and employer expectations. *Accounting & Finance*, 48(2), 279-300.
- Kieso, D.E., Weygandt, J.J., & Warfield, T.D. (2016). *Intermediate accounting*, 16th edition. John Wiley & Sons, Inc.: Hoboken, New Jersey.
- Lin, P., Grace, D., Krishnan, S., & Gilsdorf, J. (2010). Failure to communicate: Why accounting students don't measure up to professionals' expectations. *The CPA Journal*, January, 63-65.
- Liu, Y., Xu, H., & Krahel, J.P. (2019). Improving the writing self-efficacy of accounting students. *The Accounting Educators' Journal* Vol. XXIX, 41-59.
- Marshall, L.L., & Varnon, A.W. (2009). Writing apprehension among accounting seniors. *The Accounting Educators' Journal* Vol. XIX, 45-65.
- May, C.B., & May, G.S. (2012). *Effective writing: A handbook for accountants*, 9th edition Instructor's Manual. Prentice Hall: New Jersey.
- May, C.B., & May, G.S. (2015). *Effective writing: A handbook for accountants*, 10th edition. Prentice Hall: New Jersey.
- McLeod, S.H., & Soven, M. (1992). *Writing across the curriculum: A guide to developing programs*. Sage Publications: Newbury Park, CA. <https://wac.colostate.edu/books/landmarks/mcleod-soven/> .
- McNellis, C.J., Premuroso, R.F., & Houmes, R.E. (2015). Using the Codification to research a complex accounting issue: The case of goodwill impairment at Jackson Enterprises. *Issues in Accounting Education*, 30(1), 35-46.
- McNellis, C.J. (2018a). Dynamic Divestitures: A Codification exercise on the reporting of discontinued operations. *Issues in Accounting Education*, 33(1), 53-63.
- McNellis, C.J. (2018b). Middle Road Media: A Codification research case on the accounting for software development activities. *Issues in Accounting Education*, 33(3), 135-144.
- Mohrweis, L.C. (1991). The impact of writing assignments on accounting students' writing skills. *Journal of Accounting Education*, 9(2), 309-325.
- NASBA. (2011). AICPA, NASBA, and Prometric Announce Successful Launch of New Uniform CPA Examination. <https://nasba.org/blog/2011/01/05/010511-aicpa-nasba-and-prometric-announce-successful-launch-of-new-uniform-cpa-examination/> .
- Persellin, J.S., Shaub, M.K., & Wilkins, M.S. (2014). Arachnophobia: A case on impairment and accounting ethics. *Issues in Accounting Education*, 29(4), 577-586.
- Purdue Online Writing Lab Memos. (2019). https://owl.purdue.edu/owl/subject_specific_writing/professional_technical_writing/memos/index.html
- Riley, T.J. & Simons, K.A. (2013). Writing in the accounting curriculum: A review of the literature with conclusions for implementation and future research. *Issues in Accounting Education*, 28(4), 823-871.
- Riley, T.J. & Simons, K.A. (2016). The written communication skills that matter most for accountants. *Accounting Education*, 25(3), 239-255.
- Riordan, D.A., Riordan, M.P., & Sullivan, M.C. (2000). Writing across the accounting curriculum: An experiment. *Business Communication Quarterly*, 63(3), 49-59.

- Sharifi, M, McCombs, G.B., Fraser, L.L., & McCabe, R.K. (2009). Structuring a competency-based accounting communication course at the graduate level. *Business Communication Quarterly*, 72(2), 177-199.
- Smart, K.L., Hicks, N., & Melton, J. (2012). Using problem-based scenarios to teach writing. *Business Communication Quarterly*, 76(1), 72-81.
- Van, P.V. (2020). Effect sizes don't matter in experiments. Or do they?
<https://www.accountingexperiments.com/post/effect-size/>

TABLE 1
OVERVIEW OF HANDOUT

Suggested number of minutes	Section	Key Takeaways
4	Introduction	<ul style="list-style-type: none"> • FASB has Codification. • Codification research is on the CPA exam. • Effective communication is important. • Writing a memo or letter is on the CPA exam.
2	Memo Resources	<ul style="list-style-type: none"> • Where to look to review how to write a memo.
2	Codification Resources	<ul style="list-style-type: none"> • How to log in to the Codification.
2	Target Audience	<ul style="list-style-type: none"> • Target is an accounting client. • Clarify what they should be providing in their answers.
4	Preparing Your Answers / List of Mistakes	<ul style="list-style-type: none"> • Things to do and not do when writing the memo. • Pick one or two items to read through during class; students should read through the list on their own.
5	Example	<ul style="list-style-type: none"> • Show students how to use the Codification to find answers to a sample client question.
5	Grading Rubric	<ul style="list-style-type: none"> • Students know ahead of time what to expect when it comes to being evaluated.

TABLE 2
GRADING RUBRIC

Main Criteria	Grade Item
Accounting Content	<ul style="list-style-type: none"> • Accounting issues identified and addressed? • Conclusions supported by the information provided? • Informative? • Written appropriately for the reader (i.e., explained higher level items and/or did not waste time defining things the reader would know)?
Clear and Readable Style	<ul style="list-style-type: none"> • Did you answer all of the client's questions satisfactorily? • Sentences constructed so they are clear and easy to read? • Concise yet understandable? • All information included has a clear purpose/no unnecessary filler or fluff?
Coherent Organization	<ul style="list-style-type: none"> • Purpose of memo clearly stated, including main ideas/conclusions summarized near the beginning of the document? • Paragraphs well organized: begin with topic sentences, 4 or 5 sentences maximum, develop one idea? • Transitions where necessary to preserve logical flow of thought? • Grammatical and mechanical errors do not distract the reader?

Note: The instructor resources that accompanied the May & May (2012) text provided an instructor's check-sheet—a suggested list of criteria of effective writing on which students can be graded (117). This was used as a starting point but developed further for this assignment, leading to a final grading rubric that was similar but included some new items and some items being reworded or removed. The final rubric was a list of criteria and grade items identified by May & May as being important.

TABLE 3

PRETEST AND POSTTEST SCALE ITEMSON STUDENT UNDERSTANDING AND APPLICATION
 Panel A: Full sample (pretest n=165, posttest n = 139).

Survey Question (scale items measured on a seven point scale, 1 = strongly disagree, 4 = neutral, 7 = strongly agree).	Mean	Standard Deviation	p-value (two-tailed)
Pretest: I believe that I know how to write a quality business memo.	2.93	1.61	
Posttest: I believe that I know how to write a quality business memo.	5.73	0.95	< 0.001
Pretest: Before the start of this class, I was aware that the FASB is developing Codification.	4.34	2.09	
Posttest: I am aware that the FASB is developing Codification.	6.50	0.84	< 0.001
Pretest: Before the start of this class, when I heard 'accounting Codification,' I knew what that meant.	4.08	1.99	
When I hear about 'accounting Codification', I know what that means.	6.55	0.90	< 0.001
Pretest: I know how to search through the Codification to find possible answers to an accounting question.	3.43	1.92	
Posttest: I know how to search through the Codification to find possible answers to an accounting question.	5.96	1.09	< 0.001
Pretest: I know how to summarize and effectively communicate information found in the Codification.	3.18	1.63	
Posttest: I know how to summarize and effectively communicate information found in the Codification.	5.78	1.15	< 0.001

Panel B: Matched sample (pretest and posttest n = 127).

Survey Question (scale items measured on a seven-point scale, 1 = strongly disagree, 4 = neutral, 7 = strongly agree).	Mean	Standard Deviation	p-value (two-tailed)
Pretest: I believe that I know how to write a quality business memo.	2.94	1.64	
Posttest: I believe that I know how to write a quality business memo.	5.74	0.93	< 0.001
Pretest: Before the start of this class, I was aware that the FASB is developing Codification.	4.33	2.07	
Posttest: I am aware that the FASB is developing Codification.	6.55	0.79	< 0.001
Pretest: Before the start of this class, when I heard 'accounting Codification,' I knew what that meant.	3.98	1.99	
When I hear about 'accounting Codification', I know what that means.	6.55	0.92	< 0.001
Pretest: I know how to search through the Codification to find possible answers to an accounting question.	3.30	1.96	
Posttest: I know how to search through the Codification to find possible answers to an accounting question.	6.00	1.08	< 0.001
Pretest: I know how to summarize and effectively communicate information found in the Codification.	3.06	1.66	
Posttest: I know how to summarize and effectively communicate information found in the Codification.	5.79	1.13	< 0.001

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THE EFFECT OF COVID-19 ANNOUNCEMENT ON THE US STOCK MARKET

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ABSTRACT

World Health Organization formally announced on 31 December 2019, that an unknown virus found in Wuhan City in China. On 20 January 2020, 282 confirmed cases of COVID-19 and 6 deaths reported from four countries, including China, Thailand, Japan and the Republic of Korea (WHO, 2020). On February 25, 2020, the Centers for Disease Control (CDC) announced COVID-19 heading to be pandemic. On the 11th of March 2020, officially, WHO declared that COVID 19 characterized as pandemic disease.

The COVID 19 outbreak on global stock markets was staggering. In this study, the event study method is used to examine the impact of the COVID 19 out-break on US stock markets, specifically comparing the postdate volatility following three key dates: 1) February 25, 2020 CDC's announcement 2) 11th March 2020 World Health Organization's announcement and 3) March 13, 2020 Trump/ White House's announcement. There have been other papers studying US market volatility following COVID-19 announcement dates but this paper will uniquely try to gauge and compare how investors and US markets reacted differently following the three announcements, our study will shade light on the investors behavior or reaction to each announcement and which announcement have greater impact on the US stock market. We use DOW Jones, NASDAQ, and S&P 500 indices to investigate the US stock market. Our result indicates that all the three announcements have no immediate negative impact on all three major indices. However, the Trump/Whitehouse and CDC's announcements have longer term (three day to thirty days) seems to have a significant and negative impact in almost all three indices compared to CRSP equally weighted market stock returns. While, CDC's announcement has only short term small negative effect on the S&P 500 and DOW Jones stock returns compared to CRSP equally weighted market returns. It could also be other variables such as the COVID 19 number of cases or deaths that may have impacted the stock returns in the long term.

INTRODUCTION

World Health Organization formally announced on 31stDecember, 2019 that an unknown virus has been found in Wuhan City in China. On 20th January 2020, 282 confirmed cases of COVID-19 and six deaths had been reported from four countries, including China, Thailand, Japan and the Republic of Korea (WHO, 2020). On the 11th of March, 2020, officially, WHO declared that COVID 19 can be characterized as pandemic disease. It had affected more than 100,000 people in over 100 countries killing thousands. From March, the outbreak began to appear widely outside China; as of the June 30th, 2020, the number of COVID-19 cases worldwide was 10,417,063 and the number of deaths was 509,474. The most affected countries were USA, Brazil, Russia, India, and UK amongst others. President Donald Trump declared COVID-19 as a national emergency on March 13th, 2020.

The COVID 19 outbreak on global markets was staggering. International stock markets suffered historic losses, especially in the first 3 months of the year, due to COVID 19 outbreak. The Dow Jones index and London's FTSE 100 saw their biggest quarterly drops since 1987, plunging 23% and 25% respectively. The S&P 500 lost 20% during the same period, its worst since 2008.

In this study, the event study method is used to examine the impact of the COVID 19 break on US stock markets, specifically comparing the postdate volatility following three key dates: 1)25th February 2020 2) 11th March 2020 and 3) March 13th, 2020 announcements made by Center for Disis Prevention and Control (CDC), World Health Organization (WHO) and Trump/Whitehouse respectively. There have been other papers studying US market volatility following COVID-19 announcement dates. But this paper will uniquely try to gauge and compare how investors and US markets reacted differently following the March announcements vs the WHO declaration on Dec 31st, to show if there was a delayed lag in changes investment behavior. We expect to find a stronger market volatility response to the days following Trump's declaration vs the previous two dates.

LITERATURE REVIEW

The effect of COVID19 on the economy felt across the country and or in the world. COVID 19 effect on the US stock market was also tremendous on March 2020 the Dow Jones index fell sharply to 19,173 from its peak of 29,500 in mid-February 2020 (that is 35% decline). Many literatures try to find the impact of COVID 19 on the stock market Baker et al (2020) use text-based methods to develop infectious diseases outbreak impact on the stock market from now back to 1900. The US stock market reacted so much more forcefully to COVID-19 than to previous pandemics in 1919-1919, 1957 – 1958, and 1968. They explained the findings that government restrictions on commercial activity and voluntary social distancing, operating with powerful effects in a service-oriented economy as a main reason.

Yousfi et al (2021) make a comparative assessment of the impacts of the first and second waves of the ongoing COVID-19 pandemic for the US stock market and its uncertainty. They investigate dynamic conditional correlation and the asymmetric impacts of shocks on the correlation between the US (S& P 500) and Chinese (CSI 300) stock markets before and during the COVID-19 crisis. Using data from January 5, 2011, to September 21, 2020. They find that the dynamic conditional correlations support the presence of contagion effects, especially during the rapid spread of COVID-19 in the US. The volatility spillover between the Chinese and US markets was higher during the COVID-19 pandemic than before it. The results of the news impact correlations show that the shocks in both markets have asymmetric impacts on the relationship between the US and China stock markets during our sample period, including during the COVID-19 pandemic. They confirmed empirically using the wavelet coherence methodology and showed that the continued increase in COVID-19 infections and deaths during the first and second waves increased the uncertainty of the US stock market.

Ambros et al. (2021) examined the impact of changes in the number of COVID-19 news on eight different stocks markets during the initial two months of coronavirus crisis 2020. Using 30-minute tick returns for Stock market data are obtained from Refinitiv and include nine stock market indices: FTSE MIB (Italy), DAX, FTSE, EURO STOXX, S&P 500, Dow Jones (DJ), Hang Seng, Shanghai Stock Exchange, and MSCI World. They find that COVID-19 related news impacts stock market volatility positively in Europe, but less so in other markets. Thus, changes for number of COVID-19 news can partly explain the unprecedented market volatility in February/ March 2020. The first months of the COVID-19 outbreak showed a significant impact on both financial markets and real economic activity. However, the data suggest that there is no significant impact of changes in COVID-19 news on stock market returns.

Zhang and Hamori (2021) analyzed the return and volatility spillover between the COVID-19 pandemic in 2020, the crude oil market, and the stock market by employing two empirical methods for connectedness: the time-domain approach and the method based on frequency dynamics. Using daily data of the Infectious Disease Equity Market Volatility Tracker (IDEMVT), Crude Oil WTI Futures (WTI), S&P 500 Index (SP500), TOPIX Index (TOPIX) and DAX index (DAX) from 4 January 2006 to 31 August 2020 for US, Japan, and Germany. They find that the return spillover mainly occurs in the short term; however, the volatility spillover mainly occurs in the long term. From the moving window analysis results, the impact of COVID-19 created an unprecedented level of risk, such as plummeting oil prices and triggering the US stock market circuit breaker four times, which caused investors to suffer heavy losses in a short period. In addition, they find the impact of COVID-19 on the volatility of the oil and stock markets exceeds that caused by the 2008 global financial crisis and continues to have an effect. The impact of the COVID-19 pandemic on financial markets is uncertain in both the short and long terms.

The US stock market show significant volatility due to COVID-19 (Beak et. al. 2020). Beak, Mohanty and Glambosky explore US stock market response to daily reporting on COVID-19, daily US stock values, macro-economic indicators and daily number of COVI-19 cases from 2nd of January 2020 until 30th April 2020. The number of confirmed cases, deaths and recoveries are collected from Johan Hopkins Coronavirus Resource Center. Daily economic variables are obtained from the FRED database. Utilizing machine learning feature selection methods and economic indicator, their results show significant increase in total risk for the US stock market. Their examination of 30 industries shows increases in total and idiosyncratic risk for all industries. Notably, significant increases in systemic risk for defensive industries, such as telecom and utilities, but decreases in systemic risk for aggressive industries, such as automobiles and business equipment.

A study by Louhichi (2021) aim to analyze the effect of COVID-19 on the economic environment in the main cluster countries: China, France, Italy, and the US. Data economic indicators are based on the following series: the closed prices ($p^{stock}_{k,t}$) stock market index for market (k) at time (t). Therefore, they collect the SSE50, the CAC40, the FTSEMIB, and S&P500 for the Chinese, French, Italian, and American stock markets, respectively. The investor fear sentiment is assessed in their analysis through the implicit volatility measure. More specifically, they collected the VCAC40, CHIX, IVI, and VIX to measure the implicit volatility for the French, Chinese, Italian, and American stock markets, respectively. Based on daily data ranged from December 2019 to July 2020, they measure the dependence between the pandemic evolution and the main economic indicators: financial markets performance, investor fear sentiment, and the currency markets. Their results show that the impact of the pandemic's evolution on the main economic indicators exhibit a different pattern in China than in France, Italy, and the USA. For China, their results show that the pandemic evolution co-moves with the main economic indicators only in the short term (one week). However, for the other countries, the effect is more persistent. Second, they show that the main economic indicators are more sensitive to pandemic evolution when it is assessed by the number of deaths rather than the number of cases. Third, they show that currency and financial markets are affected by the pandemic evolution in different timescales.

Izzeldin et al. (2021) investigated the impact of Covid-19 on stock markets across G7 countries and their business sectors. They highlight the synchronicity and severity of this unprecedented crisis. They used data that comprises daily prices of the aggregate and sector equity indices for the G7 economies (Canada, France, Germany, Italy, Japan, UK and US). All indices are value-weighted and exclude dividends. The data source is Datastream and cover the period from 24/4/2018–24/4/2020. Using a novel smooth transition heterogenous autoregressive model (ST-HAR) to identify transition between regimes. Their results show a non-linear transition to a crisis regime for all countries and sectors. Their findings are that the Healthcare and Consumer Services sectors were the most severely affected, with Telecommunications and Technology the least. Financial markets in the UK and the US took the largest hits, yet with high response heterogeneity across business sectors.

Baig et. al (2021) investigates the impact of COVID-19 pandemic on the microstructure of US equity market. They collected stock market information for the S&P 500 constituent stocks is obtained from Thomson Reuters Datastream. Their data is a firm-day panel that consists of all the constituent stocks of the S&P 500 index for the period January 13th, 2020 to April 17th, 2020. Their results suggest that increases in confirmed cases and deaths due to coronavirus are associated with a significant deterioration of market liquidity and stability. Similarly, public fear and the implementation of restrictions and lockdowns seem to contribute to the illiquidity and instability of the markets.

Event Study: An event study is a statistical method of an empirical investigation of the relationship between security prices and economic events (Dyckman et al., 1984). Most event studies have focused on the behavior of share prices in order to test whether their stochastic behavior is affected by the disclosure of firm-specific events. Furthermore, “in a corporate context, the usefulness of event studies arises from the fact that the magnitude of abnormal performance at the time of an event provides a measure of the unanticipated impact of this type of event on the wealth of the firms’ claimholders” (Kothari and Warner 2006).

EMPIRICAL MODEL

Methodology:

This study employs a standard event study methodology, using Eventus from WRDS and we fit a standard market model to measure normal performance:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it}, \quad \text{where } E(\varepsilon_{it}) = 0 \text{ and } \text{var}(\varepsilon_{it}) = \sigma_{\varepsilon_i}^2$$

1

Each sample calendar date is converted to event time by defining the date of the NRRS announcement date (and the implementation date) as event date 0. So, for the announcement date, event date 0 is the same trading day. The

regression coefficients α_i and β_i are estimated in an ordinary least squares (OLS) regression during the estimation period one year (255 trading days) prior to the event period (event days -300 through -46). The event period consists of 61 trading days centered on NRRS announcement date (-30 through +30). We define four event windows based

on the event date, [-30,-2], [-1, 0], [+1, +2] and [+3, +30]. As proxy for the return for the market portfolio R_{mt} , both the CRSP value weighted index and the CRSP equal weighted index are used.

Under standard assumptions, OLS is a consistent estimation procedure for the market model parameters. Under the

assumption that asset returns are jointly multivariate normal and independently and identically distributed (iid), OLS is also efficient. The prediction errors, PE_{it} , which represent abnormal returns, are simply the OLS residuals, $\hat{\varepsilon}_{it}$.
 $PE_{it} \equiv \hat{\varepsilon}_{it} = R_{it} - (\hat{\alpha}_i + \hat{\beta}_i R_{mt})$

with

$$\hat{\sigma}_{\varepsilon t}^2 = \frac{1}{255 - 2} \sum_{\tau=t-299}^{t-46} (R_{it\tau} - \hat{\alpha}_i - \hat{\beta}_i R_{m\tau})^2 \quad (3)$$

The prediction error, PE_{it} is used as an estimator of the abnormal return. In other words, the abnormal return is the residual term of the market model calculated on an out of sample basis. Let $AR_{it\tau}, \tau = t - 30, t - 29, \dots, t + 29, t + 30$ be the sample of 61 abnormal returns for firm i in the event window. Under the null hypothesis, conditional on the event window market returns, the abnormal returns will be jointly normally distributed with a zero conditional mean and conditional variance:

$$AR_{it\tau} \square N(0, \sigma^2(AR_{it\tau}))$$

The conditional variance $\sigma^2(AR_{it\tau})$ has two components. The first component is the disturbance $\hat{\sigma}_{\varepsilon t}^2$ from (3), and the second component is additional variance due to sampling error in estimating the market model parameters α_i and β_i .

$$\sigma^2(AR_{it\tau}) = \sigma_{\varepsilon\tau}^2 + \frac{1}{255} \left[1 + \frac{(R_{m\tau} - \bar{R}_m)^2}{\hat{\sigma}_m^2} \right] \text{ where } \bar{R}_m = \frac{1}{255} \sum_{\tau=t-299}^{t-46} R_{m\tau} \quad (5)$$

Since the estimation window is large (255 trading days), I assume that the contribution of the second component to $\sigma^2(AR_{it\tau})$ is zero.

To draw inferences about the average price impact of an event, abnormal return observations have to be aggregated across securities and through time. Average abnormal returns $AAR_{it\tau}$ are formed by aggregating abnormal returns $AR_{it\tau}$ for each event period $\tau = t - 30, t - 29, \dots, t + 29, t + 30$. Given N events (for our sample, $N = 147$),

$$AAR_{it\tau} = \frac{1}{N} \sum_{i=1}^N AR_{it\tau} \quad (6)$$

Under the assumption that average abnormal returns are independent across securities, the asymptotic variance equals to

$$Var(AAR_{it\tau}) = \frac{1}{N^2} \sum_{i=1}^N \sigma_{\varepsilon\tau}^2 \quad (7)$$

The average abnormal returns are aggregated through time to give the cumulative average abnormal return,

$$CAAR_i(\tau_1, \tau_2) = \sum_{\tau=\tau_1}^{\tau_2} AAR_{it\tau} \quad (8)$$

Setting the covariance terms to be zero,

$$var(CAAR_i(\tau_1, \tau_2)) = \sum_{i=1}^N var(AAR_{it\tau}) \quad (9)$$

$$\text{Hence } CAAR_i(\tau_1, \tau_2) \square N(0, var(CAAR_i(\tau_1, \tau_2))) \quad (10)$$

This can be used to test the null hypothesis that the abnormal returns are zero.

The estimated variance of $AAR_{it\tau}$ is

$$\hat{\sigma}_{AAR}^2 = \frac{\sum_{\tau=t-299}^{t-46} (AAR_{it\tau} - \overline{AAR})^2}{255 - 2} \text{ where } \overline{AAR} = \frac{\sum_{\tau=t-299}^{t-46} AAR_{it\tau}}{255} \quad (11)$$

The portfolio test statistic for day τ in event time is

$$t = \frac{AAR_{\tau}}{\hat{\sigma}_{AAR}^2} \quad (12)$$

Assuming time series independence, the test statistic for $CAAR_i(\tau_1, \tau_2)$ is

$$t = \frac{CAAR_i(\tau_1, \tau_2)}{\sqrt{(\tau_2 - \tau_1 + 1)\hat{\sigma}_{AAR}}} \quad (13)$$

The abnormal return estimators often have different variances across firms. A common way of addressing this problem is the standardized residual method (Patell, 1976). Define the *standardized abnormal return*, SAR_{it} as

$$SAR_{it} = \frac{AR_{it}}{\hat{\sigma}_{MLE_{it}}} \quad (14)$$

Where

$$\hat{\sigma}_{MLE_{it}} = \hat{\sigma}_{\varepsilon\tau}^2 \left(1 + \frac{1}{T} + \frac{(R_{m\tau} - \bar{R}_m)^2}{\sum_{\tau=t-299}^{t-46} (R_{m\tau} - \bar{R}_m)^2} \right) \quad (15)$$

Is the maximum likelihood estimate of the variance. Under the null hypothesis each SAR_{it} follows a student's t distribution with T-2 degrees of freedom. Summing the SAR_{it} across the sample yields

$$ASAR_{it} = \sum_{i=1}^N SAR_{it} \text{ where } ASAR_{it} \sim N(0, Q_{\tau}) \quad (16)$$

The Z-test statistic for the null hypothesis that $CAAR_i(\tau_1, \tau_2) = 0$ is

$$Z(\tau_1, \tau_2) = \frac{1}{\sqrt{N}} \sum_{i=1}^N Z_i(\tau_1, \tau_2) \text{ where } Z_i(\tau_1, \tau_2) = \frac{1}{\sqrt{(\tau_2 - \tau_1 + 1)\frac{T-2}{T-4}}} \sum_{\tau=\tau_1}^{\tau_2} SAR_{it} \quad (17)$$

The two test statistics so far discussed use the variance estimate from the market model during the estimation period to estimate the variance of the abnormal return estimator. But frequently, events increase the variance of returns, so that the event period variance is greater than the estimation period variance. The portfolio test statistic for day t in event time is

$$t = \frac{AAR_{\tau}}{\hat{\sigma}_{AAR_{\tau}} / \sqrt{N}} \text{ where } \hat{\sigma}_{AAR_{\tau}} = \frac{1}{N-1} \sum_{i=1}^N (AR_{it} - \frac{1}{N} \sum_{i=1}^N AR_{it})^2 \quad (18)$$

We use the above equation to calculate *Adjusted-t*

RESULTS

We used event study method to analyses the effect of COVID 19 announcement on the US three major stock indexes namely S&P 500, Dow Jones, and NASDAQ. We used three announcement dates of COVID 19. The first one, is February 25, 2020 announcements made by Center for Disease Control and Prevention (CDC) announced COVID19 heading to be pandemic, the second one is March 11, 2020 World Health Organization (WHO) declares COVID19 is pandemic, and the third date is March 13, 2020 when President Trump/ the Whitehouse announced COVID 19 as a National Emergency. The results of Event study are shown in Tables 1, Table 2 and Table 3 for S&P 500, NASDAQ, and DOW Jones respectively.

Table 1 (S&P 500) in the first panel presents the result of February 25th announcements of CDC that COVID 19 is heading to be pandemic. The mean Cumulative Abnormal Return (CAR) of the first window for the announcement date, thirty days before the announcement to two days before the announcement (-30, -2), is 0.78% and not statistically

significant. Result of the second window, one day before the announcement and the day of the announcement (-1, 0) was a mean CAR of -1.24%, which is highly statistically significant. This suggests that investors began factoring in COVID19 in their decision making. The mean CAR for the third window, one day after the announcement to two days after the announcement (+1, +2), is -1.05%, also highly statistically significant, indicating the announcement after it happened has a significant impact on the S&P stock returns. Finally, for fourth window of the announcement date model, three days after the announcement up to thirty days after (+3, +30), the mean CAR, was 4.15% and is statistically significant at less than one percent level of significance. Implying the announcement do not have a long-lasting negative impact of the stock returns.

Table 1 second panel presents the announcement of March 11th WHO's announcement of COVID 19 is a pandemic. The mean Compound Abnormal Return (CAR) of the first window for the announcement date, thirty days before the announcement to two days before the announcement (-30, -2), is -1.08% and statistically significant. Result of the second window, one day before the announcement and the day of the announcement (-1, 0) was a mean CAR of positive 1.90%, which is highly statistically significant. This suggests that investors are not concerned about COVID19 in their decision-making process. The mean CAR for the third window, one day after the announcement to two days after the announcement (+1, +2), is 2.38%, also highly statistically significant, indicating the announcement after it happened has no negative impact on the S&P stock returns in the short term. Finally, for fourth window of the announcement date model, three days after the announcement up to thirty days after (+3, +30), the mean CAR, was -3.88% and is highly statistically significant. Implying the announcement do have a long-lasting negative impact on S&P 500 stock returns, but not in the short term.

Table 1 third panel presents President Trump's announcement of March 13th as COVID 19 is National Emergency. The mean Compound Abnormal Return (CAR) of the first window for the announcement date, thirty days before the announcement to two days before the announcement (-30, -2), is 0.88% and not statistically significant. Result of the second window, one day before the announcement and the day of the announcement (-1, 0) was a mean CAR of 2.50%, which is highly statistically significant. This suggests that investors are not concerned about COVID19 in their decision-making process. The mean CAR for the third window, one day after the announcement to two days after the announcement (+1, +2), is -0.49%, and not statistically significant, indicating the announcement after it happened has no significant negative impact on the S&P stock returns. Finally, for fourth window of the announcement date model, three days after the announcement up to thirty days after (+3, +30), the mean CAR, was -3.60% and is highly statistically significant. Implying the announcement has a significant long lasting negative effect on the S&P 500 stock returns.

Table 2 (NASDAQ) in the first panel presents the result of February 25th announcements of CDC that COVID 19 is heading to pandemic. The mean Cumulative Abnormal Return (CAR) of the first window for the announcement date, thirty days before the announcement to two days before the announcement (-30, -2), is 2.12% and not statistically significant. Result of the second window, one day before the announcement and the day of the announcement (-1, 0) was a mean CAR of 0.27%, which is statistically significant at less than five percent significance. This suggests that investors are not factoring in COVID19 in their decision making. The mean CAR for the third window, one day after the announcement to two days after the announcement (+1, +2), is 0.96%, also statistically significant at less than ten percent level of significance, indicating the announcement after it happened has no negative effect impact on the NASDAQ stock returns. Finally, for fourth window of the announcement date model, three days after the announcement up to thirty days after (+3, +30), the mean CAR, was 17.24% and is statistically significant at less than one percent level of significance. Implying the announcement do not have a long-lasting negative impact on NASDAQ stock returns.

Table 2 second panel presents the announcement of March 11th WHO's announcement of COVID 19 is a pandemic. The mean Compound Abnormal Return (CAR) of the first window for the announcement date, thirty days before the announcement to two days before the announcement (-30, -2), is 10.28% and highly statistically significant. Result of the second window, one day before the announcement and the day of the announcement (-1, 0) was a mean CAR of positive 2.78%, which is highly statistically significant. This suggests that investors are not concerned about COVID19 in their decision-making process. The mean CAR for the third window, one day after the announcement to two days after the announcement (+1, +2), is 4.11%, also highly statistically significant, indicating the announcement after it happened has no negative impact on the NASDAQ stock returns in the short term. Finally, for fourth window of the announcement date model, three days after the announcement up to thirty days after (+3, +30), the mean CAR, was 0.95% and is highly statistically significant. Implying the announcement do not have a either short term or long term

negative impact on NASDAQ stock returns.

Table 2 third panel presents President Trump's announcement of March 13th as COVID 19 is National Emergency. The mean Compound Abnormal Return (CAR) of the first window for the announcement date, thirty days before the announcement to two days before the announcement (-30, -2), is 13.16% and highly statistically significant. Result of the second window, one day before the announcement and the day of the announcement (-1, 0) was a mean CAR of 4.24%, which is highly statistically significant. This suggests that investors are not concerned about COVID19 in their decision-making process. The mean CAR for the third window, one day after the announcement to two days after the announcement (+1, +2), is 3.66%, and highly statistically significant, indicating the announcement after it happened has no negative impact on the NASDAQ stock returns. Finally, for fourth window of the announcement date model, three days after the announcement up to thirty days after (+3, +30), the mean CAR, was -4.97% and is highly statistically significant. Implying the announcement, Trump declaring COVID 19 National Emergency, has a significant long lasting negative effect on the NASDAQ stock returns, while WHO and CDC's announcements do not have any negative impact on NASDAQ returns.

Table 3 (DOW Jones) in the first panel presents the result of February 25th announcements of CDC that COVID 19 is heading to pandemic. The mean Cumulative Abnormal Return (CAR) of the first window for the announcement date, thirty days before the announcement to two days before the announcement (-30, -2), is -1.06% and statistically significant at less than five percent level of significance. Result of the second window, one day before the announcement and the day of the announcement (-1, 0) was a mean CAR of -1.45%, which is highly statistically significant. This suggests that investors are factoring in COVID19 in their decision making, were concerned about CDC's COVID 19 announcement. The mean CAR for the third window, one day after the announcement to two days after the announcement (+1, +2), is -1.39%, highly statistically significant, the loss extends beyond the announcement date. Finally, for fourth window of the announcement date model, three days after the announcement up to thirty days after (+3, +30), the mean CAR, was 10.69% and is statistically significant at less than one percent level of significance. Implying the announcement do not have a long-lasting negative impact on DOW Jones stock returns.

Table 3 second panel presents the announcement of March 11th WHO's announcement of COVID 19 is a pandemic. The mean Compound Abnormal Return (CAR) of the first window for the announcement date, thirty days before the announcement to two days before the announcement (-30, -2), is -0.41% and not statistically significant. Result of the second window, one day before the announcement and the day of the announcement (-1, 0) was a mean CAR of positive 1.80%, which is highly statistically significant. This suggests that investors are not concerned about COVID19 in their decision-making process. The mean CAR for the third window, one day after the announcement to two days after the announcement (+1, +2), is 3.89%, also highly statistically significant, indicating the announcement after it happened has no negative impact on the DOW Jones stock returns in the short term. Finally, for fourth window of the announcement date model, three days after the announcement up to thirty days after (+3, +30), the mean CAR, was -3.34% and is not statistically significant. Implying the announcement do not have a either short term or long term negative impact on DOW Jones stock returns.

Table 3 third panel presents President Trump's announcement of March 13th as COVID 19 is National Emergency. The mean Compound Abnormal Return (CAR) of the first window for the announcement date, thirty days before the announcement to two days before the announcement (-30, -2), is 1.60% and highly statistically significant. Result of the second window, one day before the announcement and the day of the announcement (-1, 0) was a mean CAR of 4.00%, which is highly statistically significant. This suggests that investors are not concerned about COVID19 in their investment decision making process i.e., COVID is not a threat to the financial market. The mean CAR for the third window, one day after the announcement to two days after the announcement (+1, +2), is 0.41%, and not statistically significant, indicating no negative impact on the DOW Jones stock returns. Finally, for fourth window of the announcement date model, three days after the announcement up to thirty days after (+3, +30), the mean CAR, was -4.77% and is highly statistically significant. Implying the announcement, Trump declaring COVID 19 National Emergency, has a significant long lasting negative effect on the DOW Jones stock returns, similar to CDC's announcement, while WHO's announcement did not have a negative impact on DOW Jones returns.

Chart 1. The long term (three to thirty days) CAR of the three major indices

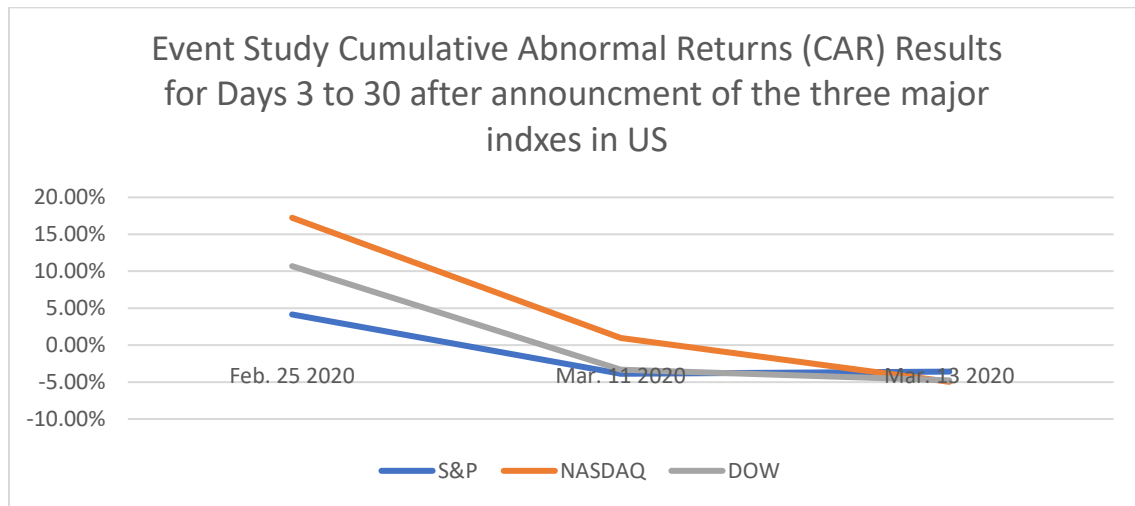


Table 1: Event Study Result of S&P 500 stock returns after COVID 19 announcements

Market Model Abnormal Returns, Equally Weighted Index

Panel I: CDC announced COVID19 heading to be pandemic: **February 25, 2020**

Days	Mean		Precision Weighted CAAR	Portfolio Positive: Negative	Time-Series (CDA) t	Uncorrected Patell p-value	Z	Generalized			
	N	Return						p-value	Sign	Z	p-value
(-30,-2)	509	0.78%	0.55%	268:241	0.396	0.3460	1.694	0.0451	0.799	0.2121	
(-1,0)	509	-1.24%	-1.40%	131:378<<<	-2.388	0.0085	-16.228	<.0001	-11.348	<.0001	
(+1,+2)	509	-1.05%	-1.27%	184:325<<<	-2.026	0.0214	-14.741	<.0001	-6.649	<.0001	
(+3,+30)	509	4.15%	3.58%	320:189>>>	2.134	0.0164	11.109	<.0001	5.409	<.0001	

Panel II: WHO declares COVID19 pandemic: **March 11, 2020**

(-30,-2)	509	-1.09%	-2.06%	229:280<<	-0.599	0.2745	-6.419	<.0001	-2.562	0.0052
(-1,0)	509	1.90%	1.92%	350:159>>>	4.004	<.0001	22.820	<.0001	8.165	<.0001
(+1,+2)	509	2.38%	2.36%	344:165>>>	5.006	<.0001	28.053	<.0001	7.633	<.0001
(+3,+30)	509	-3.88%	-4.62%	197:312<<<	-2.179	0.0147	-14.676	<.0001	-5.399	<.0001

Panel III: Trump Declares COVID 19 National Emergency: March 13, 2020

(-30,-2)	509	0.88%	0.03%	266:243	0.527	0.2991	0.085	0.4660	0.801	0.2117
(-1,0)	509	2.50%	2.46%	346:163>>>	5.683	<.0001	29.531	<.0001	7.893	<.0001
(+1,+2)	509	-0.49%	-0.64%	260:249	-1.114	0.1326	-7.687	<.0001	0.269	0.3941
(+3,+30)	509	-3.60%	-3.95%	186:323<<<	-2.189	0.0143	-12.654	<.0001	-6.292	<.0001

The symbols (<,<<,<<< or >,>>,>>>) show the direction and significance of a generic one-tail generalized sign test at the 0.10, 0.05, 0.01 and 0.001 levels, respectively.

Table 2: Event Study Result of NASDAQ stock returns after COVID 19 announcements

Market Model Abnormal Returns, Equally Weighted Index

PanelI: CDC announced COVID19 heading to be pandemic: February 25, 2020

Days	Mean		Precision	Portfolio	Uncorrected					
	Cumulative	Weighted			Positive:	Time-Series	Patell		Generalized	
	Abnormal	Return	CAAR	Negative	(CDA) t	p-value	Z	p-value	Sign Z	p-value
(-30,-2)	100	2.12%	1.83%	54:46	0.683	0.2472	2.147	0.0159	0.732	0.2320
(-1,0)	100	0.27%	-0.33%	41:59<	0.325	0.3725	-1.495	0.0675	-1.868	0.0309
(+1,+2)	100	0.96%	0.28%	57:43)	1.173	0.1204	1.264	0.1032	1.332	0.0914
(+3,+30)	100	17.24%	14.73%	89:11>>>	5.646	<.0001	17.644	<.0001	7.732	<.0001

Panel II: WHO declares COVID19 pandemic: March 11, 2020

(-30,-2)	100	10.28%	7.77%	75:25>>>	3.451	0.0003	9.343	<.0001	5.006	<.0001
(-1,0)	100	2.78%	2.75%	79:21>>>	3.560	0.0002	12.612	<.0001	5.806	<.0001
(+1,+2)	100	4.11%	4.14%	83:17>>>	5.251	<.0001	18.963	<.0001	6.606	<.0001
(+3,+30)	100	0.95%	-1.13%	46:54	0.324	0.3731	-1.382	0.0835	-0.794	0.2135

Panel III: Trump Declares COVID 19 National Emergency: March 13, 2020

(-30,-2)	100	13.16%	10.62%	80:20>>>	4.572	<.0001	12.846	<.0001	6.017	<.0001
(-1,0)	100	4.24%	4.25%	83:17>>>	5.611	<.0001	19.594	<.0001	6.617	<.0001
(+1,+2)	100	3.66%	2.56%	74:26>>>	4.846	<.0001	11.807	<.0001	4.817	<.0001
(+3,+30)	100	-4.97%	-5.50%	32:68<<<	-1.756	0.0396	-6.775	<.0001	-3.583	0.0002

The symbols (<,<<,<<< or >,>>,>>>) show the direction and significance of a generic one-tail generalized sign test at the 0.10, 0.05, 0.01 and 0.001 levels, respectively.

Table 3: Event Study Result of **DOW Jones** stock returns after COVID 19 announcements

Market Model Abnormal Returns, Equally Weighted Index

Panel I: CDC announced COVID19 heading to be pandemic: **February 25, 2020**

Days	N	Mean Cumulative Abnormal Return	Precision Weighted CAAR	Positive: Negative	Portfolio Time-Series (CDA) t	Uncorrected Patell p-value	Z	Generalized p-value	Sign Z	p-value
(-30,-2)	31	-1.06%	-0.90%	11:20<	-0.413	0.3399	-0.781	0.2174	-1.697	0.0448
(-1,0)	31	-1.45%	-1.48%	7:24<<<	-2.148	0.0159	-4.881	<.0001	-3.134	0.0009
(+1,+2)	31	-1.39%	-1.45%	5:26<<<	-2.064	0.0195	-4.789	<.0001	-3.853	<.0001
(+3,+30)	31	10.69%	10.24%	25:6>>>	4.235	<.0001	9.044	<.0001	3.332	0.0004

Panel II: WHO declares COVID19 pandemic: **March 11, 2020**

(-30,-2)	31	-0.41%	-0.67%	14:17	-0.179	0.4291	-0.603	0.2733	-0.614	0.2695
(-1,0)	31	1.80%	2.03%	23:8>>	2.952	0.0016	6.926	<.0001	2.619	0.0044
(+1,+2)	31	3.89%	4.12%	24:7>>	6.398	<.0001	14.076	<.0001	2.978	0.0015
(+3,+30)	31	-3.34%	-4.00%	15:16	-1.465	0.0714	-3.655	0.0001	-0.255	0.3993

Panel III: Trump Declares COVID 19 National Emergency: **March 13, 2020**

(-30,-2)	31	1.60%	1.57%	17:14	0.713	0.2378	1.420	0.0778	0.479	0.3160
(-1,0)	31	4.00%	4.21%	25:6>>>	6.805	<.0001	14.459	<.0001	3.353	0.0004
(+1,+2)	31	0.41%	-0.03%	17:14	0.705	0.2404	-0.094	0.4626	0.479	0.3160
(+3,+30)	31	-4.77%	-4.79%	9:22<<	-2.171	0.0150	-4.398	<.0001	-2.395	0.0083

The symbols (<, <<, <<< or >, >>, >>>) show the direction and significance of a generic one-tail generalized sign test at the 0.10, 0.05, 0.01 and 0.001 levels, respectively.

CONCLUSION

We analyzed the effect of COVID 19 announcements by CDC, WHO and Trump/Whitehouse on the US Stock market, namely in the three major indices S&P 500, NASDAQ, and DOW Jones. All the three announcements have no immediate negative impact on all three major indices. However, the Trump/Whitehouse and CDC's announcements have longer term (three day to thirty days) seems to have a significant and negative impact in almost all three indices compared to CRSP equally weighted market stock returns. While CDC's announcement has only short term small negative effect on the S&P 500 and DOW Jones stock returns compared to CRSP equally weighted market returns. It could also be other variables such as the COVID 19 number of cases or deaths that may have impacted the stock returns in the long term.

REFERENCES

- Ambros, M., Frenkel, M., Huynh, T.L.D., & Kilinc, M. (2021) COVID-19 pandemic news and stock market reaction during the onset of the crisis: evidence from high-frequency data, *Applied Economics Letters*, 28:19, 1686-1689, DOI:10.1080/13504851.2020.1851643
- Baek, S., Mohanty, S.K., Glambosky, M. (2020) COVID-19 and stock market volatility: An industry level analysis. *Finance Research Letters* No. 37. 101748.
- Baig, A.S., Butt, H. A., Haroon, O., Rizvi, S.A.R. (2021) Deaths, panic, lockdowns and US equity markets: The case of COVID-19 pandemic. *Finance Research Letters* 38. doi: 10.1016/j.frl.2020.101701
- Baker, S. R., Bloom, N., Davis, S.J., Kost, K., Sammon, M., Viratyosin, T. (2020). The Unprecedented Stock Market Reaction to COVID-19. *The Review of Asset Pricing Studies*. 10, 742 – 758.
- Izzeldin, M., Muradoglu, Y.G., Papas, V., Sivaprasad, S. (2021) The Impact of COVID-19 on G7 stock markets volatility: Evidence from a ST-HAR model. *International Review of Financial Analysis* 24, 10167.
- Louhichi, W., Ftiti, Z., Ameur, H.B., (2021) Measuring the global economic impact of the coronavirus outbreak: Evidence from the main cluster countries. *Technology Forecasting & Social Change* 167, 120732.
- Yousfi, M., Zaied, Y.B., Cheikh, N.B., Lahouel, B.B., Bouzgarrou, H. (2021) Effects of the COVID-19 pandemic on the US stock market and uncertainty: a comparative assessment between the first and second waves. *Technological Forecasting & Social Change* 167, DOI: 10.1016/j.techfore.2021.120710
- Zhang, W., Hamori, S. (2021) Crude oil market and stock markets during the COVID-19 pandemic: evidence from the US, Japan, and Germany. *International Review of Financial Analysis*, 74 (2021), DOI: 10.1016/j.irfa.2021.101702
- Mall, P. and Gupta, K. (2019). Impact of merger and acquisition announcements on stock returns and intraday volatility: Evidence from Indian Banking sector. *Journal of Entrepreneurship and Management*, 8(3), 1-11.
- Manuel, Jr., C.S. and Rhoades, D.L. (2014). Merger activity and short-run financial performance. *Transportation Journal*, 53(3), 345-375.
- Palmer, B. (2019). *Investopedia*
[https://www.investopedia.com/ask/answers/why-do-companies-merge-or-acquire-other-companies/#:~:text=Mergers%20and%20acquisitions%20\(M%26As\)%20are,share%2C%20or%20influencing%20supply%20chains](https://www.investopedia.com/ask/answers/why-do-companies-merge-or-acquire-other-companies/#:~:text=Mergers%20and%20acquisitions%20(M%26As)%20are,share%2C%20or%20influencing%20supply%20chains). Accessed July 18, 2020.
- Szmigiera, M. (2020). Value of M&A transactions globally 1985-2019. *Statistica*
[https://www.statista.com/statistics/267369/volume-of-mergers-and-acquisitions-worldwide/#:~:text=In%202019%2C%20the%20value%20of,to%203.7%20trillion%20U.S.%20dollars.&text=Mergers%20and%20acquisitions%20\(M%26A\)%20is,enterprise%20in%20its%20particular%20sector.](https://www.statista.com/statistics/267369/volume-of-mergers-and-acquisitions-worldwide/#:~:text=In%202019%2C%20the%20value%20of,to%203.7%20trillion%20U.S.%20dollars.&text=Mergers%20and%20acquisitions%20(M%26A)%20is,enterprise%20in%20its%20particular%20sector.)
 Accessed July 18, 2020.
- Varmaz, A. and Laibner, J. (2016). Announced versus canceled bank mergers and acquisitions: Evidence from the European banking industry. *Journal of Risk Finance*, 17(5), 510-544.

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MANAGEMENT AND LEADERS UNDERSTANDING COMMUNICATION DYNAMICS: THE IMPACT OF INTERNAL COMMUNICATION ON SATISFACTION, PERFORMANCE, AND MOTIVATION

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ABSTRACT

The purpose of this survey research study was to address the reasons communications preferences of employees are often left unfulfilled. A questionnaire was administered to employees in four mid-sized companies located in the northeastern part of the United States. The researchers found that 178 respondents desire frequent, open, honest, and transparent communication from their organizations and supervisors. Furthermore, across measurements of managers and employees, men and women, Baby Boomers (approximately born from 1940 to 1964), Generation X (approximately born from 1965-1980), and Millennials (approximately born from 1981-1995) indicate they want to know how their work tasks contribute to the organization. The findings of this study indicate that knowing the reason behind task assignments can create a favorable culture and positively impact job satisfaction, performance, and motivation. Moreover, differences in understanding the *Why* behind a task existed between blue collar and white-collar employees. White collar employees had statistical differences from blue collar, indicating they desire more information about why they were assigned work assignments and how it impacts the organization. White collar employees were also more satisfied with their jobs than blue collar employees. Finally, Baby Boomers were statistically more satisfied with their jobs than Millennials.

INTRODUCTION

Communicating with employees is often thought to be a top management priority (Young & Post, 1993; Westley 1990). Leaders influence their followers through effective communication. Therefore, good leaders are good communicators (Kouzes & Posner, 1995; Goetsch & Davis, 2016). Although internal communication is essential to management, leaders, and organizations, literature recommends further research for identifying internal communication preferences and needs of employees (Hargie & Tourish, 2009; Welch, 2011).

Workplace dynamics and the importance of employee communication have been discussed at length in the management literature but there is a need to further examine generational cohorts in the work environment (Rudolph, Rauvola, & Zacher, 2018). Job satisfaction and performance, communication in the workplace, and employee motivation have become more important to managers as Baby Boomers begin to retire and Millennials take hold in the workplace. Generational cohorts, “a society-wide peer group, born over a period of roughly the same length as the passage from youth to adulthood, who collectively possess a common persona” (Howe & Stauss, 2000: 40), have become an important component of workplace vitality and relations. Literature often focuses on the differences between these cohorts. Yet Deal et al. (2010) indicate how inclusiveness across all generations is more effective with regards to employee relations. According to Deal (2007), all generations do share common traits like a willingness to learn and a yearning to be treated well in the workplace. This same notion of inclusiveness and shared traits could be applied to factors in the work environment, such as job satisfaction and communication, across all working generations.

LITERATURE REVIEW

Communication in the Workplace

The literature suggests that communication is at the heart of what determines job satisfaction for employees at all levels. Mohamad et al. (2017) conclude that communication is an essential component for organizational performance. Likewise, Mishra et al. (2014) posit that internal communications provides opportunities for employees to be more engaged, thus building trust with management. This trust nurtures and creates relationships with customers, which is crucial for generating and maintaining business. Effective internal communications are the key to an organization’s success as it permits strategic leaders to engage employees and achieve organizational objectives (Harter et al. 2002; Welch and Jackson, 2007), which is vital for any company or organization to flourish. The role of clear, concise, and effective internal communication in employees’ job satisfaction cannot be under emphasized which will be further explored through this study.

Despite communication having a pivotal role in the workplace, employees' needs and preferences regarding internal communication are not being met and need further understanding (Uusi-Rauva&Nurkka, 2010, Welch 2007). This is worrisome as poor communication is a primary factor for employee dissatisfaction (Buckingham & Coffman, 1999). Furthermore, employees struggle to understand the connection between their work and the organization's goals (Carton, 2018). There is also lacking research to identify how managers and leaders can help employees understand the impact of their work tasks. This study intends to address the problem of employees' internal communication preferences being unfilled, provide management and leaders with tools to help employees see their impact, and measure the alignment between these preferences and motivation, satisfaction, and performance.

Job Satisfaction and Performance

Job satisfaction and performance are at the heart of effective and efficient companies. (Bateman, 1983; Robbins& Coulter, 2018). Kornhauser (1965) and Khaleque (1981) found that satisfaction in one's work is increasingly important to the overall physical and mental health of employees. When employees are satisfied with their job, the organization benefits from increased productivity, positive employee relationships, decreased turnover and absenteeism. (Chen et al., 2011; Chenet al., 2020; Vroom, 1964). These benefits are documented by a company's bottom line.

Like job satisfaction, performance on the job is often discussed relative to communication methods implemented by management. Job performance, defined as measureable actions, behaviors, and outcomes in which employees engage that contribute to the goals of the organization (Viswesvaran& Ones, 2000; Yousef, 2000), is affected by the type of communication. Literature indicates an increase in job satisfaction and job performance when employees receive open, honest, and need-based communication (Jui-Chen et al., 2006; Mazzei, 2014; Pincus, 1986), which has an impact on the organization's results (Downs & Adrian, 2012). Internal communication is pivotal for organization and individual performance (Suh et al., 2018). Furthermore, the implementation of open communication between management and employees is an effective way to increase employees' performance (Neves & Eisenbrger, 2012). Likewise, Garnett et al. (2008) validate that internal communications have a positive impact on performance. They also found management that focuses on task-oriented communication, upward communication, and performance feedback increases performance. Most importantly, Viswesvaran and Ones (2000) indicate that job performance is a main predictor companies consider when hiring talent.

Motivation

Motivation and internal communications are often correlated (Harris & Nelson, 2007). Employees who are highly motivated are often more driven and more successful in their work. Young *et al.* (2021) suggest that internal communication can help to increase motivation and aid in creating a shared identity amongst employees. Communication can play an instrumental role in motivating employees. Managers or employers who instituted effective and clear downward communication led to more motivated employees and created additional benefits such as efficient work teams and a productivity boost (Ancona& Caldwell, 1992; Eisenberg & Wittenm, 1987; Kirkhaug, 2010). Intrinsic motivation also increases when employees are actively sharing knowledge in the workplace (Gottschalg&Zollo, 2007; Pink, 2009). In addition to generating positivity, organizations and managers should understand the needs and interests of the employees in order to properly motivate them (Harter *et al.* 2002; Lušňáková et al., 2018).

Purpose

Communicating purpose through internal communication also can be impactful as employees desire this information (Harter et al. 2002; Fine, 1996; Wrzesniewski& Dutton, 2001). Often organizations communicate goals through the company's hierarchy, but letting individuals understand how their work contributes to the organization is a want of employees that is currently unfulfilled. Although setting goals for employees can generally align with organizational strategic direction, employees often get absorbed in the narrow technical aspects of a work task and their overarching impact on the organization is not understood or provided by top management (Staw&Boetgger, 1990; Westley, 1990).

Sinek (2009) believes that purpose is what motivates employees. Sinek suggests that individuals are motivated by the *Why*, a sense of purpose or belief bigger than oneself. The *why* is what motivates and inspires employees. Sinek (2017) suggests that the *why* can be a tool to communicate more clearly, although there is a need for more empirical research to justify this notion. Inclinations in the literature suggest this concept could be worthwhile (Delcampo *et*

al., 2011, Dicannao 2021, Palmer & Blake, 2018). This study intends to investigate this concept further and add an element to see if providing the *Why* behind a task or reason for work assignments would be desired by employees and its potential impact.

THEORETICAL FRAMEWORK

Two distinct and interrelated theories were the catalyst for this study. Motivation Theory and Expectancy Theory laid the foundation for the interpretation of data. Kanferet al. (2017) recent discussion of Motivation Theory aims to connect needs, motives, desires, and interests. Current theories seek to explain why individuals pursue different goals and what guides an individual to do what they do voluntarily, and most often motivation is a key component of that decision making.

Expectancy Theory was informed by the underpinnings of Motivation Theory. Expectancy Theory has had rigorous academic testing and support and is easily understood (Fudge & Schlater, 1990). It is also a popular theory used in measuring organizational behavior, motivation, job satisfaction, and job performance (Colquitt & Zapata-Phelan, 2007; Vroom, 1964; Vroom, 1995). Expectancy Theory consists of valence, instrumentality, and expectancy. Valence consists of the view on the outcome (Vroom, 1964). Typically, individuals will weigh the desirability or attractiveness of this outcome (Van Eerde & Theiry, 1996). The perspective of this viewpoint will provide anticipated satisfaction with the completion of the outcome. Instrumentality is an outcome-outcome association (Van Eerde & Theiry, 1996). This is the belief that the completion of the first outcome is necessary to receive the second. Vroom (1964) argued that expectancy is when the person determines the risk or probability to obtain the outcome. It is an action-outcome association. The likelihood that a particular act will follow with an event. Each of these three components can positively influence motivation (Fudge & Schlater, 1999) but coincide with how the individual determines the desire and attraction weight and preference of outcomes (Vroom, 1965). The data for this study was examined through those two lenses.

Research Questions

The following research questions were examined in this study:

1. Are managers communicating to employees Purpose, specifically the *Why* behind a task?
2. What are the communication preferences of employees and managers?
3. What effect does knowing the *Why* behind a task have on employees'
 - a. motivation?
 - b. job satisfaction?
 - c. job performance?

RESEARCH DESIGN

A survey research design was utilized in this study. The researcher-created questionnaire was validated by literature, a panel of experts (Research Professors, Management Professor, Operations Manager, Vice President of Mission Services, and Internal Communication Consultant), and piloted to increase the instrument's validity and reliability (Drinkwater, 1965; Malhotra, 2006; Saris & Gallhofer, 2014). Survey research can be useful as it unravels patterns, distributions, and variances amongst respondents (Kelle, 2006). The pilot study was informed by the recommendations of Forza (2002) and included areas of feedback to ensure the instructions and questions were clear, and that no misunderstanding occurred. After feedback from the pilot was analyzed, the measurements did, indeed, demonstrate strong reliability and was then sent to the convenience sample of companies.

Instrument

The researcher-created questionnaire utilized an 18 item five-point Likert scale that ranged from strongly disagree to strongly agree. The instrument was piloted with a convenience sample of 113 people and received a 35.4% response rate. The pilot demonstrated reliability indicating Cronbach's $\alpha = 0.873$. This prompted the researcher to then send the instrument to human resources representatives at four midsize (100-999 employees) companies, who emailed it to all company employees. The four mid-sized companies consist of a technical training company, a grocery store distributor, a manufacturing and fabrication company, and a defense manufacturer. The participating companies were located in the northeast part of the United States. A further breakdown of responses from each company is illustrated in Table 1.

Table 1
Company Classification

Company	Responses	Percent
Technical Training	59	33.2%
Grocery Store Distributor	47	26.4%
Manufacturing and Fabrication Company	41	23.0%
Defense Manufacture	31	17.4%
Total	178	

Data Analysis

The questionnaire results were analyzed with descriptive and inferential statistics. For descriptive statistics the researcher used the commonly used measures of mean, standard deviation, and the frequency of agreement and disagreement to examine each item (Bryman & Cramer, 2011; Rahem& Darrah, 2018). The descriptive statistics were compared amongst gender, generation, and employee classification (manager vs. employees; blue collar vs. white collar). A total item correlation, independent sample *t*-tests, and a one-way ANOVA were also used to measure any differences between disaggregate groups.

Sample

Demographic information within each company was collected and categorized into groups which included gender, generation, and employee classification responses. Respondents consisted of 58.5% males ($n = 93$) and 41.5% females ($n = 66$). Of the total respondents, Generation X represented 47.3% ($n = 79$), Millennials 29.3% ($n = 49$), Baby Boomer 19.8% ($n = 33$) and Generation Z 3.6% ($n = 6$). There was also 66.9% blue collar ($n = 119$) and 33.1% white collar employees ($n = 59$). Out of the total sample 67.6% were employees ($n = 119$) while managers made up 32.4% ($n = 57$).

Results

The findings from the questionnaire are presented in Table 2, below:

Table 2
Survey Results

Survey Item	<i>N</i>	<i>M</i>	<i>SD</i>
I expect honest communication from my organization.	178	4.81	.40
I want my direct supervisor to be transparent in their communication with me.	177	4.62	.58
I am motivated to complete tasks most commonly assigned to me.	177	4.52	.78
My job motivation is positively related to my understanding of how I contribute to the organization.	177	4.50	.65
I perform my job at a high level.	177	4.47	.67
I like to receive feedback from my direct supervisor.	178	4.47	.61
I prefer that my direct supervisor communicates organizational updates.	176	4.41	.71
Communicating why tasks are assigned is essential to maintaining a positive organizational culture.	178	4.40	.76
I understand how my work contributes to my organization's purpose.	177	4.40	.73
I prefer that my direct supervisor makes me feel like my work counts.	178	4.32	.72
My job satisfaction is positively related to my understanding of how I contribute to organizational purpose.	178	4.30	.77
My job performance is positively related to my understanding of how I contribute to the organization.	176	4.30	.77
I am satisfied with my job.	177	4.27	.80
I like to be recognized for my accomplishments.	178	4.14	.81
I prefer to know why tasks are assigned to me.	177	4.00	.87
My current direct supervisor effectively communicates why I am assigned tasks.	177	3.86	1.02
I have made career decisions based on my communication preferences.	177	3.66	.96
My organization transparently communicates with me.	177	3.48	1.03

The reliability of this study is Cronbach's $\alpha = 0.821$. In addition to these results, a correlation of the highest rated items is provided in Table 3. The table displays results with Corrected Item – Total Correlation, which demonstrates the correlation between each item and overall score (Bohrnstedt, 1969). The closer to 1, the stronger the correlation. The highest correlated items are presented in Table 3.

Table 3
Highest Correlated Items

Survey Item	Corrected Item – Total Correlation
My job satisfaction is positively related to my understanding of how I contribute to organizational purpose.	.569
My job motivation is positively related to my understanding of how I contribute to the organization.	.524
My job performance is positively related to my understanding of how I contribute to the organization.	.506

Independent sample *t*-tests were generated from the total correlation measures. The *t*-tests compared managers and employees, men and women, and across Baby Boomers, Generation X, and Millennials. The results of the comparisons

showed no significant differences, indicating that all groups prefer to understand how their work is contributing to their organization, and understanding their contributions positively impacts job satisfaction, job motivation, and job performance.

However, when investigating if employees were satisfied with their jobs, a one way ANOVA with three levels (Boomers, Generation X, and Millennials) revealed that there was a significant difference $F(2, 157) = 3.697, p = 0.027$. Bonferroni post hoc tests displayed that Boomers ($M = 4.59$) were statically more satisfied with their jobs then Millennials ($M = 4.12$), $p = 0.024$, while Generation X ($M = 4.25$) had no statistical difference with Baby Boomers or Millennials.

There were also significant differences between blue collar and white-collar employees through the Independent Samples *t*-tests. The summary of these differences is illustrated in Table 4.

Table 4
Independent Samples T-tests Summary

Measure	Company	<i>N</i>	<i>M</i>	<i>SD</i>	<i>T</i>	<i>df</i>	Sig
Sum	Blue Collar	119	74.97	6.36	4.628	176	0.000
	White Collar	59	79.92	7.38			
My job motivation is positively related to my understanding of how I contribute to the organization.	Blue Collar	118	4.47	0.64	1.064	175	0.289
	White Collar	59	4.58	0.67			
My job satisfaction is positively related to my understanding of how I contribute to organizational purpose.	Blue Collar	119	4.14	0.76	4.153	176	0.000
	White Collar	59	4.63	0.67			
My job performance is positively related to my understanding of how I contribute to the organization.	Blue Collar	119	4.20	0.82	2.341	174	0.020
	White Collar	57	4.51	0.80			
I prefer to know why tasks are assigned to me.	Blue Collar	118	3.89	0.87	2.427	175	0.016
	White Collar	59	4.22	0.83			
I am satisfied with my job.	Blue Collar	118	4.19	0.81	2.007	175	0.046
	White Collar	59	4.44	0.77			

From Table 4, it is evident that white collar employees have different communication preferences than blue collar employees. White collar employees have significantly higher preferences for knowing *Why* they are assigned tasks than blue collar employees. Furthermore, white collar employees have higher expectations of understanding how they contribute to the organization, and that has a positive effect on job satisfaction and performance. Also, white collar employees are statistically more satisfied with their job than blue collar employees.

Discussion of the Findings

Research Question 1: Are managers communicating to employees the *Why* behind a task?

The results from this study indicate that managers are not communicating to employees the reasons they are assigned responsibilities, and organizations often lack transparency in communication to employees. The third lowest survey item was “My current direct supervisor effectively communicates why I am assigned tasks” ($M = 3.86$), and the lowest survey item was, “My organization transparently communicates with me” ($M = 3.48$). The organization and management serve as the two social exchange relationships that employees have with their work (Masterson et al., 2000). For employees to fully comprehend organizational goals and objectives, managers and organizations must communicate effectively (Holtzhausen&Zerfass, 2015). Company leaders must be cognizant that a lack of transparency ultimately affects a company’s productivity (Delcampo et al., 2011; Men & Stacks, 2014). Moreover,

Truss et al. (2006) assert that managers lack the ability to make employees feel as if their work counts, has meaning, or shows how they impact the bottom line. This trend was supported by this research.

Interestingly enough, although employees are not receiving their purpose from the organization or management, employees are still finding it. The question, “I understand how my work contributes to my organization’s purpose” (M = 4.40), which illustrates employees’ perceptions of their contribution as important. Finding a purpose bigger than oneself in work is often what motivates and inspires people (Evans *et al.*, 2021; Sinek, 2009; Schabram&Maitlis 2017). When employees understand the impact or reasons behind work assignments (Delcampo et al. 2011; Dicianno, 2021; Harter et al. 2002), employees are more satisfied, and effort in this area could dramatically improve management and employee relations.

It was also evident that the employees believe understanding the purpose of their work creates a positive culture, as one survey item received high ratings, which was “Communicating why tasks are assigned is essential to maintaining a positive culture” (M = 4.40). Organizational culture consists of communication patterns and networks (Ireland &Hitt, 2005) and leadership can establish an effective organizational culture (Boal &Hooijberg, 2000; Kim & Chang, 2019). When a successful organizational culture is created, employees feel a sense of understanding how they fit into the corporation puzzle and this can be used as a competitive advantage. This finding should prove beneficial for managers, leaders, and organizations. Research also indicates that Millennials, Generation X, and Baby Boomers were more likely to be satisfied with their job if they had a positive culture (Stewart et al.,2017).

Research Question 2: What are the communication preferences of employees and managers?

Survey results suggest that employees want honest and transparent communication from their organization and managers. The survey items “I expect honest communication from my organization” (M = 4.81), and “I want my direct supervisor to be transparent in their communication with me” (M = 4.62). Dasgupta, Suar, & Singh (2013) indicate that job performance can be enhanced with open, honest, and needs-based communication, which supports the findings in this study. Moreover, Rawlins (2008) suggests that companies should be more open, honest, and transparent as such behaviors can build trust with employees.

Furthermore, employees want feedback from their supervisor (M = 4.47) and want organizational updates (M = 4.41). These findings align with Neves and Eisenbrger’s, (2012) study that indicate managers who openly communicate with employees increase employee’s performance. Furthermore, Myers and Sadaghiani (2010) found that millennials favor frequent and open communication with their supervisors. This study builds on this notion as Baby Boomers and Generation X have similar preferences.

Research Question 3: What effect does knowing the Why behind a task have on employees’

- a. motivation?
- b. job satisfaction?
- c. job performance?

The results of the survey indicated that the *Why* behind a task has a positive impact on motivation (M = 4.50), job satisfaction (M = 4.30), and job performance (M = 4.30). This is further validated with the results from the total correlation, as these items had the highest correlation within the survey. Employees are more motivated when they understand why they are asked to perform a particular task and employees’ satisfaction with their job and performance is ultimately enhanced when with provided the reason for task assignments.

The findings in this study suggest that employees want to know how they are contributing to the company and this has a positive effect on motivation, satisfaction, and performance. Argenti (2017) found that constant and consistent communication aligns employees to the organization and when employees comprehend strategies, they often believe it is in their benefit to enhance the company’s objectives and interests. Furthermore, BerggenandBernshteyn (2007) posit that in order to improve employee performance, companies should openly communicate goals. The findings of this study build on this notion as employees should not only know the goals but understand the reason for them and the impact these goals have on the organization.

Limitations of the Study

The generalizability of this study is a limitation because the majority of the respondents were located in the

northeastern United States, which limits the ability to generalize to other parts of the country and/or other midsize companies. Also, some employees may not have answered honestly out of fear of repercussions from their company. Although unique identifiers were removed, and no individual data was shared, this could still have an impact on respondents' truthfulness. This study does not account for the pre-existing factors such as employee-manager relationships and previous work ethic of employees, which could affect results. Finally, a threat to internal validity may exist due to the possibility of selection bias.

IMPLICATIONS

Managerial Implications

Although there is an argument that management and leadership are different from one another (Kotter, 1990), communication still serves an integral role for management (Harmon et al., 2015; Mintzberg, 1973; Mintzberg, 1994; Young & Post, 1993), leadership (Jansen *et al.*, 2009; Northouse, 2019), and organizations (Hargie&Tourish, 2009; Smidtset al., 2001; Welch, 2012). This study addresses the problem that employees' communication preferences are left unsatisfied. It is evident that one of the main reasons internal communications are left unfilled is the high expectations for honest and transparent communication from their organization compared to what they are experiencing, which does not meet those honesty and transparency expectations. In addition, employees desire frequent, open, honest, and transparent communication from their organizations and supervisors, and want to know how their work connects to the organization's purpose (the *Why* behind a task). If they are given that connection, it could have a positive impact on motivation, job performance, job satisfaction, and workplace culture.

To add to this argument is the concept of generational differences. For instance, Millennials were less satisfied with their jobs than Baby Boomers, and blue-collar workers were less satisfied than white collar workers with their employment. Blue and white collared employees also differed with regard to desire to know how their work may have contributed to the organization's purpose. White collars employees were statistically significantly higher with regard to knowing how their work contributed to the organization. Overall, the results indicated, that the *Why* positively impacted motivation and job performance compared to blue collared employees.

Theoretical Implications

Typically, expectancy theory is viewed through an extrinsic motivation lens in research, and that was the intent with its origins (Isaac *et al.*, 2001; Vroom, 1964; Vroom 1995). However, this study applied expectancy theory from an intrinsic lens. With expectancy theory, typically, some extrinsic outcome such as a bonus with pay or promotion is connected with the event (Vroom 1995). This study applied expectancy theory through an intrinsic lens to understand the impact of employees' work on the company which served as an intrinsic outcome. Vroom (1964) believes that individuals will put forth more effort towards a task if they value the outcome, and once completing the assignment the anticipated levels of satisfaction will be received, if they were viewed as desirable.

Although Vroom (1964) argues that his theory is not in the parameters of intrinsic motivation, this research study found expectancy theory to be valid from the intrinsic lens as well. If employees value their impact on the organizations' purpose, they provide more effort, their performance is enhanced, and it aids in satisfaction. Therefore, they view making an impact on the company with their work assignments as a desirable outcome. More research would have to be conducted to determine if satisfaction occurs after the task is completed, as expectancy theory suggests and how they measure the probability of the outcome positively effecting the company. Still, the findings show it aids in positive satisfaction. This study found a way of applying expectancy theory with intrinsic motivation lens which is a new development by communicating the purpose and impact behind work task assignments

Future Research

The majority of the participants in this study were located in the northeast part of the United States. It would be beneficial to increase the sample size of this study, aggrandize to different locations, and expand to other types and sizes of companies. It would also be beneficial to measure Generation Z's internal communication preferences as they become more prevalent in the work force and compare those findings with this study. More studies are needed to understand and contextualize why Millennials are not as satisfied with their jobs compared to Baby Boomers.

Moreover, understanding the differences with the *Why* behind a task and job satisfaction between blue collar employees and white-collar employees would be valuable for organizations.

Summary

The results indicated that employees have a high expectation for open and transparent communication from their supervisor and organization. The results further specified that employees desire purposeful, frequent, open, honest, and transparent communication from their organization and supervisor. These preferences were the same across generations (Baby Boomers, Generation X, and Millennials), managers and employees, and gender. Employees in these cohorts also indicated if they know how their work contributes to the organization (*Why* behind a task), it can positively impact culture, job performance, satisfaction, and motivation.

The results also exhibited that white collar and blue-collar employees had differences regarding their job satisfaction and communication preferences. The white-collar employees have a higher desire of why they are assigned tasks compared to blue collar employees. Although this information did not differ with the impact on motivation, differences were found regarding performance and satisfaction. Furthermore, it also disclosed that white collar employees were more satisfied with their jobs than blue collars. The results also found that Baby Boomers were more satisfied with their jobs than Millennials.

This information can be extremely beneficial as effective internal communication is critical to a company's success (Krogh *et al.*, 2000; Welch and Jackson, 2007; Witherspoon, 1997) and is viewed as a critical component for employee and management relations. Furthermore, the results provide simple but effective techniques that can be fruitful for managers as they are typically time-starved (Hall & Lawler, 1970; Kotter, 1982; Mintzberg 1973) and can be applied to a broader audience of employees.

REFERENCES

- Ancona, D. G., & Caldwell, D. F. (1992). Bridging the boundary: External activity and performance in organizational teams. *Administrative Science Quarterly*, 37(4), 634-665.
- Argenti, P. A. (2017). Strategic communication in the c-suite. *International Journal of Business Communication*, 54(2), 146-160.
- Bateman, T. S. (1983). Job satisfaction and the good soldier: The relationship between affect and employee citizenship. *Academy of Management Journal*, 26(4), 597-595.
- Berggen, E., & Bernshteyn, R. (2007). Organizational transparency drives company performance. *Journal of Management Development*, 26(5), 411-417.
- Boal, K. B., & Hooijberg, R. (2000). Strategic leadership research: Moving on. *The Leadership Quarterly*, 11(4), 515-549.
- Bohrnstedt, G. W. (1969). A quick method for determining the reliability and validity of multiple-item scales. *American Sociological Review*, 34(4), 542-548.
- Bryman, A., & Cramer, D. (2011). *Quantitative data analysis with IBM SPSS 17, 18 & 19: A guide for social scientists*. Routledge.
- Buckingham, M., & Coffman, C. (1999). *First, Break All the Rules: What the World's Greatest Managers Do Differently*. Simon & Schuster.
- Carton, A. M. (2018). I'm not mopping the floors, I'm putting a man on the moon: How NASA leaders enhanced the meaningfulness of work by changing the meaning of work. *Administrative Science Quarterly*, 63(2), 323-369.
- Chen, C., Chen, S., & Tsai, P. (2020). Job passion in the context of green restaurant: Environmental stewardship orientation and job autonomy as antecedents. *Journal of General Management*, 46(1), 16-25.
- Chen, G., Ployhart, R. E., Thomas, H. C., Anderson, N., & Bliese, P. D. (2011). The power of momentum: A new model of dynamic relationships between job satisfaction change and turnover intentions. *Academy of Management Journal*, 54(1), 159-181.
- Colquitt, J. A., & Zapata-Phelan, C. P. (2007). Trends in theory building and theory testing: A five-decade study of the Academy of Management Journal. *Academy of Management Journal*, 50(6), 1281-1303.
- Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 16(3), 297-334.
- Dasgupta, S., Suar, D. & Singh, S. (2013). Impact of managerial communication styles on employees' attitudes and behaviors. *Employee Relations*, 35(2), 173-199.
- Deal, J., Altman, D., & Rogelberg, S. (2010). Millennials at work: what we know and what we need to do (if anything). *Journal of Business and Psychology*, 25(2), 191-199.
- Deal, J. J. (2007). *Retiring the generation gap: How employees young and old can find common ground*. Jossey Bass.
- Delcampo, R., Haggerty, L., Haney, M., & Knipple, L. (2011). *Managing the multi-generational workforce: from the gi generation to millennials*. Gower.
- Downs, C. W., & Adrian, A. D. (2012). *Assessing organizational communication: Strategic communication audits*. Guilford Press.

- Dicianno, J. (2021). *A busy leader's guide to caring leadership*. Koehlerbooks.
- Drinkwater, B. L. (1965). A comparison of the direction-of-perception technique with the Likert Method in the measurement of attitudes. *Journal of Social Psychology*, 67(2), 189-196.
- Eisenberg, E. M., & Witten, M. G. (1987). Reconsidering openness in organizational communication *The Academy of Management Review*, 12(3), 418-426.
- Evans, R., Davis, W., & Neely, A. (2021). The role of organizational cynicism and conscientiousness in the relationship between ethical leadership and deviance. *Journal of Managerial Issues*, 33(1), 49-68.
- Fine, G. A. (1996). Justifying work: Occupational rhetoric as resources in restaurant kitchens. *Administrative Science Quarterly*, 41(1), 90-115.
- Forza, C. (2002). Survey research in operations management: A process-based perspective. *International Journal of Operations & Production Management*, 22(2), 152-194.
- Fudge, R. S., & Schlacter, J. L. (1999). Motivating employees to act ethically: An expectancy theory approach. *Journal of Business Ethics*, 18(3), 295-304.
- Garnett, J. L., Marlowe, J., & Pandey, S. K. (2008). Penetrating the performance predicament: Communication as a mediator or moderator of organizational culture's impact on public organizational performance. *Public Administration Review*, 68(2), 266-281.
- Goetsch, D. L., & Davis, S. B. (2016). *Quality management for organizational excellence: Introduction to total quality*. Pearson, Inc.
- Gottschalg, O., & Zollo, M. (2007). Interest alignment and competitive advantage *Academy of Management Review*, 32(2), 418-437.
- Hall, D. T., & Lawler, E. E. (1970). Job characteristics and pressures and the organizational integration of professionals. *Administrative Science Quarterly*, 15(3), 271-281.
- Harmon, D. J., Green, S. E., & Goodnight, G. T. (2015). A model of rhetorical legitimation: The structure of communication and cognition underlying institutional maintenance and change. *Academy of Management Review*, 40(1), 76-95.
- Hargie, O., & Tourish, D. (2009). *Auditing organizational communication*. Routledge.
- Harris, T. E., & Nelson, M. D. (2007). *Applied organizational communication: Theory and practice in a global environment*. Routledge.
- Harter, J. K., Schmidt, F. L., & Haynes, T. L. (2002). Business-unit-level relationships between employee satisfaction, employee engagement, and business outcomes: a meta-analysis. *Journal of Applied Psychology*, 87(2), 268-279.
- Holtzhausen, D., & Zerfass, A. (2015). Strategic Communication: Opportunities and challenges of the research area, Holtzhausen, D., and Zerfass, A. (Ed.), *The Routledge handbook of strategic communication*. Routledge.
- Howe, N., & Strauss, W. (2000). *Millennials rising: The next great generation*. Vintage Books.
- Ireland, R. D., & Hitt, M. A. (2005). Achieving and maintaining strategic competitiveness in the 21st century: The role of strategic leadership. *Academy of Management Executive*, 19(4), 57-63.

- Isaac, R., Zerbe, W., & Pitt, D. (2001). Leadership and motivation: The effective application of expectancy theory. *Journal of Managerial Issues*, 12(2), 212-226.
- Jansen, J. J., Vera, D., & Crossan, M. (2009). Strategic leadership for exploration and exploitation: The moderating role of environmental dynamism. *The Leadership Quarterly*, 20(1), 5-18.
- Jui-Chen, C., Silverthorne, C., & Jung-Yao, H. (2006). Organization communication, job stress, organizational commitment, and job performance of accounting professionals in Taiwan and America. *Leadership & Organization Development Journal*, 27(4), 242-249.
- Kanfer, R., Frese, M., & Johnson, R. E. (2017). Motivation related to work: A century of progress. *Journal of Applied Psychology*, 102(3), 338-355.
- Kelle, U. (2006). Combining qualitative and quantitative methods in research practice: purposes and advantages. *Qualitative Research in Psychology*, 3(4), 293-311.
- Khaleque, A. (1981). Job satisfaction perceived effort and heart rate in light industrial work. *Ergonomics*, 23, 735-742.
- Kim, T., & Chang, J. (2019). Organizational culture and performance: A macro-level longitudinal study. *Leadership & Organization Development Journal*, 40(1), 65-84.
- Kirkhaug, R. (2010). Conditions for communication in risk exposed organisations. *Journal of General Management*, 36(2), 23-36.
- Kotter, J. P. (1990). *A force for change: How leadership differs from management*. The Free Press.
- Kotter, J. P. (1982). *The general managers*. The Free Press.
- Kornhauser, A. (1965). *Mental health of the industrial worker*. John Wiley.
- Kouzes, J. M., & Posner, B. Z. (1995). *The leadership challenge*. Jossey-Boss, Inc.
- Krogh, G., Ichijo, K., & Nonaka, I. (2000). *Enabling knowledge creation: How to unlock the mystery of tacit knowledge and release the power of innovation*. Oxford University Press.
- Lušňáková, Z., Šajbidorová, M., & Juričková, Z. (2018). Development trends in motivation factors applied by business managers in corporation. *Management of Organizations: Systematic Research*, 79(1), 71-84.
- Malhotra, N. K. (2006). Questionnaire design and scale development. In: Grover R and Vreins M (eds) *The handbook of marketing research: Uses, misuses, and future advances*. Sage.
- Masterson, S. S., Lewis, K., Goldman, B. M., & Taylor, S. M. (2000). Integrating justice and social exchange: The differing effects of fair procedures and treatment on work relationships. *Academy of Management Journal*, 43(4), 738-748.
- Mazzei, A. (2014). Internal communication for employee enablement: Strategies in American and Indian companies. *Corporate Communications*, 19(1), 82-95.
- Men, L. R., & Stacks, D. (2014). The effects of authentic leadership on strategic internal communication and employee-organization relationships. *Journal of Public Relations Research*, 26(4), 301-324.
- Mintzberg, H. (1973). *The nature of managerial work*. Prentice-Hall, Inc.
- Mintzberg, H. (1994). Rounding out the manager's job. *Sloan Management Review*, 36, 1-11.

- Mishra, K., Boynton, L., & Mishra, A. (2014). Driving employee engagement: The expanded role of internal communications. *International Journal of Business Communication*, 51(2), 183-202.
- Mohamad, B., Nguyen, B., Melewar, T., & Gambetti, R. (2017) Antecedents and consequences of corporate communication management (CCM): An agenda for future research. *The Bottom Line*, 31(1), 56-75.
- Myers, K., & Sadaghiani, K. (2010). Millennials in the workplace: A communication perspective on millennials' organizational relationships and performance. *Journal of Business and Psychology*, 25(2), 225-238.
- Neves, P., & Eisenberger, R. (2012). Management communication and employee performance: The contribution of perceived organizational support. *Human Performance*, 25(5), 452-464.
- Northouse, P. G. (2019). *Leadership: Theory and practice*. Sage Publications, Inc.
- Palmer, K., & Blake, D. (2018) *The expertise economy*. Nicholas Brealey Publishing.
- Pincus, J. D. (1986). Communication satisfaction, job satisfaction, and job performance. *Human Communication Research*, 12, 395-419.
- Pink, D. H. (2009). *Drive: The surprising truth about what motivates us*. Penguin.
- Rahem, M. A., & Darrah, M. (2018). Using a computational approach for generalizing a consensus measure to Likert scales of any size n. *International Journal of Mathematics and Mathematical Sciences*, 1-7.
- Rawlins, B. R. (2008). Measuring the relationship between organizational transparency and employee trust. *Public Relations Journal*, 2(2), 1-21.
- Robbins, S. P., & Coulter, M. (2018). *Management*. Pearson.
- Rudolph, C. W., Rauvola, R. S., & Zacher, H. (2018). Leadership and generations at work: A critical review. *The Leadership Quarterly*, 29(1), 44-57.
- Saris, W. E., & Gallhofer, I. N. (2014). *Design, evaluation, and analysis of questionnaires for survey research*. John Wiley & Sons.
- Schabram, K., & Maitlis, S. (2017). Negotiating the challenges of a calling: Emotion and enacted sensemaking in animal shelter work. *Academy of Management Journal*, 60(2), 584-609.
- Sinek, S. (2009). *Start with why: How great leaders inspire everyone to take action*. Penguin Group.
- Sinek, S., Mead, D., & Docker, P. (2017). *Find your why: A practical guide for discovering purpose for you and your team*. Penguin Group.
- Smidts, A., Pruyn, A. Th., & Van Riel, C. B. (2001). The impact of employee communication and perceived external prestige on organizational identification. *Academy of Management Journal*, 49(5), 1051-1062.
- Staw, B. M., & Boettger, R. D. (1990). Task revision: A neglected form of work performance. *Academy of Management Journal*, 33(3), 534-559.
- Stewart, J. S., Oliver, E. G., & Cravens, K. S., & Oishi, S. (2017) Managing millennials: Embracing generational differences. *Business Horizons*, 60, 45-54.
- Suh, J., Harrington, J., & Goodman, D. (2018). Understanding the link between organizational communication and innovation: An examination of public, nonprofit, and for-profit organizations in South Korea. *Public Personnel Management*, 47(2), 217-244.

- Truss, K., Soane E., Edwards C., & Croll, A. (2006). *Working life: employee attitudes and engagement 2006*. CIPD.
- Uusi-Rauva, C. & Nurkka, J. (2010). Effective internal environment-related communication: An employee perspective. *Corporate Communications*, 15(3), 299-314.
- Van Eerde, W., & Theiry, H. (1996). Vroom's expectancy models and work-related criteria a meta-analysis. *Journal of Applied Psychology*, 81(5), 575-586.
- Viswesvaran, C., & Ones, D. S. (2000). Perspectives on models of job performance. *International Journal of Selection and Assessment*, 8(4), 216-226.
- Vroom, V. H. (1964). *Work and motivation*. Wiley.
- Vroom, V. H. (1995). *Work and motivation*. Jossey-Bass Publishers.
- Welch, M. (2012). Appropriateness and acceptability: Employee perspectives of internal communication. *Public Relations Review*, 38(2), 246-254.
- Welch, M. (2011). The evolution of the employee engagement concept: communication implications. *Corporate Communications* 16(4), 328-346.
- Welch, M. & Jackson, P. R. (2007). Rethinking internal communication: a stakeholder approach. *Corporate Communications*, 12(2), 177-198.
- Westley, F. R. (1990). Middle managers and strategy: Microdynamics of inclusion. *Strategic Management Journal*, 11(5), 337-351.
- Witherspoon, P. (1997). *Communicating leadership: An organizational perspective*. Ally and Bacon.
- Wrzesniewski, A., & Dutton, J. E. (2001). Crafting a job: Revisioning employees as active crafters of their work. *Academy of Management Review*, 26(2), 179-201.
- Young, M., & Post, J. E. (1993). Managing to communicate, communicating to manage: How leading companies communicate with employees. *Organizational Dynamics*, 22(1): 31-43.
- Young, H. R., Glerum, D. R., Joseph, D. L., & McCord, M. A. (2021). A meta-analysis of transactional leadership and follower performance: Double-edge effects of LMX and empowerment. *Journal of Management*, 47(5), 1255-1280.
- Yousef, D. A. (2000). Organizational commitment: a mediator of the relationships of leadership behavior with job satisfaction and performance in a non-western country. *Journal of Managerial Psychology*, 15(1), 6-28.

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THE FUTURE OF ETHICS AT WORK: A COMPARATIVE ANALYSIS OF MBA STUDENTS AND CURRENT EMPLOYEE PERCEPTIONS

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ABSTRACT

The changing ideas of morality, the evolution of employment laws, and society have influenced ethical perspectives. Although business schools and faculty teach the art and science of ethics, identifying the potential future frameworks and morals of organizations and employees is fascinating and challenging to predict. The study and research of ethics in the workplace have been ongoing for years. The latest ethical developments are something that organizations, management, and society should be aware of and monitor. In an attempt to ascertain the direction of business ethics changes in the near term, this research sought to identify potential trends stemming from the attitudes of graduate students in a Master of Business Administration (MBA) program compared to employee attitudes identified in the Institute of Business Ethics at work: 2021 International survey findings. The focal points of the study consist of organizational culture, willingness to speak up about ethical issues, formal ethical programs, supportive ethical environments, and current and future ethical issues. Some of the more notable findings include that MBA students' value and desire strong ethics from their prospective employers, want a supportive ethical environment, and are very concerned about the future of the workplace. MBA students also felt more pressure to compromise their ethical standards compared to the current workforce. Current employees and MBA students are not as satisfied with the managerial action that follows after speaking up about something unethical. The findings indicate that existing employees and MBA students might be less likely to speak up because they feared job loss. Findings provide additional areas for future research as well as a deeper dive into the current data collection.

INTRODUCTION

Research on ethics in the workplace has been ongoing for years, and its importance is heightened more than ever, especially with infamous business scandals such as Tyco, WorldCom, Enron, and the very recent development of FTX, plus others. Business ethics is defined as collective behaviors from employees, leaders, and management within the organization that are considered to be morally acceptable and appropriate (Ferrell, Fraedrich, & Ferrell, 2011; Stanwick & Stanwick, 2016). The negative impacts of conducting poor ethics and unacceptable behavior can be severe. Companies with improper ethics can cause damage to the brand image, result in the loss of profits and performance, and even negatively impact society as a whole (Cremer & Moore, 2020). With some of the more notable scandals mentioned, some of the results consisted of employees' jobs lost, shareholders loss of investments, and more regulation for all businesses. It is clear that ethical failures are something that should not be accepted or tolerated (Cremer, Mayer, & Schminke, 2010).

LITERATURE REVIEW

Organization Culture

Ethics in the workplace and its integration into culture has been a topic of concern and discussion since people started working together. In 1931, an article in *The Saturday Evening Post* talked about honesty in the workplace and the politics associated with moving up in an organization (Dutton, 1931). Nearly 100 years later, the content of that article is still being researched and analyzed. Employers and employees are still looking for similarities in values and ethical expectations at work. In discussing how to create an ethical organization, Epley and Kumar (2019 p. 147) indicate that "creating an ethical culture thus requires thinking about ethics not simply as a *belief* problem but also as a *design* problem." They then identify four design features that should be addressed to create an ethical culture. They include *Explicit values, thoughts during judgment, incentives, and cultural norms*. One of the key points in their findings related to judgement is that ethical lapses are less frequent when the culture of the organization places ethics at the center of attention (Epley & Kumar, 2019). Using policies and procedures to remind employees of the company's ethical expectations can help both the employee and the organization. When employees are reminded of the organization's ethics, they do not need to rely on their own personal ethical values as they make decisions – they are able to implement actions in line with the organization's mission and values. Scholten, de Vries, and Besieux (2022) found that, while necessary, formal rules compliance policies are not enough by themselves. Organizations need to be aware of where their organization's weaknesses lie and address them specifically. One large area of risk is

organizational goal setting and management pressure to perform which can lead to unethical employee actions including cheating and deception (Niven and Healy, 2016). Managers can use a behavioral approach to managing risk by analyzing processes and organizational structures. The goal is to identify the elements that “trigger risky behaviors” (Scholten, de Vries, & Besieux, 2022 p. 108). In 2019 a Harvard Business School study found that on average Fortune 500 companies have more than two instances of misconduct per week (Scholten, de Vries, & Besieux, 2022). These and other unethical behaviors result in excessive fines, loss of customer loyalty and brand value, investor financial loss, decline in employee commitment, and other costly consequences up to businesses closing by force or will.

Speaking Up

Due to many financial scandals of companies like Tyco, Enron, and WorldCom, in the early 2000s, the Sarbanes-Oxley Act (SOX) was enacted in 2002. The act has many pieces, but some notable aspects are that it creates ethical financial reporting, enhances corporate governance, increases penalties for unethical wrongdoings, and has safeguards for whistleblowers (Rockness & Rockness, 2005). Individuals who retaliate against whistleblowers are personally liable and can face up to ten years in prison. Despite the safeguards of SOX and other laws, there are still employees who are scared to speak up about unethical issues and remain silent out of fear of negative personal and professional consequences (Moore & Gino, 2015; Kish-Gephart et al., 2009). There are concerns of retaliation, being labeled negatively, and fear of loss of social capital. A hope for organizations is that employees fully understand their legal protections to come forward and that they would identify with the corporation and would be willing to protect the company's well-being. Unfortunately, another obstacle is that employees are sometimes uncomfortable bringing issues about organizational problems to their supervisor (Milliken, Morrison, & Hewlin, 2003), which also leads to silence.

Supportive Environment

Elements that organizations can do to encourage more employees to come forward and counteract these fears is to offer a supportive environment. If top management is willing to listen to sensitive issues, employees will infer that they care about their concerns (Dutton, et al., 1997; Dutton, et al., 2002). This also helps the culture appear generally supportive. It is also crucial that the organization has upward communication structures, that supervisors are approachable, empathetic, and trustworthy (Detert & Treviño, 2010; Kish-Gephart, et al., 2009; Milliken, F. J., Morrison, E. W., & Hewlin, 2003). Supporting and rewarding positive ethical actions is an excellent way to build trust. Creating trust helps employees feel confident to blow the whistle and not receive punishment for doing so (Stanwick & Stanwick, 2016). Other items that can help build trust include integrity, sharing appropriate information with employees, showing concern, and standing by the employees. Ethical leadership aids in speaking up and for followers to act more ethically (Schaubroeck et al., 2012).

RESEARCH DESIGN

Survey

The researchers gained permission from the Institute of Business Ethics (IBE) to reuse questions from the IBE instrument and compare their results with an MBA program located centrally in West Virginia. Some adaptations to the questionnaire were made to allow for the different perspectives of the two populations (employed vs. MBA student). The results of this study will be used to gather more interest from other MBA schools. A questionnaire was created using the survey software QuestionPro and was sent to 37 MBA students via email. The survey received an 89.2% response rate (33 responses). There were four individuals who participated in the survey but did not complete all responses. The results from the MBA students were compared to the IBE Ethics at work: 2021 international survey of employees, which had 9,834 respondents in 13 countries: Australia, France, Germany, Ireland, Italy, the Netherlands, New Zealand, Portugal, South Africa, Spain, Switzerland, the United Kingdom, and the United States of America. Each country had a sample of about 750 working adults (18 years of age and older in each country). This study used results in outputs provided by the IBE publicly and not the raw data.

Sample

Demographic information was collected in regards to gender, race, and age. The MBA sample consisted of 18 males (64.29%) and 10 females (35.71%). In regard to race, 18 respondents were white (64.29%), 4 respondents were multiracial (14.29%), 2 respondents were Black or African American (7.14%), 2 respondents were Hispanic or Latino (7.14%), 1 respondent was Asian (3.57%), and 1 respondent preferred not to say (3.57%). All respondents were between the ages of 21 – 25 years old.

RESULTS AND DISCUSSION

Organization Culture

In reviewing areas related to organization culture, the focus was on ethically questionable work practices, organization honesty, pressure to compromise standards, and instances of misconduct. Table 1 illustrates the respondent's perception of how acceptable they found specific questionable practices.

Table 1
Acceptable, Questionable, Practices

SurveyItem	IBE	MBA
Making sexual advances towards a colleague	6%	0%
Charging personal entertainment to expenses	9%	13%
Pretending to be sick to take the day off	11%	10%
Claiming company fuel expenses for personal mileage	13%	7%
Minor exaggeration of travel expenses	15%	7%
Favoring family or friends when recruiting or awarding contracts	17%	0%
Taking stationery from work for personal use	23%	13%
Using the company's printer to print personal items	46%	57%

There were two areas in which the MBA students found questionable items to be more acceptable than those currently employed. MBA students found it slightly more acceptable to charge personal entertainment expenses to the organization (MBA 13% vs IBE 9%). One item of note is that the types of personal entertainment may vary due to the types of preferred entertainment by age group due to the increased use of personal electronic entertainment devices and other changes in entertainment venues. The second area that the MBA students found more acceptable than the current workforce was in the use of the company's printer for personal printing. Fifty seven percent of MBA students felt that it was acceptable to use the company device while current employees were lower at 46%. While only two of our areas were higher, the IBE survey found that the 18-34-year-old demographic was more likely to find each of the questionable practices more acceptable (IBE, 2021).

On average, in the IBE survey, only 86% of international organizations were cited as practicing honesty in daily operations while the United States average was 87%. These numbers appear to be high but when compared to the desires of MBA students, there is a shortfall because all MBA students indicated a desire to work at an organization that practiced honesty in daily operations. In fact, 70% indicated that it was extremely important and the remaining 30% said it was very important.

Pressures to Compromise

Areas of compromise pressure are illustrated in Table 2 with values for the IBE international results, the results specific to the United States, and then the MBA results.

Table 2
Main Pressures to Compromise

Survey Item	IBE	IBE USA	MBA
Time pressure/unrealistic deadlines	35%	30%	24%
I was following my boss's orders	33%	30%	12%
We were under resourced	23%	27%	8%
I was being asked to take shortcuts	23%	30%	8%
I had to meet unrealistic business objectives	20%	24%	4%
I felt peer pressure to be a team player	20%	20%	8%
I was trying to save my job	18%	17%	8%
There were financial/budgeting pressures at the company	17%	19%	4%
I wanted to help the organization perform better	16%	18%	4%
My organization has an unethical culture	15%	13%	0%
Other	1%	1%	12%
Prefer not to say	2%	2%	8%

The IBE survey indicated that 11% of respondents felt pressure to compromise their current organization's standards of ethical conduct but they also reported that the average for younger employees (18-34) was the highest (16%) compared to employees 35-54 (10%) and employees 55 and over (6%). It was surprising that the MBA students, who were current full-time students, felt more pressure compared to the current workforce. Over 21% of our survey respondents indicated that they had felt pressure to compromise an organization's ethical standards, which is 10 percentage points higher than the overall average and still 5 percentage points higher than the same age demographic in the IBE survey.

Areas of compromise pressure are illustrated in Table 2 with values for the IBE international results, the results specific to the United States, and then the MBA results. In the majority of the areas the MBA student responses were below the IBE international and USA responses but the Other and Prefer Not to Say items were much higher for the MBA respondents. While they were minimal for the IBE groups (1-2%), the 12% of MBA students indicated an alternate pressure to compromise and 8% indicated that they preferred not to state the exact pressure area.

The IBE survey asked if respondents were aware of conduct by their employer or colleagues that violated the law or the organization's ethical standards. The international average was 18% and the US average was 20% (indicating that they were aware of legal or ethical violations). IBE did report that the younger employees (ages 18-34) were more likely to be aware of misconduct than those in older demographic groups. Twenty-four percent of the younger employees responded that they were aware of misconduct compared to 18% in the 35-54 age group and an even lower 10% in the 55 and up group. Since MBA students are not working full-time for an employer, this question was revised to ask how aware students were of similar unethical behaviors by any employees or employers. Over 63% indicated they were aware of misconduct.

Speaking Up

This section investigated employees and MBA students' willingness to speak up about unethical issues or misconduct they have witnessed. The respondents were also asked why they chose to or not to speak about the concerns, if they were happy with the outcome, and if they experienced any retaliation. The findings in Table 3 below.

Table 3
Speaking Up Survey Results

Survey Item	IBE	MBA
Did you raise or speak up about any of your concerns with management, another appropriate person, or through any other mechanism? (Respondents who said yes.)	57%	34%
After raising or speaking up about your concerns, how satisfied or dissatisfied were you with the outcome? (Fairly or very satisfied)	62%	38%
After raising or speaking up about your concerns, did you experience any personal disadvantage or any form of retaliation for doing so? (Respondents who said yes.)	43%	8%

The results indicated that employees (57%) and MBA students (34%) spoke up about unethical concerns they had witnessed. The students encountering and speaking up about these concerns were intriguing as most of the students have work experience but are more side-jobs (such as servers etc.) or temporary jobs (such as internships, graduate assistants, etc.) pursuing a full-time career.

Furthermore, after speaking up about ethical concerns, employees (62%) and MBA students (38%) were fairly or very satisfied with the outcome. This indicates that there is improvement needed when individuals do come forward. Other literature has found that not all administration takes their ethical guidance role seriously (Danely et al., 1996). It is recommended for managers, leaders, and organizations to encourage employees to speak, investigate the report quickly, and, if possible, report back on the decisions made (Detert&Treviño, 2010).

The employees (43%) and MBA students (8%) also indicated that they received some disadvantage or retaliation for speaking up. As mentioned previously, retaliation against whistle-blowers is illegal under the SOX. In addition to being illegal, the mishandling of ethical problems brought to light creates a negative culture and destroys trust (Bartolome & Laruent, 1986; Stanwick, & Stanwick, 2016). It can also inhibit others from speaking up in the future. It is recommended that organizations work towards a robust ethical culture and ethical leadership, as that encourages others to speak up, feel protected from retaliation, and believe positive actions will be taken about their concerns (Schaubroeck et al., 2012).

The next area under investigation discusses why participants perhaps did not speak up about unethical activity. The results are in Table 4 below.

Table 4
Speaking Up Survey Results

Survey Item	IBE	MBA
Which of the following, if any, influenced your decision not to raise or speak up about your concerns?		
I felt I might jeopardize my job	34%	31%
I did not believe that corrective action would be taken	34%	34%
I did not want to be seen as a troublemaker by management	25%	21%
I felt it might alienate myself from my colleagues	21%	1%
I felt it was none of my business	21%	31%
I thought that they already knew about it	15%	10%
I did not know who to contact	11%	17%
I didn't think it was a serious issue at the time	9%	17%
I thought it would be raised by someone else	8%	24%
I thought that it was common practice	8%	.03%

The results indicated that employees (34%) and MBA students (31%) did not want to jeopardize their jobs, so they remained silent. This finding is interesting as many MBA students are still pursuing full-time employment. However, the fear of losing one's job is also why others in related literature remained silent (Kish-Gephart et al. 2009; Milliken, Morrison, &Hewlin, 2003). Some respondents also believed employees (34%) and MBA students (34%) that no corrective action would be taken. Literature suggests that the administration must take swift remedial action when someone reports wrongdoing (Bartel et al., 1998; Miceli, Near, & Dworkin, 2009). If not, fewer employees are willing

to speak up, as indicated by some respondents here. Being alienated from colleagues was a bigger concern for employees (21%) than MBA students (1%). Social aspects are another element that an organization should consider when attempting to get people to come forward. MBA students thought it was none of their business (31%) compared to employees (21%) or that it would be raised by someone else employees (8%) and MBA students (24%). Organizations that want to enhance ethical behavior should promote accountability, with these findings, that may be helpful (Desai & Kouchaki, 2017; Cremer & Moore, 2019).

Supportive Environment

This section analyzes how ethics are used in their organization, and we also investigate what MBA students are seeking from future employers. In particular, the survey investigates the role of management, how organizations engage with stakeholders on ethics, whether organization discipline employees who breach ethical standards, and attitudes towards minor breaches of the rules. The findings are in Table 5 and Table 6 below.

Table 5
Supportive Environment Survey Results

Survey Item	IBE	MBA
To what extent do you agree or disagree with each of the following statements? IBE <i>Percentage of respondents who said either strongly agree or tend to agree.</i>		
How important are the following statements to you? (Please consider your future employment situation for these questions.) MBA <i>Percentage of respondents who said either very important or extremely important</i>		
Overall my line manager sets a good example of ethical business behavior	71%	97%
Senior management take ethics seriously in my organization	70%	97%
My line manager supports me in following my organization's standards of ethical behavior	68%	97%
My line manager explains the importance of honesty and ethics in the work we do	65%	97%
My line manager rewards employees who get good results, even if they use practices that are ethically questionable	32%	36%
My organization acts responsibly in all its business dealings (with customers, clients, suppliers, etc.)	76%	97%
My organization lives up to its stated policy of social responsibility	71%	97%
Issues of right and wrong are discussed in staff meetings	58%	97%
In my organization, decisions about people are made fairly	65%	97%
People in my organization know what is expected of them in terms of ethical behavior	78%	93%
My organization disciplines employees who violate my organization's ethical standards	63%	97%
People in my organization are held accountable when they break ethical rules	68%	97%

Table 6
Supportive Environment Survey Results

Survey Item	IBE	MBA
To what extent do you agree or disagree with each of the following statements? <i>Percentage of respondents who said either strongly agree or tend to agree.</i>		
Minor breaches of the rules are inevitable in a modern organization	40%	46%
If we cracked down on every minor breach of the rules, we would soon find we had no staff	36%	36%
If we cracked down on every minor breach of the rules, we would soon find we had no suppliers	31%	39%
As long as I come in on time and within budget, I am not going to worry about some minor breaches of the rules	26%	14%
It is acceptable to artificially increase profits in the books as long as no money is stolen	13%	4%

The study's findings also gathered information on how vital an ethical environment would be for MBA students versus what current employees are experiencing. It is very clear from the results that MBA students strongly desire an ethical environment from future employers, as 97% of the student's responses indicated that a moral climate or ethical support is very important or extremely important to them. The MBA students (14%) compared to current employees (26%) also indicated that they were uncomfortable with even a minor breach of the rules to be on time and on budget. To create the right supporting ethical environment, organizations and management should communicate the importance of ethics, reward those who act ethically, and successfully deal with ethical problems reported (Bartel et al., 1998; Mayer, Kuenzi, & Greenbaum, 2010). A robust ethical climate is desired from future employees, and it, if it is provided, will also have less serious ethical issues.

Ethics Programs

This section explores employees' awareness of and the MBA students' desire for written standards of ethical conduct, confidential reporting, ethics training, and an advice helpline. All responses are provided in Table 7. Note that the table has some distinct differences in response reporting. The IBE survey asked about the awareness of programmatic ethical components at the participant's organization so the options for responding reflect their application of the concept while the MBA students were asked about their perceived importance of the same issues.

Table 7
Ethics Programs

Survey Item	IBE Application	IBE US Application	MBA Importance
My organization has written standards of business conduct that provide guidelines for my job	67% Yes 22% No 12% Don't know	87% Yes	64% Extremely 32% Very 4% Moderately
My organization provides employees with a means of reporting misconduct confidentially	57% Yes 27% No 16% Don't know	73% Yes	64% Extremely 29% Very 7% Moderately
My organization provides training on personal conduct	52% Yes 37% No 12% Don't know	74% Yes	50% Extremely 36% Very 11% Moderately 4% Slightly
My organization offers advice or an information hotline where I can get advice about behaving ethically at work	46% Yes 39% No 15% Don't know	63% Yes	54% Extremely 25% Very 18% Moderately 4% Slightly

The international and U.S. numbers provide the affirmative responses but only the international responses indicate the breakdown of the remaining values into No or Don't know (due to available data from IBE). The U.S. application is more in line with the perceived importance when comparing the sum of respondents that selected Extremely and Very. The international averages were lower. Overall, the training and hotline were not as available or as important as the standards of conduct and reporting opportunities.

Current and Future Issues

This section explores employees and MBA students' perception of the impact of restrictions imposed due to COVID-19 as well as concerns employees and MBA students have about the future of the workplace. All responses are provided in Table 8.

Table 8
Concerns About the Future Workforce

Survey Item	IBE	IBE US	MBA
Loss of interpersonal interactions due to the effects of the COVID-19 lockdown	44%	50%	63%
Misuse of Artificial Intelligence (AI) for unethical behavior (e. g. for discrimination, privacy violations)	41%	45%	67%
Discrimination or bias in the workplace	41%	44%	75%
Automated machines of Artificial Intelligence replacing humans in the workforce	41%	39%	59%
Loss of interpersonal interactions due to new technologies	40%	45%	63%
Inability of organizations to live up to their stated ethical standards	37%	41%	66%
Increased level of unethical behavior due to an increase in the use of new technologies	35%	38%	74%
Increased surveillance and monitoring in the workplace	35%	36%	55%
New workplace/skillset requirements due to digitalization and new technologies	34%	36%	63%

Students were much more concerned about the COVID-19 impact and the future of the workforce. It is hypothesized that the uncertainty of employment following graduation impacted their responses (students completed the survey early in the Fall term of the academic year when very few had secured positions following the traditional May graduation). This highest area of concern for MBA students was the potential for discrimination and bias while current employees indicated that the biggest concern was the loss of personal interaction due to COVID-19. It is of note that the MBA program is in an area that is not considered diverse in terms of minority population. This could have contributed to the high concern for bias.

Overall, MBA students felt the general organizational response to the COVID-19 pandemic caused organization ethics to improve (47%) or stay the same (33%). Thirteen percent felt organizational ethics worsened based on the pandemic and 7% elected not to respond. The IBE responses were based on employee's opinions of how their organization behaved. Fifty-four percent believed that their organization stayed the same while 37% felt that their organization's ethics improved. Only 8% felt it worsened and 2% elected not to respond. Interestingly, the US numbers were reversed for the first two. Employees felt their organization's business ethics improved 54% and stayed the same 38% which is more comparable to the MBA student responses to the overall business ethics climate.

LIMITATIONS

Although the IBE ethics at work: 2021 international survey of employees had 9,834 respondents in 13 countries, with roughly 750 respondents in each country, our current comparison data was only with one school in West Virginia. Thus, this study's generalizability is limited but still provides fruitful findings to encourage more research.

The study also compared to the IBE survey outputs but did not have access to the raw data. This was especially evident in the comparisons where United States sub data varied from the international averages and was added to the findings to illustrate a closer connection to the MBA student responses.

Although unique identifiers were removed, there is also the possibility of distrust with completing the questionnaire and answering honestly. A survey does provide efficient responses, but there were also no open-ended questions for further elaboration from respondents.

FUTURE RESEARCH

This study is designed to spur future research. It would be a benefit for the sample size of MBA programs to increase with the number of schools partaking and expand geographically. Broader comparisons could be made between the data and if a longitudinal study were conducted, over time, trends could be identified and perhaps predict ethical

changes in the work environment. Research could also be conducted asking students who have entered the workforce to compare their expectations formed while in graduate school to their realities of the workplace. This data could also be correlated to the IBE findings to look for relationships. Additionally, access to the IBE raw data could find additional similarities or differences between the current workforce and students enrolled in an MBA program.

It would also be interesting to know why employees and MBA students were dissatisfied with the outcome after coming forward about an ethical concern. Follow-up studies are recommended to see if retaliation is still a concern for people speaking up.

CONCLUSION

In summary, this research study aimed to compare current employees' ethical perceptions, experiences, and attitudes with the future workforce. The results can aid employers and organizations in ethical improvements and attitudes and perceptions on the horizon. The findings indicated that MBA students are already encountering ethical concerns, regardless of full-time work experience. A troublesome result was the number of negative effects or retaliation people encountered after speaking up about unethical pieces. Companies and schools should provide education on the law in those realms. The results also indicated that students are very concerned about the future of the workplace. They have very high ethical expectations from their employer as well. This can be a great advantage for everyone as a better ethical business avoids all the potential negative impacts to stakeholders and is a much more successful business in regards to profit (Upadhyay & Singh, 2010).

REFERENCES

- Bartels, L. K., Harrick, E., Martell, K., & Strickland, D. (1998). The relationship between ethical climate and ethical problems within human resource management. *Journal of Business Ethics* 17, 799-804.
- Bartolome, F., & Laruent, A., (1986). The manager: master and servant of power. *Harvard Business Review*, 64(6), 77-81.
- Cremer, D. D., Mayer, D. M., & Schminke, M. (2010). On understanding ethical behavior and decision making: A behavioral ethics approach. *Business Ethics Quarterly*, 20(1), 1-6.
- Cremer, D. D., & Moore, C. (2020). Toward a better understanding of behavioral ethics in the workplace. *Annual Review of Organizational Psychology and Organizational Behavior*, 7(3), 369-393.
- Danely, J., Harrick, E., Schaefer, D., Strickland, D., Sullivan, G., (1996). HR's view of ethics in the workplace: Are the barbarians at the Gate? *Journal of Business Ethics*, 15(3), 273-285.
- Desai, S. D., & Kouchaki, M. (2017). Moral symbols: A necklace of garlic against unethical requests. *Academy of Management Journal*, 60(1), 7-28.
- Detert, J. R., & Treviño, L. K. (2010). Speaking up to higher-ups: How supervisors and skip-level leaders influence employee voice. *Organization Science*, 21(1), 249-270.
- Dutton, J. E., Ashford, S. J., Lawrence, K. A., & Miner-Rubino, K. (2002). Red light, green light: Making sense of the organizational context for issue selling. *Organization Science*, 13(4), 355-369.
- Dutton, J. E., Ashford, S. J., O'Neill, R. M., Hayes, E., & Wierba, E. E. (1997). Reading the wind: How middle managers assess the context for selling issues to top managers. *Strategic Management Journal*, 18(5), 407-425.
- Dutton, W. S. (1931). Getting on in the World. *Saturday Evening Post*, 204(12), 33-118.
- Epley, N., & Kumar, A. (2019). How to design an ethical organization. *Harvard Business Review*, 97(3), 144-150.
- Institute of Business Ethics (2021) Ethics at work: 2021 international survey of employees. IBE. <https://www.IBE.org.uk/ethicsatwork2021.html>
- Kish-Gephart, J. J., Detert, J., Trevino, L. K., & Edmondson, A. C. (2009). Silenced by fear: The nature, sources, and consequences of fear at work. *Organizational Behavior* 29, 163-164.
- Mayer, D. M., Kuenzi, M., & Greenbaum, R. L. (2010). Examining the link between ethical leadership and employee misconduct: The mediating role of ethical climate. *Journal of Business Ethics*, 95(1), 7-16.
- Moore, C., & Gino, F. (2015). Approach, ability, aftermath: A psychological process framework of unethical behavior at work. *Academy of Management Annals*, 9(1), 235-289.
- Miceli, M. P., Near, J. P., & Dworkin, T. M. (2009). A word to the wise: How managers and policymakers can encourage employees to report wrongdoing. *Journal of Business Ethics*, 86, 379-396.
- Milliken, F. J., Morrison, E. W., & Hewlin, P. F. (2003). An exploratory study of employee silence: Issues that employees don't communicate upward and why. *Journal of Management Studies*, 40(6), 1453-1476.
- Niven, K., & Healy, C. (2016). Susceptibility to the 'dark side' of goal setting: Does moral justification influence the effect of goals on unethical behavior? *Journal of Business Ethics*, 137(1), 115-127.
- Ferrell, O. C., Fraedrich J., Ferrell, L. (2011). *Business ethics: Ethical decision making and cases*. Cengage.

Rockness, H., & Rockness, J. (2005). Legislated ethics: From Enron to Sarbanes-Oxley, the impact on corporate America. *Journal of Business Ethics* 57, 31-54.

Schaubroeck, J. M., Hannah, S. T., Avolio, B. J., Kozlowski, S. W., Lord, R. G., Treviño, L. K., Dimotakis, N., & Peng, A. C. (2012). Embedding ethical leadership within and across organization levels. *Academy of Management Journal*, 55(5), 1053-1078.

Scholten, W., de Vries, F., & Besieux, T. (2022). A better approach to avoiding misconduct. *Harvard Business Review*, 100(3), 104–111.

Stanwick, P. A., & Stanwick, S. D. (2016) *Understanding business ethics*. Sage.

Upadhyay, Y., & Singh, S. K. (2010). In favour of ethics in business: The linkage between ethical behaviour and performance. *Journal of Human Values*, 16(1), 9-19.

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EXAMINING THE IMPACT OF COURSE DESIGN, COGNITIVE SCAFFOLDING, AND STUDENT ENGAGEMENT ON STUDENT LEARNING OUTCOMES IN INTRODUCTORY ACCOUNTING CLASSES

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ABSTRACT

The pandemic sped the transformation of traditional brick and mortar classrooms to on-line learning environments. This transformation requires faculty to deliberately replace or replicate the structure, content, and personal relationships endemic to a traditional classroom environment. Research identifies a variety of foundational elements that support positive learning outcomes and student satisfaction. These foundational elements include course design, cognitive scaffolding, and student engagement. This research measures the impact of course design, cognitive scaffolding, and student engagement on student learning outcomes in Introductory Financial Accounting courses. The research finds evidence that a course design with cognitive scaffolding, incorporating regular and strict student engagement improves student learning outcomes.

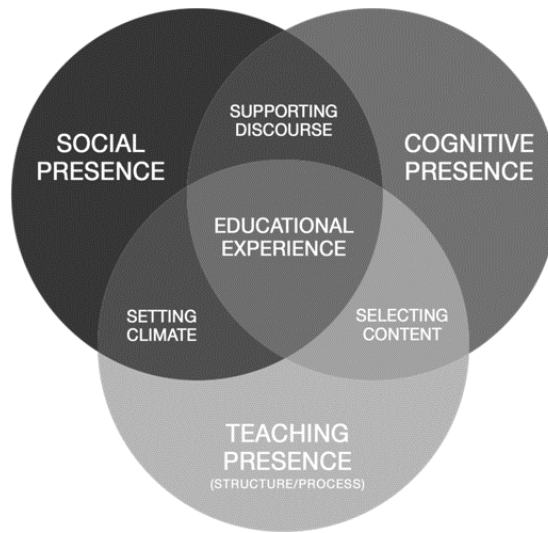
INTRODUCTION

The evidence on growing on-line enrollments is mixed and uncertain and recent data is certainly skewed by the pandemic. Inside Higher Ed (Lederman, 2021) reported a 93% increase in distance education enrollments between Fall 2019 and Fall 2020. Schools such as Western Governors (WG), Southern New Hampshire University (SNHU), and University of Maryland Global Campus (UMGC) report significant growth. SNHU grew from 135,000 students to 175,000 students in just over six months in 2022. Despite the rapid growth in online enrollments at selected schools, the overall trend may be just a blip. A recent survey reports that “before the pandemic, 0.28 percent of the high school respondents said they planned to attend college fully online. In 2022, that figure more than doubled, to 0.72 percent.” (Newton, 2022). An increase, but hardly a tidal wave given declining enrollments at both 2-year and 4-year institutions (Weissman, 2021). In fact, the competition for students has increased, with some taking place in the online educational space, and this reinforces calls for quality.

Significant bodies of theoretical and empirical research inform effective online teaching. Much of this research stretches back to centuries. John Dewey (1929) viewed education and learning as social and interactive processes. Students had to interact with the curriculum and take part in their own learning. Vygotsky (1978) advanced the concept of a zone of proximal development, a metaphor for cognitive development, representing the space between what a student can learn on their own and what they can accomplish with the help knowledgeable teacher. More recently Chickering and Gamson (1987) offer principles to improve undergraduate education. They identify seven effective practices: “(1) encourages contacts between students and faculty; (2) develops reciprocity and cooperation among students; (3) uses active learning techniques; (4) gives prompt feedback; (5) emphasizes time on task; (6) communicates high expectations; and (7) respects diverse talents and ways of learning.” This research evaluates a course design that emphasizes active learning, prompt feedback, time on task, and offers diverse ways of learning. Students engage in six distinct categories of learning activities, are assessed on 94 assignments, most of which provide immediate feedback.

Further the course draws on the Community of Inquiry model designed by Garrison et al. (2000) and Garrison (2007). Garrison’s Community of Inquiry model identifies three types of intersecting presence required for an effective educational experience. Effective teaching and an effective online course require a social presence, cognitive presence, and teaching presence. Social presence relates to connectedness, a sense of community that requires open communication and group connectedness. Garrison describes Cognitive presence “in the context of a general model of critical thinking” (p. 98). It requires students to create knowledge purposefully and collaboratively. Teaching Presence is derived from two primary functions course design and facilitation. Course design includes the structure, content, and organization of the course. Learning is facilitated through communication, instructional prompts, instructional content, and feedback. (Garrison et al., 2000)

The Community of Inquiry model Garrison et al. (2000)



The intersecting zones are the educational experience. It can be thought of as the zone of proximal development as advanced by Vygotsky (1978), or the social interactive learning process advanced by Dewey (1929).

The study evaluates the impact of course design, facilitation, and cognitive structure on student engagement and learning outcomes. The design of the course including the development of learning resources, selection, and construction of course activities and assessments was intentional, reflecting the need for active student engagement, significant time on task, scaffolded course activities, prompt feedback, diverse opportunities for learning. The sections that follow outline the course design, assignment structures, methodology, findings, and conclusions.

STUDY DESCRIPTION

The study evaluates student performance in three asynchronous sections of Financial Accounting during the spring semester in 2021. All three sections used identical D2L and Connect course shells and instructional content.¹ The two control sections, taught by a single professor, had an initial combined enrollment of 78 students and used unstructured assignment due dates. The treatment section, taught by a second professor, had an initial enrollment of 38 students and used structured assignment dates reflecting the scaffolded design of course assignments. The research evaluates student engagement and performance by on 94 unique assignments spanning 6 broad assessment categories. In addition to the assignments describe below, the students had access to a variety of other learning resources including, but not limited to a SmartBook, PowerPoint notes, and WSJ articles. The sections that follow describe the assignment types, course structure, the control and treatment conditions, and student outcomes.

Assignments

The course structure and assignments are intentional and reflect a multi-tiered scaffolded approach to student learning. Students assessed on 94 activities spanning six broad categories as described below and listed in table 1.

Table 1: Breakdown of assignments and points

Assignment	Number	Points
Connect – Interactive Preview	13	69
Excel – Chapter Handouts	11	77
Connect – Account Quizzes	32	32

¹ D2L (Desire to Learn) is the university's LMS (Learning management system). Connect is a publisher (McGraw-Hill) LMS.

Connect – Homework	28	243
Excel – Worksheets	6	60
Connect – Exams	4	500
Total	94	981

The Connect Interactive Previews were publisher prepared assignments incorporating lecture videos and embedded concept check questions. The assignments followed chapter learning objectives and included basic multiple choice and open-ended questions.

The Excel Chapter Handouts were custom Excel workbooks that included a chapter overview (embedded video) and separate assignments (worksheet tabs) for chapter learning objectives. The chapter overview was a short 10 to 15 - minute instructor prepared lecture video. The tabs were self-correcting worksheets with embedded instructional videos that walked students through a version of the assigned handout/problem. Students completed a similar problem with different values. The worksheets made use of conditional formatting, data validation fields, and embedded comments to guide students through each worksheet tab (learning objective). The conditional formatting used a bold blue font to indicate correct student answers.²

The Connect Account Quizzes were brief, repetitive, 20 question multiple choice quizzes that required students to identify specific accounts as an asset, liability, equity, revenue, or expense. The 20 questions (accounts) were initially drawn from a pool of 27 accounts in chapter one, but the pools grew to 45 accounts by the end of the course. Initially quizzes took students 5-10 minutes to complete, but by the end of the course as students mastered the content this time was cut to 2-3 minutes.

The Connect Homework assignments were algorithmically generated mini-exercises, exercises, and problems. Each chapter had two homework sets. Homework set A included basic mini-exercises and exercises at the lower levels of Bloom's taxonomy, while homework set B included more challenging exercises and problems, at higher levels of cognition.

Roughly half the chapters included Excel Worksheet assignments that required students to complete/build Excel worksheets using formulas and functions to solve problems, answer questions, and analyze financial statements. Several of these assignments assessed student learning at the highest levels on Bloom's Taxonomy.

There were four on-line Connect Exams, consisting of three interim exams and a comprehensive final covering all 13 chapters. Exams included a limited number of pooled static conceptual multiple-choice questions, and a larger number of algorithmically generated open ended questions. A point breakdown of exam questions by point weighting appears in table 2.

Table 2: Exam points by question type

	Static	Algorithmic	Total
Exam 1	22	78	100
Exam 2	22	78	100
Exam 3	20	80	100
Exam 4	55	145	200

Students had 120 minutes to complete interim exams and 150 minutes to complete the final exam. The exams made use of the free version of McGraw-Hill's proctoring software which locks down web browsers, limits access to external websites, blocks downloads, disables copy and paste features, right clicking, and prevents technical ways of interfering with lock down options. Students were required to sign an integrity agreement before beginning exams. I have no evidence as to the effectiveness of the McGraw-Hill's proctoring software other than student performance. The average exam score was a 74%, with a median of 77%, which suggest no wide-spread cheating.

²Blazer, Eric, "Delivering Just-In-Time Learning With Self-Correcting Excel Worksheets." The Academy of Business Education, 2007. https://www.abeweb.org/files/ugd/4ccb80_d32385a6288d4754a2a62fad97643930.pdf

COURSE STRUCTURE

The course structure incorporated a multi-tiered scaffolding approach to student learning. At the broadest level, the course's structure followed the textbook's chapter progression and the order of learning objectives within each chapter. Each chapter opens with a short focus company vignette that attempts to link the previous chapter's content to the current chapter's learning objectives.³ A second tier of scaffolding involved the structure and order of assignments within each chapter. The assignments reflect scaffolded content as well as scaffolded levels of cognition as reflected in Bloom's Taxonomy (Bloom 1956). In general, assignments progressed following Bloom's taxonomy from basic remembering to analyzing and evaluating, with an occasional creative assignment. The typical order of assignments for each and the level of learning is presented in table 3.

Table 3: Sample assignment weekly due dates

Monday	Interactive Preview (Connect)	Remember/Understand
Tuesday	Chapter Handout (D2L)	Understand/Apply
Tuesday	Account Quiz (A)	Remember
Thursday	Account Quiz (B)	Remember
Friday	Homework Set A (Connect)	Understand/Apply
Saturday	Excel - Assignment (D2L)	Analyze/Evaluate/Create
Sunday	Homework Set B (Connect)	Apply/Analyze/Evaluate

The intermediate due dates (Monday, Tuesday, Thursday...) referenced above applied only to the treatment section. The two non-treatment sections had a single due date for all chapter assignments (Sunday evening).⁴

As previously noted, the account quizzes were basic repetitive quizzes, they drew from an expanding question pool as the course progressed. This scaffolding approach allowed students to continuously build on a growing foundation of knowledge. For the treatment group this scaffolding approach was reinforced by restricting quizzes to a two-day window. That is students in the treatment group could not work ahead or complete more than one account quiz in any two-day period. Students in the treatment group were required to login to Connect on a regular basis to complete the 32 account quizzes. In fact, treatment section students had assignments due most every day of the semester, and these assignments progressed systematically from the lowest levels of learning on Bloom's taxonomy to higher levels of learning.

This contrasts with students in the two non-treatment sections that had a single due date, one for each chapter's assignments. Students in the non-treatment sections could complete account quizzes as well as other assignments any time prior to their Sunday evening due date. As such, students were not required to regularly engage with course content, and this resulted in lower levels of overall course engagement, higher withdraw rates, lower grades, and lower course completion rates.

RESULTS

Course structure had a significant impact on student engagement, course completion rates, and final course grades, but only a modest impact on average exam scores. Furthermore, a trimmed sample excluding students who either officially or unofficial (implicit) withdrew from the course, failed to show a significant difference in exam performance between the treatment and control groups.

³The adopted textbook is "Fundamentals of Financial Accounting 7e." Phillips, Clor-Proell, Libby, and Libby, McGraw-Hill, 2022. Several learning objectives in later chapters were omitted.

⁴ Due to exams, holidays, breaks, and content not all chapters followed a Monday-Sunday schedule.

Student Engagement

Student engagement as measured by the percentage of attempted assignments were consistently higher for the control group across all types of assignments. A summary of these findings appears in table 4. Structured interim due dates force students to engage in course materials early and on a regular basis. A single weekly due date enables procrastination and increased the likelihood that students did not complete assignments. Students in the treatment group attempted 94% of the course assignments compared with only 81% for the control group.

Table 4: Percentage of assignments and exams attempted

Assignment	Number of assignments	Treatment Group	Non-Treatment Group
Connect – Interactive Preview	13	93%	70%
Excel – Chapter Handouts	11	89%	78%
Connect – Account Quizzes	32	96%	90%
Connect – Homework	28	94%	80%
Excel – Worksheets	6	88%	54%
Exam 1	1	100%	96%
Exam 2	1	100%	93%
Exam 3	1	95%	90%
Exam 4	1	97%	92%
Total	94	94%	81%

Course Completion Rates

Not surprisingly, higher levels of student engagement led to higher course completion rates. Course completion rates were measured across three dimensions related to an official university withdraw, an unofficial or implicit withdraw, or a student's failure to earn a C- or better, the required minimum grade. A summary of course completion rates appear in table 4.

The university has an unrestrictive withdraw policy. Students are free to withdraw from a course for any reason through week 10 of a 15-week semester. Students in the treatment group had slightly higher official withdraw rate (7.5%) than the control group (6.4%). This reduced sample sizes to 37 and 73 students respectively. However, despite the university's generous withdraw period, students often quit attending, yet fail to submit an official withdraw. To more accurately measure student engagement and course performance our final or trimmed sample excludes students who tacitly withdrew. Students were considered to have tacitly withdrawn from the course if they failed to take two of the four exams. By this combined measure (official and tacit withdraws) 10% of the treatment group withdrew from the course compared to 15.4% control group. The trimmed samples (n= 36 for the treatment group and n=66 for the control group) are used to compare assignment performance and grades in the sections that follow.

Table 4: Course Completion rates

	Treatment	Control
Original Enrollment	40	78
Official Withdraws	3	5
Withdraw percentage	7.5%	6.4%
Official and tacit withdraws*	4	12
Combined withdraw percentage	10.0%	15.4%
Failed to successfully complete the course**	6	28
Failure to successfully complete the course (%)	15.0%	35.9%

* Includes students who failed to take two of the four exams.

* Successful completion requires a C- or better for the final course grade.

Finally, and perhaps most importantly, as it relates to student success, retention efforts, and 4-year graduations rates, was a student's failure to earn the required minimum course grade of a C- or better. By this metric, students in the treatment group were more than half as likely to experience an unsuccessful course outcome (15%) compared to s (35.9%) for the control group (15%). Student outcomes are more fully examined in the next sections.

Final Course Grades

As would be expected based on the documented student engagement, students in the treatment group had significantly higher average course points and better final grades than students in the control group. These results and all grade-based comparisons are based on trimmed sample means that exclude both official and tacit student withdraws. The results of a t-test comparing average total course points assuming unequal sample variance appears in table 5. The average total course points for students in the treatment group was 783.5/981 points compared to 704/981 points for students in the control group. The difference of 79.5 points, is close to a full letter grade and is statistically significant with a p-value of 0.0005 for a one-tail test. This result is not surprising given that students cannot earn points on assignments they fail to attempt.

Table 5: Total Course Points

t-Test: Two-Sample Assuming Unequal Variances		
Total Course Points		
	Control	Treatment
Mean	704.0	783.5
Variance	21749.6	7714.1
Observations	66	36
Hypothesized Mean Difference	0	
df	99	
t Stat	-3.408	
P(T<=t) one-tail	0.0005	
t Critical one-tail	1.6604	
P(T<=t) two-tail	0.0009	
t Critical two-tail	1.9842	

As a result of attempting fewer assignments and earning fewer course points, it's not surprising that students in the control group had lower average course letter grades. Final grades based on a traditional 10-point scale are reported in table 6. Final grades were based on a 50/50 weighting of exam scores (500 points) and other course assignments (481 points) as detailed in table 4.

Table 6: Total Course Points

Letter Grade	Treatment		Control	
	Number	Percent	Number	Percent
A	5	12.5%	11	14.1%
B	19	47.5%	21	26.9%
C	10	25.0%	18	23.1%
D	0	0.0%	8	10.3%
F	3	7.5%	11	14.1%
Z*	0	0.0%	4	5.1%
W	3	7.5%	5	6.4%

* Equivalent to an "F". Professors have the discretion to assign a "Z" grade to students who quit attending but do not officially withdraw.

As previously noted, students in the treatment group experienced significantly higher success rates than students in the control group. Students in the treatment group were more engaged, earned more points, and better grades than students in the control group. The success rate (earning a C- or better) was 85% for the treatment group compared with just 64.1% for the control group.

Points by Assignment Category

As noted in the prior section students in the treatment section attempted more assignments, earned significantly more course points, and higher final grades than control group students. A breakdown of assignment points by category appears in table 7. For non-exam assignments, the treatment group earned significantly higher average points across all five assignment categories (Interactive Previews, Handouts, Account Quizzes, Connect Homework, and Excel worksheets) at p-values ranging up to .029. Problematically one of the most significant differences was for the Interactive Preview, the student's initial content driven learning resource for each chapter.

Table 7: Points by Assignment Category
t-test assuming unequal sample variances

trimmed sample n=36 treatment, n=66 control

	Interactive Preview	Excel Handouts	Account Quizzes	Connect Homework	Excel Worksheets	Cumulative Final Exam	Exam Total
Total Points	69	77	32	243	60	200	500
Treatment	61.4	69.8	29.8	209.1	41.1	150.3	372.3
Control	<u>47.2</u>	<u>61.0</u>	<u>27.8</u>	<u>173.4</u>	<u>26.2</u>	<u>144.7</u>	<u>368.4</u>
Difference	14.2	8.9	2.0	35.7	14.9	5.5	3.9
t-Stat	5.229	2.990	2.217	3.857	5.977	0.954	0.308
p-value (one-tail)	0.000	0.002	0.014	0.000	0.000	0.171	0.380
p-value (two-tail)	0.000	0.004	0.029	0.000	0.000	0.343	0.759

Interestingly, while average assignment scores were lower for all assignment categories, the difference was not significant for exams. The difference on the final exam was 5.5/200 points (p-value .171) and 3.9/500 points (p-value .380) for total exam points.

CONCLUSIONS

An online asynchronous course with scaffolded learning activities and assessments combined highly structured due dates led to significantly higher levels of student engagement, higher course retention rates, significantly higher average assignment scores, better letter grades, and significantly higher rates of successful course completion rates. It did not significantly improve exam performance. As the research was conducted in asynchronous online introductory

level accounting classes, structured due dates may not be as important in face-to-face learning environments with frequent class meetings, or upper-level courses. Examining the impact of structured assignments and due dates on face-to-face classes and in particular classes that meet once a week would be informative.

REFERENCES

- Al-Dheleai, Y.M., Tasir, Z. (2019). Web 2.0 for fostering students' social presence in online learningbased interaction. *Journal of Technology and Science Education*, 9(1), 13-19.
- Barnes, C.L. (2016). Where's the teacher? Defining the role of instructor presence in social presence and cognition in online education. *Humanizing Online Teaching and Learning. CreateSpace Independent Publishing Platform*.
- Bloom, B. S. (1956). *Taxonomy of educational objectives, handbook I: The cognitive domain*. New York: David McKay Co Inc.
- Chickering, A. W., & Gamson, Z. F. (1987). Seven principles for good practice in undergraduate education. *AAHE Bulletin*, 3, 7.
- Dewey, J. (1929). *My pedagogic creed*. In D. Flinders & S. Thornton (Eds.). (2009). *The curriculum studies reader*. New York, NY: Routledge.
- Fu, J. (2019, January 11). Five strategies for enhancing instructor presence in online courses. *Instructional Design*.
- Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education*, 2(2), 87-105.
- Garrison, D. R. (2007). Online community of inquiry review: Social, cognitive, and teaching presence issues. *Journal of Asynchronous Learning Networks*, 11(1), 61-72.
- Jackson, S.H. (2019). Student questions: A path to engagement and social presence in the online classroom. *Journal of Educators Online*, 16(1),
- Lederman, D (2021, September 16). Detailing Last Fall's Online Enrollment Surge. Inside Higher Ed.
- Lorenzo, G., & Moore, J. (2002). Five pillars of quality online education. The Sloan consortium report to the nation, 15-09.
- Newton, D. (2022, October 20). *Blip in online college enrollment doesn't mean what you think*. Forbes.
- Philips, F., Clor-Proell, S., Libby, R. Libby, P. (2022). *Fundamentals of Financial Accounting 7e*. New York: McGraw-Hill LLC.
- Quality Matters. (2014). Standards from the QM higher education rubric. (5th ed.).
- Richardson, J.C., Besser, E., Koehler, A., Lim, J., Strait, M. (2016, June). Instructors' Perceptions of Instructor Presence in Online Learning Environments. *International Review of Research in Open and Distributed Learning*, 17(4).
- Riggs, S., Linder, K. (2016, December). Actively Engaging Students in Asynchronous Online Classes. *IDEA Paper #64*.
- Rourke, L. & Kanuka, H. (2009). Learning in communities of inquiry: A review of the literature. *Journal of Distance Education (Online)*, 23(1), 19.
- Shea, P., & Bidjerano, T. (2009). Community of inquiry as a theoretical framework to foster epistemic engagement and cognitive presence in online education. *Computers & Education*, 52(3), 543-553.
- Tichavsky, L. P., Hunt, A. N., Driscoll, A., Jicha, K. (2015, July). It's Just Nice Having a Real Teacher": Student Perceptions of Online versus Face-to-Face Instruction. *International Journal for the Scholarship of Teaching and Learning*, v9 n2 Article 2.

Vygotsky, L. S. (1978). Interaction between learning and development. In M. Gauvain & M. Cole (Eds.), (1997).
Readings on the development of children (2nd ed.).

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DOES SENTIMENT DEPEND ON REFERENCE LEVEL? EVIDENCE FROM HONG KONG TYPHOON SIGNALS

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ABSTRACT

Using the typhoon signal mechanism in Hong Kong as a natural experiment, we find empirical evidence supporting the expectation-based reference-dependent preference through sentiment created by day-offs from typhoons. First, sentiment is experienced relative to a reference level: The stock market gains from likely day-off from looming typhoons and it is stronger than the holiday effect from weekends and public holidays. Second, the reference level is based on expectation: The market gains more under strengthening typhoon signals but less under weakening signals. Third, not-so-informative good news can be undesirable: The market drops under weak standby signals.

INTRODUCTION

Standard economic and finance models assume that individual decision making is neither affected by frames of reference nor emotional states. Recent evidence shows that individuals can depart significantly from these assumptions. In this paper, we focus on two key findings, namely reference-dependent preference, and sentiment effect. The former implies that an outcome is not only experienced just on an absolute scale but also experienced relative to a reference level (O'Donoghue and Sprenger, 2018). The latter suggests that the psychological state of an individual could distort one's belief so that positive sentiment leads to a more positive judgement (Barberis, 2018).

Besides complementing traditional asset-pricing models, reference-dependent preference has successfully offered additional insights and predictions (e.g., Campbell and Cochrane, 1999; Barberis, Huang, and Santos, 2001; Routledge and Zin, 2010). Furthermore, Köszegi and Rabin (2006, 2007, 2009) propose the "expectation-based reference-dependent preference" with one distinguishing feature that the reference level should be based on expectations about the present and future outcomes. One salient implication is that good news about future outcomes does not always make an individual better off. This predicts that individuals prefer less-frequent-more-informative signals to more-frequent-less-informative signals. While there is experimental evidence for this prediction (e.g., Gneezy and Potters, 1997; Anagol and Gamble, 2013; Falk and Zimmermann, 2016; Ganguly and Tasoff, 2017), we are, to the best of our knowledge, the first to conduct an empirical test on the implication.

Regarding psychological states, many studies have documented those changes in investors' sentiment led to observable impacts on the stock market. One explanation proposed in the literature is that positive (negative) sentiment is associated with positive (negative) judgement about the economic prospect (e.g., Saunders, 1995; Hirshleifer and Shumway, 2003; Kamstra et al., 2003; Edmans et al., 2007).

In this paper, we investigate the prediction of expectation-based reference-dependent preference in the financial market through changes in investors' sentiment. More specifically, we address the following questions: Is sentiment based on reference level? If so, is the reference level based on expectation? Can insufficient informative good news lead to negative sentiment?

We utilize the empirically established links between positive sentiment and holidays (Jacobs and Levy, 1988; Fabozzi et al., 1994; Bialkowski et al., 2012) to measure investors' sentiment. As investors are happier immediately preceding public holidays and weekends, the stock market performs better on these days, compared with on an ordinary day, which is known as "holiday effect".⁵

We document that Hong Kong stock market goes up on the days with typhoons (tropical cyclones) that are likely to warrant a day-off. We refer to it as "typhoon effect". Like holiday effect, investors are happy as they are expecting day-off, and this mood will be impounded in the stock prices. One may expect that holiday effect should be stronger

⁵ We do not distinguish weekend effect from holiday effect unlike some prior studies (e.g., Kim and Park, 1994).

than typhoon effect because the day(s)-off associated with a typhoon (usually one day) is shorter than those with a major holiday or a weekend (at least two days), and the day-off associated with a typhoon is probabilistic, as typhoon may weaken. Interestingly, we find the opposite results: the typhoon effect is stronger than the holiday effect. We propose to explain the phenomenon by the expectation-based reference-dependent preference—the reference point for typhoon effects is lower than holidays and weekends since the day-off due to typhoons is not fully expected. As will be discussed later, we find no evidence that our findings are driven by changes in weather conditions (e.g., Saunder, 1995; Hirshleifer and Shumway, 2003; Kamstra et al., 2003), the investor attention (e.g., Peng and Xiong, 2006; Da et al., 2011; Peress and Schmidt, 2020), surprise effect (e.g., Ely et al., 2015), or company fundamentals. Moreover, the price movements are accompanied by trading activities and more pronounced among small stocks and low-price stocks.

Our empirical evidence is based on the Hong Kong stock market because it has a unique pattern of day-off. The financial hub and its stock market are in operation every day except for two different types of day-off. The first type is weekends and public holidays. The dates are fixed in advance with no uncertainty. Investors get into the holiday mood on the preceding day. The second type is due to inclement weather from a nearby strong typhoon (tropical cyclone). With the advance in forecasting technology, potential typhoons can be identified in advance with great accuracy (Wong and Choy, 2018). However, since a typhoon may switch routes or weaken as it approaches the city, this type of day-off remains probabilistic.⁶ As it may take a few days for a typhoon to develop and travel, an early warning signal of a looming typhoon by the local observatory is an informative signal about an upcoming day-off.⁷ Since typhoon signals are classified based on the distance and strength of typhoons, a stronger signal implies a higher likelihood of having a day-off. There are five levels of typhoon signals, namely signals 1, 3, 8, 9 and 10. Signal 1 (referred to as T1) is a sign for “Stand By”; signal 3 (referred to as T3) indicates “Strong Wind”; signal 8 is a sign for a gale or storm, and signals 9 and 10 indicate even stronger threats. Financial market shuts down on signal 8 and above (referred to as T8).⁸ See Section 1 for further details on Hong Kong typhoon signals.

Our three empirical findings on the sentiment effects of typhoon signals are consistent with the predictions of expectation-based reference-dependent preference (Kőszegi and Rabin, 2006, 2007, 2009). First, we find evidence of the typhoon effect, i.e., as we have defined above, the stock market tends to go up on days with looming typhoons (T3) compared to an ordinary day, and the typhoon effect is stronger than the holiday effect (returns are higher on days before weekends and public holidays). While the typhoon effect can be explained by the positive sentiment facing a day-off, it may be surprising that the effect due to a probabilistic and shorter (typically only one day) day-off from typhoons is stronger than that from a 100% certain and longer (at least two days) day-off due to major holidays and weekends. We argue that the sentiment of investors is experienced relative to their prior expectations. The vacation from weekends and holidays is expected so that the relative gain is low. In contrast, the day-off contingent on incoming typhoons is not fully expected so the relative gain is high.

⁶ Technically, there is another type of day-offs due to inclement weather from heavy rains and it is also probabilistic. Since 1998, a black rainstorm signal will be hoisted if rainfall is or is expected to be above 70mm per hour. Different from typhoon signals, this only leads to a day-off if the signal is hoisted before the office hour. Moreover, most black rainstorm signals are related to typhoons and there is on average only one black rainstorm signal each year. In Section 3, we show that our result is robust when controlling for various weather conditions including rainfall.

⁷ To study the impact of probabilistic days-off on the financial market, the typhoon signaling in Hong Kong offers a unique natural experiment for the following two distinguishing features (and more features are discussed in greater detail in Section 1). First, Hong Kong is an internationally important financial market such that many financial institutions have regional trading offices with local representatives in the city. This implies that, when there is a typhoon, the whole city is affected, and the signals are the same across most market participants. Second, the typhoon signal is public information received by all market participants simultaneously, because this signaling system is well-known by all residents in Hong Kong, and the signals are publicized to all of them via various ways (including radio broadcasting, TV, and cell phone texts).

⁸ Signals 9 and 10 are very rare—only 8 typhoons with signals 9 or 10 over our sample period (1987-2017), so we combine the effect of signal 8, 9 and 10 together. All results remain intact if we separate them.

Second, we show that the stock market is more likely to go down under a standby typhoon signal (T1) that indicates a remote possibility of a typhoon holiday.⁹ This exactly reflects the importance of the informativeness of a signal predicted by expectation-based reference-dependent preference—a piecemeal good signal can be bad news. While a T1 may be viewed as “good news” (direct effect), it does not necessarily lead to a “good mood” since it is not informative enough. As shown in Kőszegi and Rabin (2009), an investor can be worse off when less informative good news leads to a fluctuation of beliefs (indirect effect). This negative indirect effect can overwhelm the positive direct effect under loss aversion. In contrast, when a typhoon signal is sufficiently informative (as shown for T3), it can lead to a “good mood” as the direct effect is overwhelming, and this leads to a better-performing stock market.

Third, we show that stock markets go up *more* when a typhoon signal is revising upwards than when a typhoon signal is lowering or fluctuating. This suggests that the reference level for investors’ sentiments is based on expectation. A rising typhoon signal indicates an incoming and strengthening typhoon. This implies that a typhoon holiday is more likely to occur, and investors feel better with the holiday mood. With such “good news”, the stock market is likely to go up. In contrast, if the typhoon signal is lowering or fluctuating, one would expect that the typhoon holiday is less likely to occur. With this “not-so-good news”, the stock market is likely to go up less.

To explore the mechanism of our empirical results, we conduct the following tests. First, we show that our typhoon effect is stronger among small stocks and low-price stocks, which are more heavily traded by individual investors. This is consistent with the behavioral finance literature that individual investors are more likely to depart from rational decision-making compared with institutional investors. Moreover, our result is also consistent with the lab experiments on reference-dependent preference in economics that undergraduates are less willing to choose a lottery that provides more interim information (Gneezy and Potter, 1997; Bellemare et al., 2005), and professional traders are less biased than undergraduates (Haigh and List, 2005).

Second, we show that the price movement due to typhoon signals is accompanied by the trading volume movement: trading volume increases when the stock market goes up under a looming typhoon and decreases when the market goes down under a standby typhoon signal. This evidence supports our explanation that the price movement is driven by mood.

Third, we show that for companies dually listed in Hong Kong and mainland China (AH companies), only the stock performances in Hong Kong (H-shares), but not in mainland China (A-shares), are affected by the typhoon signals. Since the investors participating in the A-share markets are in various geographical regions of mainland China, performance of A-shares is unlikely to be affected by the typhoons in Hong Kong and more likely to reflect the fundamentals of the underlying AH companies. This comparison suggests that our typhoon effects are unlikely to be subject to changes in company fundamentals.

Fourth, we show that our typhoon effect is not driven by the “surprise effect” as in Ely et al. (2015). They consider that merely unexpected belief change (surprise) may generate instantaneous utility.¹⁰ Therefore, one may argue that unlike a public holiday that is scheduled and expected, a day-off due to a typhoon is largely unforeseen. The positive mood induced by a typhoon signal may be driven by the change of the belief of having an extra day-off, rather than a piece of positive news about a more likely day-off. We first argue that according to the “surprise effect”, belief changes would result in positive utility. However, the T1 coefficient is negative and thus does not support the “surprise effect” as in Ely et al (2015). Second, typhoons are common in Hong Kong and the number of typhoons hitting the city is stable over the years. Moreover, if our typhoon effect is driven by “surprise”, it should be more salient in the months

⁹ As shown in the online appendix, during our sample period (1987-2017), there were 172 typhoons leading to T1, 106 of them became T3, and 47 of them became T8. This implies that only 27% of typhoons with standby signals (T1) lead to a day-off, compared to 44% of typhoons with looming signals (T3).

¹⁰ In their model, an individual derives instantaneous utility when the current period’s belief is different from the last period’s belief (surprise); while in our hypothesis, an individual derives utility only from outcomes themselves (both absolutely and relatively). One may argue that a typhoon signal can generate “surprise” as it changes individuals’ beliefs over possible day-off from typhoons so that the typhoon effect is “belief-driven” by surprise effect, instead of “outcome-driven” by our reference-dependence preference.

when typhoons are less frequent. Instead, our results show that the opposite—our typhoon effects are stronger during the months when typhoons are more frequent.¹¹

Fifth, we show that our results are not driven by changes in weather condition (e.g., Saunder, 1995; Hirshleifer and Shumway, 2003; Kamstra et al., 2003). Indeed, the literature suggests that favorable weather can boost the stock market through positive mood, and bad weather can depress the stock market through bad mood.¹² While this strengthens our positive T3 effect (i.e., the observed T3 effect may be underestimated), it may confound with our negative T1 effect (i.e., the observed negative T1 effect is not through the “piecemeal information”, but through the bad weather). To isolate the weather impact, we add weather variables as controls to our regressions. While we find that negative weather condition depresses stock market as documented in the literature, both of our T1 and T3 effects remain intact. This particularly rules out the hypothesis that the negative T1 effect is due to the conventional weather effect.

We further test the robustness of our results in various ways. First, we show that our result is robust after controlling the time trend. Second, when we restrict our sample to only days before public holidays and with typhoon signals, our result remains intact. Lastly, our result is robust when we track sections of the stock market by analyzing portfolio returns.

Our paper connects four lines of research. First, we contribute to the large literature on prospect theory (Kahneman and Tversky 1979; Tversky and Kahneman, 1992) where reference-dependent preference is the core ingredient. As prospect theory has been applied successfully in many economic settings (e.g., Camerer et al., 1997; Genesove and Mayer, 2001; Allen et al., 2014), it also offers explanations for stock market anomalies that are not directly explained by classical models (e.g., Barberis et al., 2016; Barberis et al., 2021). One of the major challenges to empirically test the reference-dependent preference is to find an appropriate reference point. For asset pricing, existing papers use historical stock price and stock characteristics such as turnover-based average history price (Grinblatt and Han, 2005; Wang et al., 2016), past stock gains and losses (Barberis et al., 2016), and dividend payment (Baker et al., 2016). However, Köszegi and Rabin (2006, 2007, 2009) argue that reference points should be based on an individual’s expectation. While its empirical evidence for economic models is not yet definitive (e.g., Crawford and Meng, 2011; Meng and Weng, 2017), it provides new predictions for asset pricing, portfolio choice and equity premium models (Pagel, 2016, 2017, 2018). Our paper provides another piece of evidence for expectation-based reference-dependent preference in the financial market based on sentiment effects. In particular, we find supporting evidence for the distinguishing prediction that “not-so-informative-good news” can be undesirable, which is rarely tested in other empirical studies.

Second, we contribute to the extensive literature on behavioral finance. One important result is that changes in investors’ sentiment could have a measurable impact on the stock market. For example, a country’s stock market is more likely to be above average on a sunny day than on a cloudy day (Saunder, 1995; Hirshleifer and Shumway, 2003), and more likely to trend downward for countries in the northern hemisphere as the winter solstice approaches due to the depression from Seasonal Affective Disorder (Kamstra et al., 2003), and when a national team loses a match in World Cup games (Edmans et al., 2007). Sentiment change is one of the explanations for the holiday effect, that is, stock prices are likely to go up before public holidays and weekends (Ariel, 1990; Lakonishok and Smidt, 1988; Chong et al., 2005; Cadsby and Ratner, 1992; Bialkowski et al., 2012). Our study complements the existing literature by showing that the sentiments of investors not only respond positively to certain days-off due to public holidays but also signal uncertain days-off due to inclement weather.

Third, our paper is related to the rapidly growing literature on the preference on information. There is a wide range of situations, so we briefly mention two extreme cases. One is that a decision-maker may pay for useless information (Loewenstein, 1994; Powdthavee and Riyanto, 2015). For example, investors log on multiple times during the weekend to check balance when the stock market is up. The other is that a decision-maker actively avoids information

¹¹ This is consistent with data that there is a much higher possibility for a day-off during peak months conditional on observing looming typhoon signals (i.e., T3).

¹² In a closely related vein, one may argue that, when the typhoon signals are hoisted, investors should feel unhappy due to the inconvenience brought by the rain and strong wind.

(Golman et al., 2017). One example is the “ostrich effect”: investors avoid looking at their financial portfolios when the stock market is down (Karlsson et al., 2009; Sicherman et al., 2016). We document that the stock market goes down under a standby typhoon signal and goes up under a looming typhoon. This suggests that if a weather forecast is not public information, an investor may be willing to pay to avoid a standby typhoon signal and to receive a strong typhoon signal. Hence, our result shows that the two extreme cases may coexist in the same framework.

Fourth, our paper contributes to the voluminous literature relating environments to economic outcomes. On one hand, at the aggregate level, historical temperature fluctuation has been shown to affect long-term economic growth (Dell et al., 2012) and climate change risk is priced across a large number of asset classes (Giglio et al., 2021a; Giglio et al., 2021b). On the other hand, at the individual level, air pollution would have a long-term impact on the labor market (Isen et al., 2017) and housing prices (Chay and Greenstone, 2005). For financial markets, while our typhoon effect comes from the sentiment effects due to the holiday effect from severe weather, it is unrelated to the weather effect in the existing literature (Saunders 1993; Hirshleier and Shumany, 2003; Kamstra et al., 2003). However, using weather conditions as control, our study provides additional evidence that the stock market is affected by daily and seasonal changes consistent with existing studies.

RESEARCH DESIGN

Expectation-based Reference-dependent Preference

Under expectation-based reference-dependent preferences (Kőszegi and Rabin, 2009), an individual’s total utility is the sum of the present discounted value of instantaneous utilities from consumptions in each period. There are two components for instantaneous utilities in each period. The first component is “consumption utility” which is determined by the absolute level of consumption of the same period. This part is the same as in other traditional models of utility.

The second component is the “gain-loss utility” which is determined by the present and future consumption relative to reference levels that are determined by the expectation of an individual. An individual experiences “contemporaneous gain-loss” when the individual compares the actual present consumption with the corresponding prior expectation. Additionally, the individual also experiences “prospective gain-loss” when there is a change in the expectation over future consumption.

Hence, the “gain-loss utility” can be interpreted as “utility over good and bad news”. If news about more imminent consumption has a larger impact than news about more distant consumption, an individual prefers to receive the same news sooner than later. However, when there is a loss aversion with “gain-loss utility”, bad news hurts an individual more than good news pleases the individual. Thus, an individual dislikes piecemeal good news because the damage brought by the fluctuations of belief due to possible future bad news may overcome the benefits of a partial resolution of uncertainty.

Therefore, an individual faces a tradeoff between the gain of early information and the loss of partial information. A piece of not-so-informative “good news” can reduce overall utility because it leads to a small gain due to a positive change of belief, but it also leads to a large loss from the loss aversion due to the shift in the expectation-based reference point in the future.

Sentiment

It has long been recognized that people with positive sentiments are more likely to have positive judgments than those with negative sentiments (Wright and Bower, 1992). Sentiment affects many aspects of a person’s decision-making process, including the use of heuristic and systematic thinking, abstract judgment, and assessment of both favorable prospects and risks (Hirshleifer and Shumway, 2003).

Investors’ sentiment has been shown to affect the stock market since stock prices reflect investors’ perception of future cash flows. For example, stock market returns are higher on days with sunshine (Saunders, 1995; Hirshleifer, and Shumway, 2003) and lower on daylight-savings-time-change weekends than on other weekends because the seasonal affective disorder affects people’s mood and the willingness to take risks (Kamstra et al., 2003). Mood changes due to sports-related losses are also found to be associated with negative stock returns (Edmans et al., 2007).

We use stock market performance to measure investor sentiment. The literature has shown that the stock market goes up when investors are in good moods and falls when they feel sad. In particular, stock prices are likely to rise before holidays and weekends and this is known as the holiday effect (Ariel, 1990; Lakonishok and Smidt, 1988; Kim and Park, 1994; Frieder and Subrahmanyam, 2004; Chong et al., 2005; Cadsby and Ranter, 1992). One of the main explanations is that the investors are happier before holidays and weekends (Bialkowski et al., 2012; Jacobs and Levy, 1988; Fabozzi et al., 1994; Birru, 2018).

Typhoon

To study the sentiment effect on the stock market, researchers either link the market returns to an event or to a continuous variable that impacts sentiment. Compared with the use of a continuous variable, the event study approach identifies a sudden change in the sentiment of investors but usually requires a large number of events to achieve statistical significance.

Moreover, a good event study should satisfy the following three additional key characteristics (Edmans et al., 2007). First, events must be substantial and unambiguous to have a measurable impact on the stock market. Second, they must affect a large proportion of the population so that they affect many investors. Third, their effects across the majority of individuals must be positively correlated.

While such an event is rare in most financial markets around the world, a typhoon signal in Hong Kong satisfies all these criteria. Typhoons are common in Hong Kong with an average of six times per year (Wong and Choy, 2018) and affect the whole city. It is hard to imagine other regular events that produce such substantial, correlated, and market-wide mood swings in other major stock markets.

When applied to reference-dependent preference, typhoon signals have three additional advantages. First, typhoons are common for investors in Hong Kong, so it reduces other potential biases such as the endowment effect (List, 2003, 2004). Second, the change of typhoon signal is not too rapid so there is enough time for the typhoon event to “sink in” to be a reference point (Heffetz, 2021). Third, since typhoon signals are public information, the change of subjective probability of typhoon holidays is highly correlated across individuals and exogenous. It is also independent of the characteristics of the trading history of individuals and the price history of stocks. This significantly reduces measurement errors to estimate the endogenous expectation (O’Donoghue and Sprenger, 2018).

The typhoon signals are released by the Hong Kong Observatory (the Observatory). The five levels of signals are similar to the Saffir–Simpson hurricane wind scale and the Beaufort scale: signal no. 1 (T1) is a sign for “Stand By” that a tropical cyclone is centered within about 800 km and may affect the city; signal no. 3 (T3) is for “Strong Wind”; signal no. 8 (T8) is a sign for a gale or storm, and it also includes with the direction (NW, SW, NE, SE, etc.); signal no. 9 (T9) indicates increasing gales or storms, and signal no. 10 (T10) indicates the threat of hurricane-force winds. When typhoon signal no. 8 or above is hoisted, the government requires that all schools and offices be closed. Unless the signal no. 8 is discontinued before early morning, there is a day-off for the whole city. Hence, a T3 might induce a positive sentiment because it greatly increases the possibility of an extra day-off. In contrast, a T1 may have a different impact for a possible day-off, because it is a weakly associated with the wind strength and the predicted direction of the typhoon.

Although people are unable to enjoy outdoor activities and may suffer from the inconvenience caused by typhoons, anecdotal evidence shows that a day-off due to a typhoon is generally considered as “game time”, “party time”, or

“family day” for many people in Hong Kong.^{13,14} When typhoons hit Hong Kong, they affect the entire city, and all (local) investors are similarly affected. Thus, a T3 is a proxy for an informative signal of a possible day-off, the arrival of which is likely to boost the market. Meanwhile, a T1 is a weak informative signal for a possible day-off so that it may not push up the market or may even push it down.

We use the stock market performance on the day before holidays to capture the holiday effect, and the performance on the days with a looming typhoon to capture the typhoon effect. We investigate whether the sentiment effects vary from a T1 and a T3 and compare them with the holiday effect.

The Data

Our sample period is from January 1, 1987, to December 31, 2017.¹⁵ Starting from 1987, the Observatory issued the Pre-No.8 Special Announcement to give the public two hours advance notice when a T8 is expected, to allow employers sufficient time to release their employees to ensure their safety and to ease traffic congestion. People would worry less about the negative impact of a typhoon when they see a T3.

We collect the typhoon data from the Observatory and financial data from Thomson Reuters Eikon (Datastream). We select all the equity securities listed on the main board in Hong Kong, excluding all exchange-traded funds. There are 1,892 common equities in our sample altogether.

To ensure that the market has enough time to respond to typhoon signals, we only focus on the signals hoisted from 0:00 to 15:30 in a trading day, 30 minutes before the Hong Kong Stock Market closes. If a signal is released after 15:30, we treat the day as if there were no such a signal. During our sample period, there are 281 trading days on which at least one typhoon signal is hoisted before 15:30. T1 is in effect on 217 trading days, T3 on 126 trading days, and T8 or above on 35 trading days.¹⁶

The summary statistics in Table 1 supports the hypothesis that investors are happier from typhoon effect than holiday effect. We find that whenever a T3 is hoisted, the mean return is 30.65 basis points (bps), much higher than that of the day before weekends (10.78 bps) or a one-day holiday (refer to as “other holiday”, 12.84 bps).¹⁷ As multiple typhoon signals may be hoisted within the same day due to rapidly changing climate conditions, we would like to focus on cases that typhoon signals remain unchanged throughout the day. When T3 is the only signal throughout the day, the mean return is 91.20 bps, significantly higher than that on the day before major holidays (Christmas, Easter, and Chinese New Year, 50.28 bps).

¹³ The advance in technology of disaster prevention and mitigation measures leads to substantial reduction of human and economic loss since 1950 (Lam et al., 2012). During typhoons, people, besides taking rest, had leisure activities at home, like playing mahjong and eating hotpot, and went to cinema and karaoke bars for social gathering (Hong Kong Daily News, 2004; Hong Kong Commercial Daily, 2004).

¹⁴ In 2006, both typhoon Prapiroon and typhoon Cimaron appeared to be last-minute-repelled, many people are frustrated about losing vacation since a T3 was not raised to a T8. There was a humorous conspiracy theory about “Li’s (force) field” that was rebuked by the Observatory multiple times. It is named after the local tycoon “Li Ka-shing” and he can employ the force field to deflect typhoon (and/or political power to pressure the observatory into avoiding the issuance of a T8) to keep business running (South China Morning Post, 2016).

¹⁵ There were multiple stock exchanges in Hong Kong before 1986 and they merged into Hong Kong Stock Exchange by the end of 1986.

¹⁶ For a robustness check, we set the cutoffs at different times (15:00, 14:30, and 14:00) and redo all the tests — the results are highly consistent with those presented.

¹⁷ To calculate the mean return, we find the mean of daily returns for each stock, and then averaging over all stocks.

Table 1 Summary statistics of raw return (Unit: basis points)

Variable	mean (1)	median (2)	St.dev (3)	P25 (4)	P75 (5)
<i>T1</i>	-5.34* [-2.25]	-4.22*** [-3.37]	103.93	-30.97	23.9
<i>T3</i>	30.65*** [11.27]	18.73*** [-14.58]	118.39	-17.09	71.34
<i>T8</i>	-2.33 [-0.6]	-2.79* [-2.58]	164.38	-78.53	60.01
<i>Other holiday</i>	12.84*** [8.19]	12.15*** [-11.64]	68.61	-14.62	37.87
<i>Major holiday</i>	50.28*** [19.15]	48.97*** [-26.14]	115.29	9.39	91.24
<i>Weekend</i>	10.78*** [9.85]	9.99*** [-20.78]	48.21	-0.78	20.72
<i>T3only</i>	91.20*** [18.31]	61.37*** [-20.57]	211.85	-10.75	170.77
<i>AscendingT3</i>	38.45*** [9.39]	15.68*** [-8.85]	176.64	-45.7	101.8
<i>NonAscendingT3</i>	3.32 [1.09]	-0.24 [-0.71]	131.46	-57.53	51.85
All holiday	12.79*** [12.13]	11.49*** [-23.87]	46.45	1.89	22.11
All trading days	-1.32 [-1.67]	-0.24*** [-4.62]	34.84	-7.63	4.74
No. of observations	5,247,891				

Note: The table shows average return for the trading days on which the variables equal 1. *T1* (*T3*, *T8*) equals 1 when typhoon signal 1 (3, 8 or above) is hoisted from 0:00 to 15:30 on the day, and 0 otherwise. *T3only* equals 1 when typhoon signal 3 is the only typhoon signal hoisted from 0:00 to 15:30 on the day, and 0 otherwise. For example, for a day on which signal 1 changes to signal 3, *T1* = *T3* = 1 and *T3only* = 0. There is no trading on days with only *T8* (or above) is hoisted. *Weekend* equals 1 for Friday and 0 otherwise. *Major holiday* equals 1 for the preceding trading day of public holidays with more than one day-off (Christmas, Easter, and Chinese New Year), and 0 otherwise. *Other holiday* equals 1 for the preceding trading day of a public holiday with only one day-off, and 0 otherwise. All holiday equals 1 if at least one of *Major holiday*, *Other holiday* or *Weekend* dummies equal to 1, and 0 otherwise. *AscendingT3* equals 1 if typhoon signals upgrade from 0:00 to 15:30. *NonAscendingT3* equals 1 if typhoon signals (1) downgrade, or (2) upgrade and then downgrade, or (3) downgrade and then upgrade from 0:00 to 15:30. *t* statistics in brackets. *, ** and *** represent significance levels at 10%, 5% and 1%, respectively.

To filter out long-run dynamics of the market, we follow the literature to calculate the abnormal return (*AR*) to isolate the market-wide impact. It is the residual of regressing the continuously compounded daily return of a stock on the market return of the same day. The market return (*MR*) is the value-weighted stock returns in Hong Kong stock market

based on their daily market capitalization.¹⁸ Formally, our model is:

$$R_{it} = b_0 + b_1 MR_t + e_{it} \text{ and } AR_{it} = R_{it} - \hat{b}_0 - \hat{b}_1 MR_t$$

where R_{it} is the return of stock i of date t , MR_t is the market return of date t , and \hat{b}_0 and \hat{b}_1 are the estimated coefficients from the regressing R_{it} on MR_t . Table 2 and Figure 1 indicate that using AR shows highly consistent results as using raw returns directly.

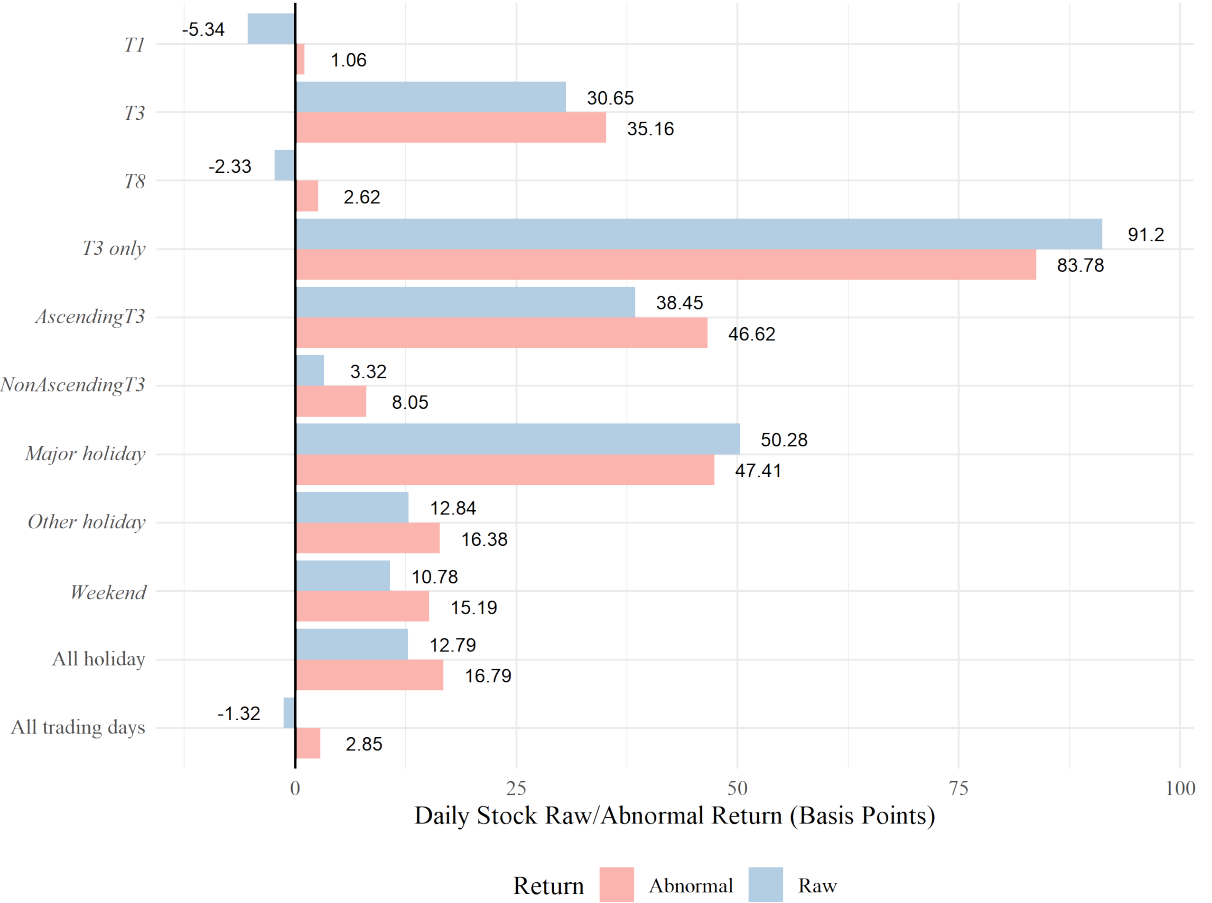
Table 2. Summary statistics of abnormal return (Unit: basis points)

Variable	mean (1)	median (2)	St.dev (3)	P25 (4)	P75 (5)
<i>T1</i>	1.06 [0.46]	2.77* [-2.49]	99.65	-23.87	29.82
<i>T3</i>	35.16*** [13.3]	25.15*** [-18]	115.05	-10.55	74.15
<i>T8</i>	2.62 [0.69]	-4.48 [-0.82]	162.85	-69.15	65.04
<i>Other holiday</i>	16.38*** [10.48]	15.79*** [-14.68]	68.4	-10.97	41.59
<i>Major holiday</i>	47.41*** [18.15]	45.78*** [-25.51]	114.65	7.21	88.63
<i>Weekend</i>	15.19*** [14]	14.17*** [-26.61]	47.76	3.75	25.25
<i>T3only</i>	83.78*** [17.2]	56.97*** [-19.7]	207.12	-16.2	159.7
<i>AscendingT3</i>	46.62*** [11.84]	27.18*** [-12.56]	169.99	-33.76	110.22
<i>NonAscendingT3</i>	8.05** [2.66]	3.15 [-1.76]	130.07	-50.12	56.27
<i>All holiday</i>	16.79*** [16.06]	15.07*** [-28.49]	46.02	5.61	26.27
<i>All trading days</i>	3.37*** [4.39]	4.53*** [-14.32]	33.83	-2.73	9.45
No. of observations	5,247,891				

Note: The table shows average abnormal return for the trading days on which the variables equal 1. See table note of Table 1 for the definitions of *T1*, *T3*, *T8*, *Other holiday*, *Major holiday*, *Weekend*, *All holiday*, *T3 only*, *Ascending T3* and *NonAscending T3*. t statistics in brackets. *, ** and *** represent significance levels at 10%, 5% and 1%, respectively.

¹⁸ While Hang Seng index is a benchmark index in Hong Kong, the number of constituents started with 33 (in 1969), and expanded to 38 (in 2007), 50 (2012), and 52 (in 2020) companies. The aggregate market value is only at approximately 60% of the total market value (Hang Seng Indexes 2020). Following the literature, to reflect the aggregate of movements of the whole market, we construct the value-weighted portfolio with cash dividends reinvested as a proxy for market returns based on all stocks in the main board.

Figure One. The effects of typhoon signals, weekend, and public holidays



Note: The figure shows mean raw and abnormal stock returns for trading days with a value equal to 1 for the label of y-axis. To calculate the mean return, we find the mean of daily returns for each stock, and then averaging over all stocks. See table note of Table 1 for the definitions of *T1*, *T3*, *T8*, *Other holiday*, *Major holiday*, *Weekend*, *All holiday*, *T3 only*, *Ascending T3* and *NonAscending T3*.

RESULTS

To estimate the impact of typhoon signals on the stock market, we estimate the following model:

$$R_{it} = b_0 + b_1 T1_t + b_2 T3_t + b_3 T8_t + b_4 MR_t + Controls + e_{it}$$

where the independent variables are typhoon signal dummies *T1*, *T3*, and *T8*. Note that *T1* (*T3*/*T8*) is a dummy variable that equals 1 if a typhoon signal 1 (3, 8 or above) is hoisted on date *t*. Hence, *b*₁, *b*₂, and *b*₃ capture the impact of the typhoon signals. We control the long-run dynamics of the market by including *MR*_{*t*}, the market return of date *t*.

Our *Controls* includes *Major holiday*_{*t*}, *Other holiday*_{*t*}, *Weekend*_{*t*}, *MV*_{*t,t-1*}, *Low price*_{*t*}, weekday dummies (i.e. Monday to Thursday), month dummies, and industry dummies. We use *Major holiday*_{*t*} and *Other holiday*_{*t*} to capture the holiday effects: *Major holiday*_{*t*} is a dummy variable that equals 1 if date *t* is the preceding trading day of important holidays including Christmas, Easter, or Chinese New Year. These holidays last more than one day, thus longer than other holidays. They are also more important than other holidays due to cultural and historical reasons. *Other holiday*_{*t*} is a dummy variable that equals 1 if date *t* is the preceding trading day of other public holidays. We use *Weekend*_{*t*}, a dummy variable that equals 1 for Fridays, to capture the holiday effect from weekends.

We also include the *weekday dummies* to capture any weekday anomaly, *month dummies* to capture the seasonal effects, and *industry dummies* based on Datastream level 6 industry classification (with 97 sectors altogether).

We estimate Regression (2) with panel-corrected standard errors, which assumes that the error terms are mean zero and uncorrelated over time but allows for heteroskedasticity and contemporaneous correlation across stocks (Hirshleifer and Shumway, 2003; Edmans et al., 2007).

Table 3. Regression results on return

	(1)	(2)	(3)	(4)
<i>T1</i>	-4.798*** [-4.46]	-4.695*** [-4.09]	-4.566*** [-4.24]	-4.799*** [-4.46]
<i>T3</i>	42.49*** [26.1]		86.21*** [14.9]	38.81*** [22.5]
<i>T3only</i>		45.80*** [17.4]		
<i>AscendingT3</i>		51.90*** [21.5]		
<i>NonAscendingT3</i>		21.58*** [7.43]		
<i>T8</i>	-34.76*** [-10.9]	-19.27*** [-5.19]	-35.28*** [-11.0]	-34.79*** [-10.9]
<i>Other holiday</i>	7.701*** [8.58]	7.813*** [8.70]	7.700*** [8.58]	7.702*** [8.58]
<i>Major holiday</i>	25.71*** [17.5]	25.70*** [17.5]	25.71*** [17.5]	25.71*** [17.5]
<i>Weekend</i>	12.19*** [24.2]	12.27*** [24.3]	12.19*** [24.2]	12.19*** [24.2]
<i>T3×MV</i>			-5.893*** [-8.54]	
<i>T3×Low price</i>				14.34*** [4.37]
<i>MR</i>	0.707*** [692.2]	0.707*** [692.2]	0.707*** [692.2]	0.707*** [692.2]
Constant	-3.804** [-2.33]	-3.970** [-2.43]	-4.434*** [-2.71]	-3.755** [-2.30]
<i>MV, Low price, Industry, Weekday, Month</i>	Y	Y	Y	Y
No. of observations	5,247,891	5,247,891	5,247,891	5,247,891

Note: Dependent variable in the table is raw return in bps. See table note of Table 1 for the definition of *T1*, *T3*, *T8*, *T3 only*, *Weekend*, *Major holiday* and *Other holiday*. *MR* is the value-weighted market return. *MV* is the log of market capitalization of the stock on previous trading day and *Low price* is a dummy variable when mean close price during our sample period is lower than HK\$1. *MV*, *Low price*, industry dummies, weekday (i.e. Monday to Thursday) dummies, and month dummies are included in all specifications. Standard errors are estimated using panel-corrected standard errors. *t* statistics in brackets. *, ** and *** represent significance levels at 10%, 5% and 1%, respectively. Using the regression model in Column (1), the *Chi*-square test statistics on the equality of the coefficients of *T3* vs. *Other holiday* is 360.35 with p-value 0.000. The *Chi*-square test statistics on the equality of the coefficients of *T3* vs.

Major holiday is 38.53 with p-value 0.000. Using the regression model in Column (2), the *Chi*-square test statistics on the equality of the coefficients of *Ascending T3* vs. *NonAscending T3* is 145.93 with p-value 0.000. The *Chi*-square test statistics on the equality of the coefficients of *T3 only* vs. *NonAscending T3* is 116.51 with p-value 0.000.

For robustness, we have also run the same regression as Column (2) but replaced *AscendingT3* with *NonDescendingT3*, and *NonAscending T3* with *Descending T3*, where *NonDescending T3* equals 1 if typhoon signals (1) upgrade, or (2) upgrade and then downgrade, or (3) downgrade and then upgrade from 0:00 to 15:30, and *Descending T3* equals 1 if typhoon signals downgrade from 0:00 to 15:30. The results are similar (see online appendix).

Looming Typhoon Signal (T3)

We would first discuss the effect of T3. Column (1) in Table 3 shows that, compared with a normal trading day (i.e., a day preceding neither holidays nor weekends), experiencing a T3 increases the return by 42.49 bps, which is significantly higher than that of a *major holiday* (25.71 bps), an *other holiday* (7.701 bps), or a *weekend* (12.19 bps).

The holiday effect literature shows that the positive sentiment is a driving force for the upward moving in the stock market before public holidays and weekends. As a T3 could lead to a day-off (if it upgrades to T8), one may consider that a T3 could generate a positive sentiment similar to the holiday effect.¹⁹ However, relying exclusively on the positive sentiment alone is not enough to explain the relative magnitudes because T3 does not always lead to a day-off.²⁰ The associated positive sentiment should be less than a “guaranteed” day-off from public holidays and weekends, which is in sharp contrast to our result.

One possible explanation to reconcile this is to allow investors to have expectation-based reference-dependence preferences. Major holidays and weekends give higher “consumption utility” (since investors will have at least two days off during weekends) but have zero “gain-loss utility” since the days-off are within their expectations. In contrast, a looming typhoon signal (T3) gives a slightly lower “consumption utility” (since the day-off is usually only one day and there is no day-off if the T3 is not converted into a T8) but has a high “gain-loss utility” since investors are not expecting a day-off beforehand such that reference level is “no days-off” or “low probability of days-off”.²¹ Hence, when the effect of a “gain-loss utility” dominates, investors are more excited to see a signal of a possible day-off than to have an even longer but 100% guaranteed holiday (weekends).

The Standby Signal (T1)

Next, we would like to consider the seemingly puzzling effect of the standby signal (T1). Column (1) in Table 3 shows that the coefficients of the standby signal (i.e., *T1*) is significantly negative. As T1 also bears a probability that a day-off may be forthcoming, one would expect a positive coefficient, following a positive sentiment explanation similar to *T3*.²²

¹⁹ One may argue that investors’ sentiment is changed by the weather instead of a possible holiday. However, the literature suggests that, on days of sunshine, investors are happier and the returns are higher (Saunders, 1993; Hirshleifer and Shumway, 2003). Consistent with the argument, investors are more likely to be less happy on typhoon days and the returns should be lower. In Section 3, we show that our result remains intact after controlling daily weather conditions.

²⁰ In our sample period (from 1987 to 2017), there were 106 typhoons with T3, and 47 of them resulted in days-off with T8 or above.

²¹ Since the reference level is based on investors’ expectation (rather than, for example, an exogenously given status quo such as whether the preceding day is a day-off or not), an investor may have a reference level of “no day-off” if T1 is immediately followed by T3, and a reference level of “a low probability of day-off” if T1 has been hoisted for sufficient time.

²² One may argue that the negative coefficient could be a result of “bad weather condition” due to typhoons. However, it is inconsistent with the positive coefficient for *T3*. Moreover, we still have significantly negative coefficient for *T1* after we control daily weather conditions (see Section 3).

Interestingly, we can reconcile this puzzling effect through the prediction from the expectation-based reference-dependence preference that “not-so-informative” good news can be bad (see Kőszegi and Rabin, 2009). We argue that T1 are more frequent but less informative and they indicate a smaller and more remote possibility of a typhoon holiday. When an investor sees a T1, she receives a positive signal and her hopes of a day-off rise. However, she will be more disappointed if there is no day-off eventually. Under loss aversion, the pleasure from receiving positive news is smaller than the pain from finding out that the news was incorrect, such fluctuations in beliefs decrease the “gain-loss utility”. When the negative impact on the “gain-loss utility” overwhelms the positive impact from the “consumption utility”, an investor would suffer from “not-so-informative” good news.

Strong Wind Signals (T8)

While strong wind signals (T8) have negative coefficients in Table 3, this does not necessarily imply that a T8 signal has a negative impact on the stock market for the following two reasons.

First, there is no trading day with T8 only. Whenever there is a T8, there is always at least one other signal, which is sharply different from T1 and T3. Thus, we cannot separately identify the impact of T8 signals. In our sample, for every trading day with T8, there is always T3 on the same day. Thus, given a positive coefficient for T3, it is not surprising to see a negative efficient for T8. This is because from Tables 1 and 2, both raw and abnormal returns are zero on an average day with a T8 signal.

Second, for every trading day with a T8, there are only two possible cases, and they post challenges to the causal inference of the T8 coefficient. One case is a looming and strengthening typhoon that a T8 is upgraded from T3/T1 during the trading hour. Then the financial market will be closed immediately, and there is little time for effect of T8 to be reflected in the trading activity.²³ The other case is a departing or weakening typhoon that a T8 is downgraded to a T3/T1 in the morning. In the other words, the “typhoon holiday” fails to materialize, and thus one may experience a “negative” holiday mood from the disappointment over the unrealized holiday.

Multiple Signals

Since typhoon signals can change within a day, it would be interesting to study how investors respond to changing typhoon signals. More specifically, we will partition the T3 dummy into the following 3 variables: (1) *T3 only_t* is a dummy variable which equals 1 if there is only a T3 hoisted on date *t*. For example, if T1 switches to T3 on date *t*, we set *T3 only_t* = 0.²⁴ (2) *Ascending T3_t* which equals one if typhoon signals upgrade through T3 (e.g., from T1 to T3, or from T3 to T8) from 0:00 to 15:30 on date *t* and 0 otherwise, and (3) *NonAscending T3_t* which equals 1 if typhoon signals (1) downgrade, or (2) upgrade and then downgrade, or (3) downgrade and then upgrade from 0:00 to 15:30 on date *t*. This trichotomous classification of T3 is based on the sentiment effect and reference-dependent preference.²⁵ If investors are in a good mood due to a potential day-off with T3, they would be happier when typhoon signals are stable (*T3 only_t*), or upgrade through T3 (*Ascending T3_t*, e.g., from T1 to T3, or from T3 to T8) than otherwise (*NonAscending T3_t*, e.g., decreasing from T8 to T3, or from T1 to T3 and then back to T1).

We perform the same model as Regression (2) except that we use *T3only_t*, *Ascending T3_t* and *NonAscending T3_t* in the place of *T3*:

²³ In Section 3.2, we show that trading volume is lower with a T8 signal.

²⁴ We do not have T8only since none of the days with only a signal 8 have trading records.

²⁵ For robustness, we have also run Regression (3) by replacing *Ascending T3_t* with *NonDescending T3_t* and *NonAscending T3_t* with *Descending T3_t*, where *NonDescending T3_t* equals 1 if typhoon signals (1) upgrade, or (2) upgrade and then downgrade, or (3) downgrade and then upgrade from 0:00 to 15:30 on date *t*, and *Descending T3_t* equals 1 if typhoon signals downgrade from 0:00 to 15:30 on date *t*. The results are highly consistent (See online appendix).

$$R_{it} = b_0 + b_1 T1_t + b_2 T3only_t + b_3 AscendingT3_t + b_4 NonAscendingT3_t + b_5 T8_t + b_6 MR_t + Controls + e_{it}$$

where *Controls* include the same variables as in Regression (2).

Column (4) in Table 3 shows the results of Regression (3). There are three sets of interesting observations that are consistent with the expectation-based reference-dependent preference.

First, the coefficients of *T3only* (45.80) and *AscendingT3* (51.90) are positive, and are significantly larger than those of *Major holiday* (25.70), *Weekend* (12.27), *Other holidays* (7.813). From our above discussion on the results in Regression (2), the expectation-based reference-dependent preference offers an explanation for their relative magnitudes.

Second, while the coefficient of *NonAscendingT3* (21.58) is still positive, it is significantly less than *T3only* and *AscendingT3*. This supports our sentiment explanation that it is the expectation of a possible day-off that leads to positive stock market responses. Investors are happier when an ascending typhoon signal or a T3 is hoisted the whole day because these are stronger indicators that they may have a day-off. On contrary, if typhoon signals weaken or there is fluctuation between different signals, the investors may be less happy since they are less likely to have a day-off.

MECHANISM

Small Stocks

As small stocks and low-price stocks are disproportionately held by local retail investors rather than by the more sophisticated institutional and foreign investors (Lee et al., 1991; Edmans et al., 2007), we would expect our T3 impacts to be more pronounced for these stocks.

In one specification, we use $MV_{i,t-1}$, the log of market capitalization of stock *i* on date *t-1*, to control for the size effect (Banz, 1981; Fama and French, 1992). Moreover, to capture the possible impact of “penny stocks” in Hong Kong, in another specification, we include *Low price_i*, which is a low-priced stock dummy that equals 1 if the mean close price of stock *i* during our sample period is below HK\$1, and 0 otherwise.²⁶

To test this prediction, we add two interaction terms: *T3*×*MV* and *T3*×*Low price*, respectively to Regression (2) to examine the impact of T3 on small stocks and low-priced stocks. Consistent with our expectation, Columns (3) and (4) in Table 3 show that the T3 effect on stock return is stronger for small stocks and low-price stocks.

As shown in the online appendix, we also obtain consistent results when we add similar interaction terms for *T3only*, *AscendingT3*, and *NonascendingT3* to Regressions (3).

Table 4. Regression results on abnormal volume

	(1)	(2)	(3)	(4)
<i>T1</i>	-0.0568*** [-6.54]	-0.0461*** [-4.98]	-0.0559*** [-6.44]	-0.0568*** [-6.54]
<i>T3</i>	0.120*** [9.14]		0.307*** [7.04]	0.129*** [9.28]
<i>T3only</i>		0.201*** [9.31]		
<i>AscendingT3</i>		0.163*** [8.44]		

²⁶ “Penny stocks” are referred to as “cent stocks” in the Hong Kong market and they are subject to additional trading restrictions to avoid manipulation.

<i>NonAscendingT3</i>		-0.0775***		
		[-3.36]		
<i>T8</i>	-0.0838***	0.0683**	-0.0861***	-0.0838***
	[-3.30]	[2.32]	[-3.39]	[-3.30]
<i>Other holiday</i>	-0.0824***	-0.0815***	-0.0824***	-0.0824***
	[-11.4]	[-11.3]	[-11.4]	[-11.4]
<i>Major holiday</i>	-0.262***	-0.262***	-0.262***	-0.262***
	[-22.0]	[-22.1]	[-22.0]	[-22.0]
<i>Weekend</i>	0.0453***	0.0457***	0.0453***	0.0453***
	[11.2]	[11.3]	[11.2]	[11.2]
<i>T3×MV</i>			-0.0250***	
			[-4.90]	
<i>T3×Low price</i>				-0.0347
				[-1.32]
Constant	0.666***	0.665***	0.664***	0.666***
	[55.0]	[54.8]	[54.7]	[55.0]
<i>Low price, Industry, Weekday, Month</i>	Y	Y	Y	Y
No. of observations	4,766,612	4,766,612	4,766,612	4,766,612

Note: Dependent variable is abnormal volume as the daily dollar volume divided by the stock's average dollar volume over the previous one year (Barber and Odean 2008). See figure note of Figure 1 for the definition of *T1*, *T3*, *T8*, *T3only*, *Short holiday*, *Long holiday*, and *Weekend*. See table note of Table 1 for the definition of *AscendingT3* and *NonAscendingT3*. Standard errors are estimated using panel-corrected standard errors. *t* statistics in brackets. *, ** and *** represent significance levels at 10%, 5% and 1%, respectively. Using the regression model in Column (1), the *Chi-square* test statistics on the equality of the coefficients of *T3* vs. *Other holiday* is 186.36 with p-value 0.000. The *Chi-square* test statistics on the equality of the coefficients of *T3* vs. *Major holiday* is 465.74 with p-value 0.000.

AH Companies

The Hong Kong stock market features some companies that are dual-listed in mainland China and in Hong Kong (AH companies): The A-shares are listed in mainland China and the H-shares in Hong Kong. Since the fundamentals for the A-shares and the H-shares are the same but the typhoon only affects Hong Kong investors, focusing on AH companies would tell us whether the *T3* effects are from the variation in firm fundamentals.

It is well known that the mainland China stock market is dominated by retail investors from all geographic regions over China.²⁷ A typhoon that hits Hong Kong might affect only places in mainland China close to Hong Kong but the majority of investors are unaffected. Hence, we expect to find the *T3* effect for H-shares but not A-shares since the typhoon signals should only affect the sentiment of the local H-share traders but have no impact on the firm fundamentals (A-shares).

We run Regression (2) for H-shares and A-shares separately, focusing on days with trading records for both shares. Our analysis starts from 1993 when the first H-share was listed. We collected the data for A-shares from China Stock Market & Accounting Research Database (CSMAR). The market return for A-shares is the Shanghai A Share Composite Index return while that for H-shares is still the value-weighted market return in the Hong Kong stock

²⁷ Before 2003, A-shares were only available to mainland citizens due to restrictions on foreign investment. After 2003, some selected foreign institutions may invest in A-shares through Qualified Foreign Institutional Investor (QFII) system. Investors in Hong Kong can trade certain A-shares listed in Shanghai and Shenzhen with quota limit through Hong Kong Stock Exchange under Shanghai-Hong Kong Stock Connect and Shenzhen-Hong Kong Stock Connect since 2014 and 2016. However, all these special schemes do not substantially the demographic composition of A-share investors.

Since holidays in mainland China are different from Hong Kong, the definitions of holiday dummies are adjusted for A-shares.²⁸

The results in Table 5 support our expectations: the coefficients of *T3* show that the effect associated with *T3* is positive and significant in the H-shares only, but not in the A-shares, which is consistent with our argument that the typhoon effect is a pure psychological effect and works through investors' sentiments, rather than via firm fundamentals.

Table 5. AH companies

	H-share	A-share
	(1)	(2)
<i>T1</i>	-2.793 [-0.67]	-1.393 [-0.44]
<i>T3</i>	19.43*** [3.23]	7.098 [1.51]
<i>T8</i>	-17.16 [-1.59]	10.85 [1.30]
<i>Other holiday</i>	-1.932 [-0.56]	-5.209 [-1.48]
<i>Major holiday</i>	3.423 [0.61]	-7.002 [-1.49]
<i>Weekend</i>	2.356 [1.29]	-4.241*** [-2.99]
<i>MR</i>	1.068*** [275.1]	1.032*** [409.52]
<i>BuyBack</i>		85.69*** [6.32]
<i>Constant</i>	34.36*** [6.04]	0.463 [0.078]
<i>MV</i> , Industry, Weekday, Month	Y	Y
No. of observations	226,002	226,002

Note: Dependent variables in Column (1) and (2) are the raw return of H-share and A-share, respectively. See table note of Table 1 for the definition of *T1*, *T3*, *T8*, *Other holiday*, *Major holiday* and *Weekend*. As public holidays in mainland China and Hong Kong are different, to define *Other holiday* and *Major holiday*, we use holidays in Hong Kong and mainland China for Column (1) and Column (2), respectively. *MR* in Column (1) is the value-weighted market return in Hong Kong and that in Column (2) is the Shanghai A Share Composite Index return. *MV* is the log of market capitalization of the stock on the previous trading day in H-share and A-share in Column (1) and (2), respectively. We also control for industry dummies, weekday dummies, and month dummies. We do not control for *Low price*, as there is no such AH stock. *BuyBack* is a dummy variable when it is between July 8 and 10, 2015. On 8th July, China Securities Regulatory Commission Government Ministry ordered the majority shareholders and management repurchase their shares if they had reduced the holdings in the previous six months, and they were not allowed to sell. The government also promised that all state-owned enterprises would not sell any stocks and would,

²⁸ Major holidays include Chinese New Year and National Day during our sample period. Note that, since (international) Labor Day was a week-long holiday in mainland between 2000 and 2006 (and it is only one-day holiday for all other years), it belongs to major holiday if only if it is within this period.

if situation permitted, buy more stocks. Standard errors are estimated using panel-corrected standard errors. *t* statistics in brackets. *, ** and *** represent significance levels at 10%, 5% and 1%, respectively.

Surprise

One possible alternative explanation for the positive return associated with T3 is from the pleasant surprise. Unlike a public holiday that is scheduled and expected, a day-off due to typhoon is unforeseen. The positive mood induced by T3 might be mainly driven by surprise (Ely et al., 2015) instead of reference-dependent preference. The “surprise” model argues that merely unexpected belief change (surprise) may generate instantaneous utility. Therefore, one may argue that a typhoon signal can generate “surprise” as it changes individuals’ beliefs over possibly day-off from typhoons so that the typhoon effect is “belief-driven” by surprise effect, instead of “outcome-driven” by our reference-dependence preference. We address the concern from the following two perspectives.

First, typhoons are common in Hong Kong and days-off because of typhoon are expected: there are on average six typhoons that necessitates a typhoon signal each year (Wong and Choy, 2018). Therefore, the major uncertainty is not about whether typhoons will come but when they will come. Thus, a T3 does not significantly raise the possibility of having an “extra” day-off but indicates the probability that a day-off is forthcoming.

Second, the distribution of typhoons in our sample is uneven throughout the year. If our results are driven by surprise, the T3 effect should be weaker in the months when typhoons are more frequent (July, August, or September). See Table 6 for the distribution of typhoon signals by month over our sample period.

Table 6. Distribution of the number of calendar days with typhoon signals
Panel A. All days from 1987 to 2017

Month	Signal no. 1 (T1)	Signal no. 3 (T3)	Signal no. 8 or above (T8)	At least one signal
(1)	(2)	(3)	(4)	(5)
Apr	3	2	0	5
May	6	7	2	10
Jun	41	19	5	51
Jul	59	39	10	78
Aug	76	42	17	96
Sep	70	39	14	94
Oct	31	22	3	46
Nov	13	2	0	14
Total	299	172	51	394

Panel B. All trading days from 1987 to 2017

Month	Signal no. 1 (T1)	Signal no. 3 (T3)	Signal no. 8 or above (T8)	At least one signal
(1)	(2)	(3)	(4)	(5)
Apr	3	0	0	3
May	6	3	0	6
Jun	28	12	3	35
Jul	37	29	8	51
Aug	60	32	10	74
Sep	54	32	12	72
Oct	20	16	2	30
Nov	9	2	0	10
Total	217	126	35	281

Note: In both panels, Col (5) is not equal to the sum of Col (2), (3) and (4) because multiple signals could exist on the same day.

To test this argument, we introduce two dummy variables to capture the month of July, August, or September (*Peak*) and other months (*NonPeak*). Then, we break *T3* into *T3*×*Peak* and *T3*×*NonPeak* and rerun Regression (2).

Table 7. Surprise

<i>T1</i>	-5.049*** [-4.69]
<i>T3</i> × <i>Peak</i>	52.92*** [28.4]
<i>T3</i> × <i>NonPeak</i>	19.08*** [7.37]
<i>T8</i>	-38.47*** [-12.0]
<i>Other holiday</i>	7.557*** [8.42]
<i>Major holiday</i>	25.74*** [17.5]
<i>Weekend</i>	12.09*** [24.0]
<i>MR</i>	0.707*** [692.1]
Constant	-3.801** [-2.33]
<i>MV</i> , <i>Low price</i> , <i>Industry</i> , Weekday, Month	Y
No. of observations	5,247,891

Note: The dependent variable in the table is raw return in bps. *Peak* is a dummy if the trading day is in the month of July, August, or September, and *NonPeak* is a dummy if it is in other months. See table note of Table 1 for the definition of *T1*, *T3*, *T8*, *T3only*, *Short holiday*, *Major holiday*, and *Weekend*. We also control for *MR*, *MV*, *Low price*, industry dummies, weekday dummies, and month dummies. See table note of Table 3 for the definition of *MR*, *MV* and *Low price*. Standard errors are estimated using panel-corrected standard errors. *t* statistics in brackets. *, ** and *** represent significance levels at 10%, 5% and 1%, respectively. The *Chi*-square test statistics on the equality of the coefficients of *T3*×*Peak* vs. *T3*×*NonPeak* is 134.07 with p-value 0.000. The *Chi*-square test statistics on the equality of the coefficients of *T3*×*Peak* vs. *Weekend*, *Other holiday* and *Major holiday* are 443.62, 485.01, and 131.01 with p-value 0.000 for all three cases. The *Chi*-square test statistics on the equality of the coefficients of *T3*×*NonPeak* vs. *Weekend*, *Other holiday* and *Major holiday* are 7.06, 18, and 5 with p-values 0.007, 0.000 and 0.025.

Table 7 shows that the *T3* effect in July, August, and September (*T3*×*Peak*, 52.92 bps) is significantly higher than in other months (*T3*×*NonPeak*, 19.08 bps), and the *Chi*-square test indicates *T3*×*Peak* is significantly larger (*p*-value<0.0000).²⁹ This suggests that the *T3* effect is unlikely due to surprise. Indeed, the difference may be attributed to the informativeness of *T3*. During our sample period, the conditional probability of having a *T8* given a *T3* during the peak months is twice as much as that during non-peak months.³⁰

Weather Effect

Previous studies (e.g., Saunder, 1995; Hirshleifer and Shumway, 2003; Kamstra et al., 2003) show that pleasant weather is associated with good mood and unfavorable weather is related to bad mood. As typhoons may lead to severe weather conditions, one may wonder if our typhoon effect is driven by the weather.³¹

As our *T3* effect is positive, there seems to be of a minor concern for the confounding effect. However, since our *T1* effects are negative, it is important to isolate the weather effect from our piecemeal information effect. We collect all daily weather measurements from the Observatory, including *Temperature* (the daily mean temperature), *Pressure* (the daily mean pressure), *Humidity* (the relative humidity on the day), *Rainfall* (the daily amount of rainfall), *Cloud* (the daily amount of cloud), and *Mean Wind* (the daily wind speed). As a preliminary analysis, we calculate the pair-wise correlation between the typhoon signals and the weather variables. Table 8 shows that the correlation between the typhoon signals and the weather variables are quite low, suggesting that our typhon effects are unlikely driven by changing weather.

Table 8. Correlation Tables between typhoon signals and weather variables

	<i>T1</i>	<i>T3</i>	<i>T8</i>	<i>Temp.</i>	<i>Press.</i>	<i>Humid.</i>	<i>Rainfall</i>	<i>Cloud</i>	<i>Wind</i>
<i>T1</i>	1								
<i>T3</i>	0.4754	1							
<i>T8</i>	0.1363	0.4726	1						
<i>Temperature</i>	0.1341	0.0831	0.0368	1					
<i>Pressure</i>	-0.2440	-0.1950	-0.1021	-0.8341	1				
<i>Humidity</i>	0.0537	0.0846	0.0605	0.2060	-0.3924	1			
<i>Rainfall</i>	0.1329	0.2577	0.2310	0.1215	-0.2664	0.3583	1		

²⁹ Chi-square tests show that the coefficient of *T3*×*Peak* is significantly larger than that of *Major holiday*, the coefficient of *Major holiday* is significantly larger than that of *T3*×*NonPeak* and the coefficient of *T3*×*NonPeak* is significantly larger than that of *Weekend* and *Other holiday*.

³⁰ As shown in the online appendix, the conditional probability is above 50% during the peak months and it is around 25-30% during non-peak months.

³¹ Besides bad weather itself, the inconvenience to daily life and potential damage to the economy can be another potential source of bad mood.

<i>Cloud</i>	0.0955	0.1029	0.0558	0.0156	-0.2282	0.6188	0.2577	1	
<i>Wind</i>	0.1739	0.2594	0.1464	-0.3135	0.2353	-0.1018	0.0927	0.2245	1

Note: See figure note of Figure 2 for the definitions of *T1*, *T3*, and *T8*. See table note of Table 1 for the definitions of *MV*, *Low price*, *AscendingT3* and *NonAscendingT3*. *Temperature* is the daily mean temperature, *Pressure* is the daily mean pressure, *Humidity* is relative humidity on the day, *Rainfall* is daily amount of rainfall, *Cloud* is the daily amount of cloud and *Mean Wind* is the daily wind speed.

Next, we include all the weather variables in Regressions (2) and (3). The results in Table 9 confirm that our typhoon effects are not driven by the change in weather. If the observed negative T1 effects are due to the weather, we would expect that the coefficients of T1 become insignificant or lower in magnitudes. However, all typhoon coefficients have the same signs, remain statistically significant, and their magnitudes are close to those in Table 3.

In particular, the comparison for T1 coefficients suggests that our T1 effect is unlikely to be a result from bad weather.

Table 9. Weather

	(1)	(2)	(3)	(4)
<i>T1</i>	-5.063*** [-4.16]	-4.090*** [-3.17]	-4.854*** [-3.99]	-5.058*** [-4.16]
<i>T3</i>	46.22*** [25.1]		95.32*** [15.2]	42.59*** [22.0]
<i>T3only</i>		54.21*** [17.3]		
<i>AscendingT3</i>		54.58*** [20.7]		
<i>NonAscendingT3</i>		24.72*** [8.27]		
<i>T8</i>	-32.12*** [-9.55]	-15.56*** [-4.04]	-33.15*** [-9.86]	-32.13*** [-9.55]
<i>Other holiday</i>	10.81*** [11.2]	10.92*** [11.3]	10.81*** [11.2]	10.81*** [11.2]
<i>Major holiday</i>	25.15*** [15.9]	25.12*** [15.9]	25.14*** [15.9]	25.14*** [15.9]
<i>Weekend</i>	11.33*** [20.8]	11.42*** [20.9]	11.34*** [20.8]	11.33*** [20.8]
<i>T3×MV</i>			-6.545*** [-8.92]	
<i>T3×Low price</i>				14.05*** [4.02]
<i>MR</i>	0.694*** [610.4]	0.694*** [610.4]	0.694*** [610.4]	0.694*** [610.4]
<i>Temperature</i>	-0.314*** [-3.22]	-0.285*** [-2.93]	-0.313*** [-3.21]	-0.314*** [-3.22]
<i>Pressure</i>	-0.103 [-1.59]	-0.0535 [-0.82]	-0.102 [-1.57]	-0.104 [-1.60]
<i>Humidity</i>	0.0423* [1.70]	0.0497** [2.00]	0.0431* [1.73]	0.0423* [1.70]
<i>Rainfall</i>	-0.0433*** [-4.43]	-0.0410*** [-4.18]	-0.0421*** [-4.30]	-0.0433*** [-4.42]
<i>Cloud</i>	-0.128*** [-12.5]	-0.129*** [-12.5]	-0.129*** [-12.5]	-0.128*** [-12.5]

<i>Mean Wind</i>	-0.0137 [-0.64]	-0.0226 [-1.05]	-0.0148 [-0.69]	-0.0137 [-0.64]
Constant	117.3* [1.74]	65.44 [0.97]	115.0* [1.71]	117.5* [1.74]
<i>MV, Low price, Industry, Weekday, Month, Year</i>	Y	Y	Y	Y
No. of observations	4,506,331	4,506,331	4,506,331	4,506,331

Note: Dependent variable in the table is raw return in bps. See figure note of Figure 2 for the definitions of *T1*, *T3*, *T8*, *T3only*, *Short holiday*, *Major holiday*, and *Weekend*. See table note of Table 1 for the definitions of *MV*, *Low price*, *AscendingT3* and *NonAscendingT3*. *Temperature* is the daily mean temperature, *Pressure* is the daily mean pressure, *Humidity* is relative humidity on the day, *Rainfall* is daily amount of rainfall, *Cloud* is the daily amount of cloud and *Mean Wind* is the daily wind speed. Standard errors are estimated using panel-corrected standard errors. *t*statistics in brackets. *, ** and *** represent significance levels at 10%, 5% and 1%, respectively. Using the regression model in Column (1), the *Chi*-square test statistics on the equality of the coefficients of *T3* vs. *Other holiday* is 295.41 with p-value 0.000. The *Chi*-square test statistics on the equality of the coefficients of *T3* vs. *Major holiday* is 75.44 with p-value 0.000.

Moreover, our results of weather measurement in Table 9 complement the existing studies and offer new findings. First, the coefficient of *Cloud* is significantly negative, which is consistent with Saunder (1995) and Hirshleifer and Shumway (2003)'s finding that sunshine can be linked to positive sentiment (Kamstra et al., 2003). Second, the coefficient of *Rainfall* is also significantly negative. This supplements Hirshleifer and Shumway (2003) as their coefficient of rainfall is negative but not significant. Third, we find that temperature could have a measurable impact on the stock market, consistent with the literature (Cao and Wei, 2005). Fourth, we find no conclusive evidence on the impact of pressure, humidity, and wind speed on investors' behavior.

Attention

One other possible explanation of the typhoon effect is from the perspective of attention (e.g., see Peng and Xiong, 2006; Da et al., 2011; Peress and Schmidt, 2020): The observed results may be from different levels of investor attention, rather than from investor sentiment. However, when different typhoon signals are hoisted, investors are expected to deviate their attention from stock market to the forthcoming day off, if any. Therefore, this (in)attention would not lead to a positive *T3* effect. Our empirical results do not support the attention hypothesis.

ROBUSTNESS

Time Trend

We would like to check how the *T3* effect on stock market changes over time. Specifically, we separate our sample period into three subperiods: 1987 to 1996 (Subperiod I), 1997 to 2006 (Subperiod II), and 2007 to 2017 (Subperiod III). We use Subperiod I as the benchmark period and add two dummy variables, *D2* and *D3*, and interaction terms *T3*×*D2* and *T3*×*D3* to Regression (2). Dummy variable *D2*(*D3*) equals 1 if date *t* is in Subperiod II (III).

Table 10 shows that the *T3* effect gets stronger in the last two decades in our sample. One possible explanation is that technological progress minimizes the damage and inconvenience created by a typhoon so that people get happier under a *T3* over time. Another potential explanation is that the improvement of stay-at-home entertainment opens various ways to pass the time during lockdown. The third potential reason is that improvement of information technologies

allows faster dissemination of typhoon signals., and therefore the information will be impounded in asset prices faster.³² Overall, all the above facts are consistent with our empirical finding that the typhoon effects are getting strong over time.

Table 10. Time trend

<i>T1</i>	-5.376*** [-4.96]
<i>T3</i>	25.66*** [7.39]
<i>T8</i>	-35.60*** [-11.1]
<i>D2</i>	-1.542*** [-2.95]
<i>T3*D2</i>	15.30*** [3.45]
<i>D3</i>	1.416*** [2.85]
<i>T3*D3</i>	21.44*** [5.64]
<i>Other holiday</i>	7.690*** [8.57]
<i>Major holiday</i>	25.71*** [17.5]
<i>Weekend</i>	12.20*** [24.2]
<i>MR</i>	0.707*** [692.0]
Constant	-1.415 [-0.85]
<i>MV, Low price,</i> Industry, Weekday, Month	Y
No. of observations	5,247,891

Note: Dependent variable in the table is raw return in bps. See table note of Table 1 for the definition of *T1*, *T3*, *T8*, *T3only*, *Other holiday*, *Major holiday* and *Weekend*. We also control for *MR*, *MV*, *Low price*, industry dummies,

³² Residents can receive the typhoon information from more channels over time. Starting from 1987, people can get the information from TV broadcasting; from 1996, the Observatory's website starts to release the typhoon information; the year 2009 witnesses the use of the Observatory's Youtube channel; in 2010, "MyObservatory" mobile app comes to use; in 2011 Twitter and Weibo accounts of the Observatory become available.

weekday dummies, and month dummies. See table note of Table 1 for the definition of *MR*, *MV* and *Low price*. Standard errors are estimated using panel-corrected standard errors. *t* statistics in brackets. *, ** and *** represent significance levels at 10%, 5% and 1%, respectively. The *Chi-square* test statistics on the equality of the coefficients of $T3 \times D2$ vs. $T3 \times D3$ is 3.55 with p-value 0.060.

Alternative Control Group

In our main regression, we compare typhoon effects and holiday effects with ordinary days.³³ As a robustness test, it may be desirable to directly compare our typhoon effect with the holiday effect. To control for the long-run dynamics, we consider the abnormal return (\widetilde{AR}_{it}) as in (1) but here we also need to filter out for day-of-the-week, seasonal, and industry effects:

$$R_{it} = b_0 + b_1 MR_t + b_2 Controls + e_{it} \text{ and } \widetilde{AR}_{it} = R_{it} - \hat{b}_0 - \hat{b}_1 MR_t - \hat{b}_2 Controls$$

where *Controls* include *Weekday*, *Month* and *Industry* dummies.

Now we restrict our samples to only days related to typhoon and holidays. In the other words, we only focus on the days with at least one of *T1*, *T3*, *T8*, *Other holiday* or *Major holiday* dummies equals to 1. Thus, we perform the same model as Regressions (2) and (3) in the new sample except that our dependent variable is \widetilde{AR} and *MR* is no longer an independent variable:

$$\begin{aligned} \widetilde{AR}_{it} &= b_0 + b_1 T1_t + b_2 T3_t + b_3 T8_t + \widetilde{Controls} + e_{it} \\ \widetilde{AR}_{it} &= b_0 + b_1 T1_t + b_2 T3_{only_t} + b_3 AscendingT3_t + b_4 NonAscendingT3_t + b_5 T8_t + \widetilde{Controls} + e_{it} \end{aligned}$$

where $\widetilde{Controls}$ include *Major holiday*, *MV*, and *low price*. Note that $\widetilde{Controls}$ do not include *Other holiday* because the comparisons now are made relative to the non-major holidays. As Table 11 shows, the results remain highly consistent.

Table 11. Alternative Control Group

	(1)	(2)	(3)	(4)
<i>T1</i>	-24.08*** [-18.3]	-25.64*** [-17.8]	-23.85*** [-18.1]	-24.09*** [-18.3]
<i>T3</i>	31.71*** [18.5]		64.73*** [9.87]	27.79*** [15.2]
<i>T3only</i>		28.13*** [9.92]		
<i>AscendingT3</i>		44.12*** [17.7]		
<i>NonAscendingT3</i>		16.14*** [5.36]		
<i>T8</i>	-35.83*** [-10.9]	-25.15*** [-6.54]	-36.13*** [-11.0]	-35.85*** [-10.9]
<i>Major holiday</i>	28.20*** [16.4]	27.63*** [15.9]	28.26*** [16.4]	28.19*** [16.4]
<i>T3 × MV</i>			-4.454*** [-5.65]	

³³ In this robustness test, we follow the standard methodology to control for day-of-the-week in calculating abnormal returns, and thus do not include holiday effects from weekend in the control group.

<i>T3</i> × <i>Low price</i>				15.22*** [4.08]
Constant	34.04*** [11.6]	34.11*** [11.6]	27.77*** [8.77]	34.77*** [11.9]
<i>MV</i> , <i>Low price</i>	Y	Y	Y	Y
No. of observations	404,731	404,731	404,731	404,731

Note: Dependent variable in the table is AR , the residual of the regression below:

$$R_{it} = b_0 + b_1 MR_t + Weekday_t + Month_t + Industry_t + e_{it}$$

where $Weekday_t$, $Month_t$, and $Industry_t$ are weekday (i.e. Monday to Thursday) dummies, month dummies, and industry dummies. The sample in the table includes all the days with at least one of $T1$, $T3$, $T8$, *Other holiday* or *Major holiday* dummies equals to 1. See figure note of Figure 2 for the definition of $T1$, $T3$, $T8$, $T3only$, *Weekend*, *Major holiday* and *Other holiday*. MR is the value-weighted market return. $AscendingT3$ equals 1 if typhoon signals upgrade from 0:00 to 15:30. $NonAscendingT3$ equals 1 if typhoon signals (1) downgrade, or (2) upgrade and then downgrade, or (3) downgrade and then upgrade from 0:00 to 15:30. MV is the log of market capitalization of the stock on previous trading day and *Low price* is a dummy variable when mean close price during our sample period is lower than HK\$1. MV and *Low price*, are included in all specifications. Standard errors are estimated using panel-corrected standard errors. t statistics in brackets. *, ** and *** represent significance levels at 10%, 5% and 1%, respectively.

Index and Portfolio

We further examine the effect of $T3$ using the index returns to track sections of the stock market. Specifically, we replace the dependent variable R_{it} in Regression (2) with $Index_{jt}$, remove MR_t , and include weekday and month dummies in *Controls*, where $Index_{jt}$ is the return for index j on date t .

We conduct two different tests. In the first test, the indices are the value-weighted market index, the small-cap index, and the large-cap index. The last two are based on top and bottom 30% by their market capitalization at the end of latest June, respectively (Fama and French, 1993).

In the second test, the indices are daily value-weighted portfolio returns. For each year from 1986 to 2017, we sort stocks based on their market value at the end of June and group them into 10 equal-size groups: M1 refers to the group with the lowest market value, while M10 refers to the group with the highest market value. Value-weighted portfolio returns are then calculated based on the market value for portfolios that are formed in the last June (Fama and French, 1996).

The regression result is provided in Table 12. Panel A shows that the value-weighted market return for smaller stocks is positive and significant with $T3$. Similarly, Panel B shows that a significant and positive $T3$ effect exists from M1 to M7. It remains positive for M8 and M9, though it is not statistically significant, and for the large cap stock group M10, the coefficient becomes negative but insignificant, indicating that the observed effect is indeed more prominent for small-cap stocks. The coefficients of $T3$ is almost monotonically decreasing from M1 to M10, which it is consistent with the literature that prices are more efficient for larger stocks.

It is also worth noting that the coefficients of *Major holiday* and *Weekend* are all significant through the smallest to the largest stocks, and they are, similar to the $T3$ coefficients, decreasing in magnitudes. Why the $T3$ effect diminishes for large stocks while the weekend effect remains? In the literature, while some argue that effects from holiday and weekend are driven by investors' emotions (e.g., Golder and Macy 2011, Birru, 2018), there are other non-psychological explanations such as behaviors of short sellers (Chen and Singal, 2003) and data mining (Sullivan et al., 2001). As small stocks are more susceptible to investor sentiment, this suggests that our typhoon effect is driven by psychological impacts.

Table 12: Index results
Panel A: Market index, small-cap index, and large-cap index

	Market	Small-cap	Large-cap
<i>T1</i>	-28.77 [-1.07]	-35.04 [-1.28]	-28.58 [-1.05]
<i>T3</i>	9.327 [0.43]	59.83** [2.16]	7.394 [0.34]
<i>T8</i>	17.90 [0.65]	3.788 [0.09]	19.42 [0.71]
<i>Other holiday</i>	3.734 [0.39]	14.00 [1.15]	2.856 [0.30]
<i>Major holiday</i>	50.11*** [3.90]	77.36*** [5.66]	48.93*** [3.77]
<i>Weekend</i>	21.04*** [3.22]	16.58 [1.21]	20.70*** [3.15]
<i>Constant</i>	-9.930 [-1.37]	-22.51** [-1.99]	-9.045 [-1.24]
No. of observations	8067	7763	8067

Panel B: Decile group

	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10
<i>T1</i>	-19.15 [-0.62]	-30.28 [-1.34]	-43.93 [-1.58]	-29.91 [-1.09]	-28.47 [-0.92]	-23.16 [-0.77]	-33.05 [-1.15]	-33.81 [-1.18]	-27.59 [-0.90]	-27.54 [-1.05]
<i>T3</i>	87.78** [2.32]	88.60*** [3.07]	64.55** [2.03]	61.66** [2.31]	56.21* [1.88]	53.97* [1.91]	54.31* [1.90]	44.16 [1.62]	36.24 [1.38]	-0.177 [-0.01]
<i>T8</i>	-9.992 [-0.18]	-39.62 [-0.79]	12.17 [0.27]	8.784 [0.18]	-14.90 [-0.38]	-25.81 [-0.71]	-12.40 [-0.31]	-22.63 [-0.65]	-36.29 [-0.99]	28.45 [1.03]
<i>Other holiday</i>	13.16 [0.74]	5.574 [0.35]	11.16 [0.88]	11.92 [1.11]	16.25 [1.37]	17.38* [1.69]	15.75 [1.45]	18.96** [1.99]	10.34 [1.05]	0.975 [0.10]
<i>Major holiday</i>	75.62** [2.40]	72.03*** [3.37]	103.7*** [5.76]	44.57*** [2.66]	75.86*** [4.76]	74.74*** [6.54]	79.39*** [6.73]	67.78*** [6.04]	57.37*** [4.54]	45.48*** [3.39]
<i>Weekend</i>	31.84*** [2.73]	36.73*** [3.00]	30.22*** [4.06]	17.91 [1.38]	29.91*** [3.84]	32.34*** [4.37]	25.78*** [3.59]	27.75*** [3.82]	24.87*** [3.33]	19.23*** [2.91]
<i>Constant</i>	-32.02*** [-2.70]	-34.50*** [-2.98]	-32.73*** [-4.13]	-23.50* [-1.94]	-29.28*** [-3.67]	-21.99*** [-2.90]	-20.57*** [-2.68]	-14.81* [-1.89]	-6.242 [-0.74]	-6.958 [-0.94]
No. of observations	7696	7691	7697	7715	7713	7700	7705	7746	7745	8067

Note: Dependent variable in the table is value-weighted return in bps for each portfolio. See table note of Table 1 for the definition of *T1*, *T3*, *T8*, *Other holiday*, *Major holiday*, and *Weekend*. Standard errors are estimated using heteroscedasticity-consistent standard errors. *t* statistics in brackets. *, ** and *** represent significance levels at 10%, 5% and 1%, respectively.

CONCLUSION

We document a new empirical fact about the expectation-based reference-dependent preference using the probabilistic holiday effect induced by typhoon signals. We show that investors dislike positive piecemeal information and display a strong preference for positive informative signals.

Hence, the effect of good news may depend on its informativeness so that an individual may not benefit from (or even suffer from) insufficient informative good news. Indeed, this may offer an explanation why the loss effect is significant, but the win effect is not prominent for FIFA World Cup games studied by Edmans et al. (2007). Winning a game is a weak signal of being the final winner but losing is a strong signal of zero chance of getting the trophy.

Our paper suggests that investigating the role of expectation-based reference dependence in corporate disclosure would be interesting. For example, a publicly listed company is often required to issue profit warnings when earnings are expected to be much lower than historical ones. Given the dislike of positive piecemeal news, it may be justified that firms are not required to an announcement for positive news. Similarly, when a firm may decide what to disclose prior to a large forthcoming earning surprise, many managers choose to disclose qualitative information rather than quantitative information (Kasznik and Lev, 1995). Using a less precise estimation would avoid big changes in reference point so that it reduces the chance of fluctuation of belief as uncertainty resolves. Moreover, our studies may also provide an additional rationale behind management expectations in corporate disclosure (He et al., 2020).

REFERENCES

- Allen, E. J., Dechow, P. M., Pope, D. G., & Wu, G. (2017). Reference-dependent preferences: Evidence from marathon runners. *Management Science*, 63(6), 1657-1672.
- Anagol, S., & Gamble, K. J. (2013). Does presenting investment results asset by asset lower risk taking? *Journal of Behavioral Finance*, 14(4), 276-300.
- Ariel, R. A. (1990). High stock returns before holidays: Existence and evidence on possible causes. *Journal of Finance*, 45(5), 1611-1626.
- Banz, R.W. (1981). The relationship between return and market value of common stocks. *Journal of Financial Economics*, 9(1), 3-18.
- Baker, M., Mendel, B., & Wurgler, J. (2016). Dividends as reference points: A behavioral signaling approach. *Review of Financial Studies*, 29(3), 697-738.
- Barber, B. M., & Odean, T. (2008). All that glitters: The effect of attention and news on the buying behavior of individual and institutional investors. *Review of Financial Studies*, 21(2), 785-818.
- Barberis, N. (2018). Psychology-based models of asset prices and trading volume. In *Handbook of Behavioral Economics: Applications and Foundations*, 1, 79-175. North-Holland.
- Barberis, N., Huang, M., & Santos, T. (2001). Prospect theory and asset prices. *Quarterly Journal of Economics*, 116(1), 1-53.
- Barberis, N., Jin, L. J., & Wang, B. (2019). Prospect theory and stock market anomalies. *Journal of Finance*, 76(5), 2639-2687.
- Barberis, N., Mukherjee, A., & Wang, B. (2016). Prospect theory and stock returns: An empirical test. *Review of Financial Studies*, 29(11), 3068-3107.
- Barberis, N., Shleifer, A., & Vishny, R. (1998). A model of investor sentiment. *Journal of Financial Economics*, 49(3), 307-343.
- Barberis, N., & Xiong, W. (2009). What drives the disposition effect? An analysis of a long-standing preference-based explanation. *Journal of Finance*, 64(2), 751-784.
- Barberis, N., & Xiong, W. (2012). Realization utility. *Journal of Financial Economics*, 104(2), 251-271.
- Bellemare, C., Krause, M., Kröger, S., & Zhang, C. (2005). Myopic loss aversion: Information feedback vs. investment flexibility. *Economics Letters*, 87(3), 319-324.
- Benartzi, S., & Thaler, R. H. (1995). Myopic loss aversion and the equity premium puzzle. *Quarterly Journal of Economics*, 110(1), 73-92.
- Bergeman, D. & Morris, S. (2019). Information design: A unified perspective. *Journal of Economic Literature*, 57(1), 44-95.
- Bialkowski, J., Etebari, A., & Wisniewsky, T. (2012). Fast profits: Investor sentiment and stock returns during Ramadan. *Journal of Banking & Finance*, 36(3), 835-845.
- Birru, J., (2018) Day of the week and the cross-section of returns. *Journal of Financial Economics*, 130(1), 182-214.
- Cao, M., & Wei, J. (2005). Stock market returns: A note on temperature anomaly. *Journal of Banking & Finance*, 29(6), 1559-1573.

- Cadsby, C., & Ratner, M. (1992). Turn-of-month and pre-holiday effects on stock returns: Some international evidence. *Journal of Banking & Finance*, 16(3), 497-509.
- Campbell, J. Y., & Cochrane, J. H. (1999). By force of habit: A consumption-based explanation of aggregate stock market behavior. *Journal of Political Economy*, 107(2), 205-251.
- Chay, K.Y., & Greenstone, M. (2005). Does air quality matters? Evidence from the housing market. *Journal of Political Economy*, 113(2), 337-424.
- Chen, H., & Singal, V. (2003). Role of speculative short sales in price formation: The case of the weekend effect. *Journal of Finance*, 58(2), 685-705.
- Chong, R., Hudson, R., Keasey, K., & Littler, K. (2005). Pre-holiday effects: International evidence on the decline and reversal of a stock market anomaly. *Journal of International Money & Finance*, 24(8), 1226-1236.
- Crawford, V. P., & Meng, J. (2011). New York city cab drivers' labor supply revisited: Reference-dependent preferences with rational-expectations targets for hours and income. *American Economic Review*, 101(5), 1912-32.
- Camerer, C., Babcock, L., Loewenstein, G., & Thaler, R. (1997). Labor supply of New York City cabdrivers: One day at a time. *Quarterly Journal of Economics*, 112(2), 407-441.
- Da, Z., Engelberg, J., & Gao, P. (2011). In search of attention. *Journal of Finance*, 66(5), 1461-1499.
- Dell, M., Jones, B.F., & Olken, B.A. (2012). Temperature shocks and economic Growth: Evidence from the last half century. *American Economic Journal: Macroeconomics*, 4(3), 66-95.
- Dunn, R., & Spetch, M. L. (1990). Choice with uncertain outcomes: Conditioned reinforcement effects. *Journal of the Experimental Analysis of Behavior*, 53(2), 201-218.
- Edmans, A., Garcia, D., & Norli, Ø. (2007). Sports sentiment and stock returns. *Journal of Finance*, 62(4), 1967-1998.
- Ely, J., Frankel, A., & Kamenica, E. (2015). Suspense and surprise. *Journal of Political Economy*, 123(1), 215-260.
- Fabozzi, F., Ma, C., & Briley, J. (1994). Holiday trading in futures markets. *Journal of Finance*, 44(1), 307-324.
- Falk, A., & Zimmermann, F. (2016). Beliefs and Utility: Experimental evidence on preferences for information. Available at SSRN: <https://ssrn.com/abstract=2834222>
- Fama, E. F., & French, K. R. (1992). The cross-section of expected stock returns. *Journal of Finance*, 47(2), 427-465.
- Fama, E. F., & French, K. R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics*, 33(1), 3-56.
- Fama, E. F., & French, K. R. (1996). Multifactor explanations of asset pricing anomalies. *Journal of Finance*, 51(1), 55-84.
- Fanger, P. O. (1970). Thermal comfort. Analysis and applications in environmental engineering. Thermal comfort: Analysis and applications in environmental engineering. *Danish Technical Press*.
- Frieder, L., & Subrahmanyam, A. (2004). Non-secular regularities in return on volume. *Financial Analysts Journal*, 60(4), 29-34.

- Ganguly, A., & Tasoff, J. (2017). Fantasy and dread: The demand for information and the consumption utility of the future. *Management Science*, 63(12), 4037-4060.
- Genesove, D., & Mayer, C. (2001). Loss aversion and seller behavior: Evidence from the housing market. *Quarterly Journal of Economics*, 116(4), 1233-1260.
- Gneezy, U., & Potters, J. (1997). An experiment on risk-taking and evaluation periods. *Quarterly Journal of Economics*, 112(2), 631-645.
- Giglio, S., Kelly, B., & Stroebel, J. (2021a). Climate finance. *Annual Review of Financial Economics*, 13, 15-36.
- Giglio, S., Maggiori, M., Rao, K., Stroebel, J., & Weber, A. (2021b). Climate change and long-run discount rates: Evidence from real estate. *The Review of Financial Studies*, 34(8), 3527-3571.
- Golder, S. A., & Macy, M. W. (2011) Diurnal and seasonal mood vary with work, sleep, and daylength across diverse cultures, *Science*, 333, 1878-1881.
- Golman, R., Hagmann, D., & Loewenstein, G. (2017). Information avoidance. *Journal of Economic Literature*, 55(1), 96-135.
- Grinblatt, M., & Han, B. (2005). Prospect theory, mental accounting, and momentum. *Journal of Financial Economics*, 78(2), 311-339.
- Haigh, M. S., & List, J. A. (2005). Do professional traders exhibit myopic loss aversion? An experimental analysis. *Journal of Finance*, 60(1), 523-534.
- Hang Seng Indexes (Dec 20, 2020). Proposal to enhance the “Hang Seng Index” as regards continuing to serve as the most representative and important Hang Seng Indexes benchmark of the Hong Kong stock market. *Hang Seng Indexes*.
- He, J., Liu, T., Netter, J., & Shu, T. (2020). Expectation management in mergers and acquisitions. *Management Science*, 66(3), 1205-1226.
- Heffetz, O. (2021). Are reference points merely lagged beliefs over probabilities? *Journal of Economic Behavior & Organization*, 181, 252-269.
- Hirshleifer, D., & Shumway, T. (2003). Good day sunshine: Stock returns and the weather. *Journal of Finance*, 58(3), 1009-1032.
- Holt, C. A. & Laury, S. K. (2002). Risk aversion and incentive effects. *American Economic Review*, 92(5), 1644-1655.
- Hong Kong Commercial Daily. (Jul 17, 2004). Kompas hits Hong Kong: citizens and tourists have fun under typhoons – The first typhoon signal no .8 was hoisted, but the severity is not as bad as expected (圓規插港市民遊客趁風作樂首掛八號波風弱災輕). Hong Kong Commercial Daily. (p.A03).
- Hong Kong Daily News. (Jul 17, 2004). The typhoon signal no. 8 was hoisted, but the influence is weak – Citizens enjoy a half-day holiday for leisure (八號風球破壞力弱市民喜得半日閒四出尋消遣). Hong Kong Daily News. (p. A02).
- Howard, D. J. (1992). Gift-Wrapping Effects on Product Attitudes: A Mood-Biasing Explanation. *Journal of Consumer Psychology*, 1(3), 197-223.
- Isen, A., Rossin-Slater, M., & Walker, W.R. (2017). Every breath you make—every dollar you’ll make: The long-term consequence of the clean air act of 1970. *Journal of Political Economy*, 125(3), 848-902.

- Ingersoll, J. E., & Jin, L. J. (2013). Realization utility with reference-dependent preferences. *Review of Financial Studies*, 26(3), 723-767.
- Jacobs, B.I., & Levy, K.N. (1988). Calendar anomalies: abnormal returns at calendar turning points. *Financial Analysts Journal*, 44(6), 28-39.
- Kahneman, D., & Tversky, A. (1979). Prospect Theory: An Analysis of Decision under Risk. *Econometrica*, 47(2), 263-292.
- Kamenica, E., & Gentzkow, M. (2011). Bayesian Persuasion. *American Economic Review*, 101(6), 2590-2615.
- Kamstra, M. J., Kramer, L. A., & Levi, M. D. (2003). Winter blues: A SAD stock market cycle. *American Economic Review*, 93(1), 324-343.
- Karlsson, N., Loewenstein, G., & Seppi, D. (2009). The ostrich effect: Selective attention to information. *Journal of Risk and Uncertainty*, 38(2), 95-115.
- Kasznik, R., & Lev, B. (1995). To warn or not to warn: Management disclosures in the face of an earnings surprise. *Accounting Review*, 70(1), 113-134.
- Kim, C., & Park, J. (1994). Holiday effects and stock returns: Further evidence. *Journal of Financial and Quantitative Analysis*, 29(1), 145-157.
- Kőszegi, B., & Rabin, M. (2006). A model of reference-dependent preferences. *Quarterly Journal of Economics*, 121(4), 1133-1165.
- Kőszegi, B., & Rabin, M. (2007). Reference-dependent risk attitudes. *American Economic Review*, 97(4), 1047-1073.
- Kőszegi, B., & Rabin, M. (2009). Reference-dependent consumption plans. *American Economic Review*, 99(3), 909-36.
- Lakonishok, J., & Maberly, E. (1990). The weekend effect: Trading patterns of individual and institutional investors. *Journal of Finance*, 45(1), 231-243.
- Lakonishok, J., & Smidt, S. (1988). Are seasonal anomalies real? A ninety-year perspective. *Review of Financial Studies*, 1(4), 403-425.
- Loewenstein, G. (1994). The psychology of curiosity: A review and reinterpretation. *Psychological bulletin*, 116(1), 75.
- Lam, H., Kok, M.H., & Shum, K.Y. (2012). Benefit from typhoon—the Hong Kong perspective. *Weather*, 67(1), 16-21.
- Lee, C. M., Shleifer, A., & Thaler, R. H. (1991). Investor sentiment and the closed-end fund puzzle. *Journal of Finance*, 46(1), 75-109.
- List, J. A. (2003). Does market experience eliminate market anomalies?. *Quarterly Journal of Economics*, 118(1), 41-71.
- List, J. A. (2004). Neoclassical theory versus prospect theory: Evidence from the marketplace. *Econometrica*, 72(2), 615-625.
- Mehra, R., & Prescott, E. C. (1985). The equity premium: A puzzle. *Journal of monetary Economics*, 15(2), 145-161.

- Meng, J., & Weng, X. (2018). Can prospect theory explain the disposition effect? A new perspective on reference points. *Management Science*, 64(7), 3331-3351.
- Odean, T. (1998). Volume, volatility, price, and profit when all traders are above average. *Journal of Finance*, 53(6), 1887-1934.
- O'Donoghue, T., & Sprenger, C. (2018). Reference-dependent preferences. In *Handbook of Behavioral Economics: Applications and Foundations* 1, 1-77), North-Holland.
- Pagel, M. (2016). Expectations-based reference-dependent preferences and asset pricing. *Journal of the European Economic Association*, 14(2), 468-514.
- Pagel, M. (2017). Expectations-based reference-dependent life-cycle consumption. *Review of Economic Studies*, 84(2), 885-934.
- Pagel, M. (2018). A News-Utility Theory for Inattention and Delegation in Portfolio Choice. *Econometrica*, 86(2), 491-522.
- Peress, J., & Schmidt, D. (2020). Glued to the TV: Distracted noise traders and stock market liquidity. *Journal of Finance*, 75(2), 1083-1133.
- Powdthavee, N., & Riyanto, Y. E. (2015). Would you pay for transparently useless advice? A test of boundaries of beliefs in the folly of predictions. *Review of Economics and Statistics*, 97(2), 257-272.
- Rabin, M. (2002). Inference by believers in the law of small numbers. *Quarterly Journal of Economics*, 117(3), 775-816.
- Routledge, B. R., & Zin, S. E. (2010). Generalized disappointment aversion and asset prices. *Journal of Finance*, 65(4), 1303-1332.
- Saunders, E. M. (1993). Stock prices and Wall Street weather. *American Economic Review*, 83(5), 1337-1345.
- Sicherman, N., Loewenstein, G., Seppi, D. J., & Utkus, S. P. (2016). Financial attention. *Review of Financial Studies*, 29(4), 863-897.
- South China Morning Post (2016). Myth Busters: Li's Field, and 15 Hong Kong Rumors Exposed, *HK Magazine*, South China Morning Post.
- Sullivan, R., Timmermann, A., & White, H. (2001). Dangers of data mining: The case of calendar effects in stock returns. *Journal of Econometrics*, 105(1), 249-286.
- Wang, H., Yan, J., & Yu, J. (2017). Reference-dependent preferences and the risk–return trade-off. *Journal of Financial Economics*, 123(2), 395-414.
- Wong, W.-K., & Choy, C.-W. (2018). Progress in Hong Kong's tropical cyclone forecasting and warning services in recent decades. *Tropical Cyclone Research and Review*, 7(1), 37-5.

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GOVERNMENTAL RESPONSE TO SURPRISE MEDICAL BILLING PRACTICES

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ABSTRACT

No surprise medical billing legislation affords states the ability to protect consumers from certain health care balance billing practices. Federal and state consumer protection laws now apply to situations in which unforeseen medical services are rendered by an out-of-network provider at an in-network facility. Balance billing practices apply to bills exceeding the amount of an insured individual's cost sharing requirements including copayment, coinsurance or deductible obligations. State intervention will need to be considered in light of existing insurance oversight that is reserved to the states. In response, states have begun to introduce legislation or executive actions to address the issue of surprise medical billing practices. The no surprise bill concept raises social concerns, insurance protections, consumer notice, disclosure, patient consent, access to care, equal healthcare, prohibitions, and compliance enforcement. Governmental authority and responsibility in matters of health insurance and managed care plans is essential in order to coordinate covered services, rate settings, plan methodologies and reimbursement obligations. Health insurance decisions are made in conjunction with health insurers, health care providers, employers, consumer advocates and the general public. Prior research to examine the variances in the policy making associated with medical balance billing legislation or executive action within the United States has been limited. To address this gap in the literature, this paper will examine surprise medical bill legislative trends including health care network adequacy, assignment of benefits, enrollee rights, payment of claims, cost sharing arrangements, dispute resolution process, consent to services requirements, and standardized methodology.

INTRODUCTION

This paper presents a literature review and critique of applicable state laws and specific aspects of the governmental response to surprise medical billing practices. If a portion of a medical bill is not covered by the health insurance company, the provider will send the patient a request for the unpaid balance of the bill. This process is called balance billing. Surprise billing may occur under circumstances where the patient receives an unexpected bill from a provider that is not in the patient's health care plan network. In certain situations, a patient may receive care from an out-of-network provider and be billed for the treatment by the non-participating provider. To address these situations, states are enacting laws to protect patients from receiving surprise medical bills and to prohibit the non-disclosure of out-of-network charges and balance billing practices. In addition, the states are promulgating these no surprise laws to provide enforcement protections. However, the applicable state laws lack uniformity.

This study evaluates the various state statutes and summarizes the similarities and differences of the no surprises laws that have been adopted and implemented by various states. This paper attempts to examine important aspects of current state legislation that enables the individual to make informed choices for their health care treatment decisions. In addition, the paper investigates further provisions to expand patient access to healthcare services and healthcare safeguards for the benefit of the community.

NATIONAL RESPONSE

In order to review the state governmental response to no surprises billing provisions, this paper highlights the overarching role of the states to no surprises billing efforts at the national level.

No Surprises Act

On December 27, 2020, the United States Congress passed the No Surprises Act (P.L. 116-260). The law, signed by the President, took effect on January 1, 2022. The legislation protects consumers from surprise medical bills for health care services. The No Surprises Act encourages states to exercise primary enforcement authority for no surprise billing practices.

Department of Health and Human Services

As a result of the passage of the No Surprises Act, Title XXVII of the Public Health Service Act (42 U.S.C. 300gg et seq) was amended to include additional health care coverage provisions. Under Section 2799 A-1, the amendment

requires health insurance plans to provide coverage for emergency services without the need for prior authorization determination. If services are provided to a patient by a nonparticipating provider, the financial limitations on coverage or cost sharing requirements cannot be more restrictive than the financial limitations on coverage or cost sharing requirements by a participating provider.

In addition, the amendments address the calculation of the cost-sharing requirements for the patient. Basically, the charges for services are determined by the amount the patient would be charged by a participating provider.

Under the provisions of the federal law, the Secretary of Health and Human Services or an applicable State authority is required to audit the health insurance issuers for compliance with the statute.

American Medical Association and American Hospital Association Response

During the Congressional discussions prior to the enactment of the federal law, the American Medical Association and the American Hospital Association supported the legislative efforts to protect patients from surprise medical billing and unexpected medical bills. The organizations assumed that group health plans and commercial health insurance issuers would agree to fair payment rates to the providers according to a fair dispute resolution process.

Subsequently, the organizations determined that applying the interim rules by the Departments of Health and Human Services, Labor and the Treasury would violate their statutory authority. In the case *American Medical Association v United States HHS*, Civ. Action No. 1:21-cv-03231, the American Medical Association, the American Hospital Association and other providers seek injunctive relief to set aside action by the federal agencies to implement the interim rules. The lawsuit contends that the independent dispute resolution process is unfair. The issue is important because the dispute resolution process determines the actual payment rate between the provider and the insurance payer. At this time, the matter is still pending before the court.

JUDICIAL INTERPRETATIONS

In order to review the state governmental response to the No Surprises Act, this paper reviews the relevant challenges to the implementation of the statute and the associated Interim Rules of the Department of Health and Human Services.

In the case, *Haller v United States HHS*, 2022 U.S. Dist. LEXIS 142813, health care providers in a Long Island surgical practice challenged the constitutionality of the No Surprises Act, Pub. L. 116-260 and sought to enjoin enforcement of the law. The court denied the request for a preliminary injunction and determined that the Act did not violate the constitutional rights of the providers.

In the case, *Texas Medical Association v United States HHS*, 2022 U.S. Dist. LEXIS 31807, healthcare providers challenged an interim final rule issued by the Departments of Health and Human Services, Labor and the Treasury. The providers claimed that the Rule was not in conformity with the No Surprises Act. The Rule was intended to outline the arbitration process for handling payment disputes by out-of-network providers. The court determined that the rules of the federal agencies conflicted with the statutory text of the federal Act. The request for summary judgment by the providers was granted and the United States District Court vacated the arbitration provisions of the Rule.

FEATURES OF NO SURPRISE MEDICAL BILLING REGULATIONS

The governmental response to surprise medical billing practices differs among the jurisdictions. Some states have statutes, executive orders or regulations that protect the patient from surprise billing. For purposes of this investigation, the paper will specifically address the function and scope of the governmental response to surprise medical billing practices.

Numerous no surprise medical billing laws have been enacted by states either by legislative, departmental regulations or executive order to provide standards that regulate the non-disclosure of medical billing practices. Many of the statutory provisions prohibit the use of surprise medical billing practices. In addition, the measures remove obstacles that prevent access to needed medical care and advance equal healthcare. Therefore, several states have intervened to regulate the implementation of these practices. The no surprise medical billing laws have many similarities and

unique specific provisions. In this paper, the regulatory or legislative differences of a random sample of no surprise medical billing laws are documented for comparative analysis.

Regulatory Intent

State laws identify certain purposes for enacting no surprise medical billing legislation. Generally, these state provisions are designed to protect the consumer from surprise billing practices. According to the Pennsylvania No Surprises Act Implementation Executive Order (Pennsylvania Exec. Order 2021-08), the purpose of the prohibition order is to protect the individual from surprise medical bills under conditions where the patient has no control over the provider of health care services. By referencing the federal law, the Pennsylvania No Surprises Act Implementation Executive Order (Pennsylvania Exec. Order 2021-08) in effect ratifies and adopts the federal No Surprises Act instead of creating a corresponding state law.

The stated intent of the Virginia Statute (Va. Code Ann. 38.2-3445) is to provide patient access to emergency services from in-network or out-of-network providers. For out-of-network services, the statutory provision promotes emergency care without imposing any additional administrative requirements or limitations on coverage from in-network providers.

The New Jersey Bulletin (N.J. Department of Banking and Insurance Bulletin No. 18-14) indicates the Out-of-Network Consumer Protection, Transparency, Cost Containment and Accountability statute enhances consumer protection from surprise bills for out-of-network health care services. The improvements are intended to provide transparency and consumer disclosures. The statute is also anticipated to address cost containment measures for out-of-network services.

General Definitions

The Georgia Statute (Ga. Code Ann. 33-20E-1) provides a helpful guide to the terms of the surprise billing parties. A health care provider may be a physician and many other professionals including a dentist, podiatrist, optometrist, psychologist, clinical social worker and other health care professionals. An out-of-network provider has no formal contract with a healthcare plan and delivers medical services to the patient. In contrast, a participating network provider has a contract with the insurer to provide services to the patient. A covered person is insured under a healthcare plan, which includes an insurance policy, a health maintenance organization, managed care contract or a state healthcare plan. According to the Nebraska Statute (Neb. Rev. Stat. 44-6834), the insurer is obligated to pay health care expense benefits on behalf of the covered person. Under the Illinois Statute (215 Ill. Comp. Stat. 5/356z.3a), the benefits of the enrollee are assigned to the non-participating provider.

The healthcare insurer contracts with certain providers to provide care and reimburses those providers for the costs of healthcare services. The healthcare insurer is subject to the insurance laws and regulations of the state.

Definition of Surprise Bill

Under the provision of Connecticut Senate Bill No. 811 (Conn. Gen. Stat. 15-146), a surprise bill means a bill received by an insured person for services provided by an “out-of-network” health care provider where the insured person did not knowingly elect to obtain the out-of-network services. According to the New Hampshire Insurance Department, a surprise billing is an unexpected charge for medical care through an in-network provider.

The Georgia Statute (Ga. Code Ann. 33-20E-1) does not specifically define a surprise bill. Instead, the statute describes the event in which charges are generated from a covered person receiving services from an out-of-network provider at an in-network facility. The statute does interpret a balance bill to be the amount that a “nonparticipating” healthcare provider charges for services provided to an insured individual with healthcare insurance coverage.

According to the Washington Statute (Wash. Rev. Code 48.43), a balance bill reflects a bill that is sent to an enrollee by a nonparticipating provider after the provider is not fully reimbursed by the carrier for health care services.

Scope of Surprise Billing Protection

Under the New Mexico Statute (N.M. Stat. Ann 59A-57A-1), the health insurance carrier is required to reimburse a nonparticipating provider for emergency care that is necessary to evaluate and stabilize a covered person. The interpretation of necessity is basically the general knowledge that a prudent layperson reasonably believes concerning emergency care regardless of the eventual diagnosis.

Provisions of the Michigan Surprise Medical Billing Act apply to a nonparticipating provider performing health care service to an emergency patient. The Michigan Statute (Mich. Comp. Laws Ann. 333.24501) defines an emergency patient to mean a person with acute physical or mental condition symptoms of sufficient severity and pain that a prudent layperson with an average knowledge of health and medicine could reasonably expect to result in serious consequences. The examples of conditions would include placing the health of the person in serious jeopardy, serious impairment of bodily function or serious dysfunction of a body organ or part.

Restrictions

The statutes restrict certain billing practices by health care providers. According to the Colorado Statute (Colo. Rev. Stat. 12-30-113), an out-of-network provider is prohibited from billing or collecting payment from a covered person for an outstanding balance for covered services not paid by the carrier. A covered person is entitled to receive benefits under a health coverage insurance plan (Colo. Rev. Stat. 10-16-102 (15)). Under the Virginia Statute (Va. Code Ann. 38.2-3445.01) and the Oregon Statute (Or. Rev. Stat. 743B.287), an out-of-network provider is not permitted to balance bill an enrollee for emergency services.

The New Mexico Statute (N.M. Stat. Ann. 59-16-21.3) prohibits a provider from submitting a surprise bill to a covered person in excess of the cost sharing amounts under the person's benefits plan.

Cost-Sharing Obligations

Several states address the cost-sharing obligations of the enrollee. The New Mexico Statute, (N.M. Stat. Ann 59A-57A-1) defines cost sharing as a copayment, co-insurance, deductible, or other financial obligation of a covered person. The state statutes recognize exceptions to the billing restrictions for general insurance responsibilities. According to the Colorado Statute (Colo. Rev. Stat. 12-30-113), an out-of-network provider is permitted to bill a covered person. The out-of-network provider is permitted to apply the in-network coinsurance, deductibles and copayment amounts that would be required to be paid by the patient. Under the New Hampshire Statute (N.H. Rev. Stat. Ann 329:31-b), the health care provider is permitted to bill the patient for copayment, deductible, and coinsurance obligations. The Virginia Statute (Va. Code Ann. 38.2-3445) stipulates that the health insurance carrier will pay the out-of-network provider an amount less the patient's cost-sharing portion. The patient is only responsible for any cost-sharing requirements not to exceed the in-network cost-sharing requirements under the terms of the health insurance carrier policy.

The Georgia Statute (Ga. Code Ann. 33-20E-1) places a cap on the payment obligation of the covered patient. The nonparticipating provider is not permitted to collect or bill more than the person's policy requirements for the deductible, coinsurance, copayment or other cost-sharing amount. Similarly, the Michigan Statute (Mich. Comp. Laws Ann. 333.24501) and the Nebraska Statute (Neb. Rev. Stat. 44-6834) limit the amount the nonparticipating provider can collect or attempt to collect from the patient other than the applicable in-network coinsurance, copayment or deductible.

According to the California Health and Safety Code (Cal. Code Regs. HSC 1371.30), the noncontracting individual health professional is permitted to bill or collect from the enrollee the out-of-network cost sharing amount. However, the right is conditioned on the provider obtaining the written consent of the enrollee prior to treatment. The unpaid amount may advance to collections only for the equivalent amount of the insurance plan in-network cost-sharing amount.

Under the New Mexico Statute (N.M. Stat. Ann 59A-57A-1), the insurance carrier can only limit the charges of the nonparticipating provider for emergency services to the extent of the covered person's copayment or co-insurance requirement.

WAIVER OF PRIOR AUTHORIZATION DETERMINATION

Under the Virginia Statute (Va. Code Ann. 38.2-3445), the patient is not required to obtain prior authorization from the health insurance carrier for emergency services irrespective of in-network or out-of-network care. According to the Georgia Statute (Ga. Code Ann. 33-20E-1), the insurer is expected to pay for emergency services without the need for any prior authorization determination and without any retrospective payment denial for medically necessary services.

The New Mexico Statute (N.M. Stat. Ann 59A-57A-1) restricts the health insurance carrier from requiring their prior authorization or approval for emergency care before the point of stabilization of the covered person.

Insurance Benefits Protection

The Georgia Statute (Ga. Code Ann. 33-20E-1) protects the covered person from the denial of benefits by their insurance company for a balance bill. The insurer of a healthcare plan is not permitted to deny or restrict the provision of covered benefits solely because the patient obtains treatment from a nonparticipating provider leading to a balance bill.

Principle of Patient Autonomy/ Right of Personal Choice

The surprise billing statutes address the principle of patient autonomy and right of personal choice by affirming the right of the patient to choose out-of-network providers. The Oregon Statute (Or. Rev. Stat. 743B.287) acknowledges that an enrollee may choose to receive services from an out-of-network provider. Under the Georgia Statute (Ga. Code Ann. 33-20E-1), the covered person may choose to receive nonemergency medical services from an out-of-network provider.

The California Health and Safety Code (Cal. Code Regs. HSC 1371.30) stipulates that the provider needs to obtain the written consent to treatment from the enrollee together with an estimate of the total out-of-pocket cost of care. The consent must be obtained by the actual care provider which is nondelegable and the financial document must be separate from the consent for treatment document for the care or the procedure.

According to the New Jersey Statute (N.J. Rev. Stat. 26:2SS), the provider is not permitted to balance bill a covered person for out-of-network services unless the patient has “knowingly, voluntarily, and specifically selected the out-of-network provider” and chose the services of the specific provider.

Explanation of Benefits

Under the Georgia Statute (Ga. Code Ann. 33-20E-1), the covered person may choose to receive nonemergency medical services from an out-of-network provider. In this situation, the out-of-network provider would need to provide an estimate of the potential charges in advance of such services with written acknowledgement from the patient.

According to the Virginia Statute (Va. Code Ann. 14VAC5-405-30), the health insurance carrier is responsible for providing an explanation of benefits to the enrollee and to the out-of-network providers considering the cost-sharing requirements.

According to the Colorado Statute (Colo. Rev. Stat. 12-30-113), the out-of-network provider is required to provide the covered person with a written estimate of the amount following a request for information from the covered person. Under the Michigan Statute (Mich. Comp. Laws Ann. 333.24501), the nonparticipating provider is required to provide a good faith estimate of the cost of the health care services to the nonemergency patient. However, the good faith estimate standard is not intended to take into account unforeseen circumstances.

The Oregon Statute (Or. Rev. Stat. 743B.287) requires the out-of-network provider to inform the enrollee that the enrollee is financially responsible for any coinsurance, copayments and other out-of-pocket expenses attributable to choosing an out-of-network provider.

The Michigan Statute (Mich. Comp. Laws Ann. 333.24501) describes a model disclosure form that the nonparticipating provider should use when counseling a nonemergency patient prior to surgery or other medical procedure. Pertinent information includes the patient's responsibility for costs and the right to request another provider that participates with the health benefit plan of the patient. A copy of the form needs to be retained for seven years.

Surprise Bill Exclusion

The statutes do impose certain exclusions from the no surprise billing protections. If the consumer selects an out-of-network provider for care, the consumer is expected to pay the provider the balance bill and surprise billing protection would not be applicable. According to the Georgia Statute (Ga. Code Ann. 33-20E-1), the surprise bill exclusion applies if the covered person chose to receive nonemergency medical services from an out-of-network provider. Under those circumstances, the covered person assumes financial responsibilities for the payment of out-of-network services for nonemergency services. However, the out-of-network provider would need to obtain the prior written and oral consent from the patient in order to bill the patient for out-of-network services.

According to the New Mexico Statutes (N.M. Stat. Ann. 59-16-21.3) and N.M. Stat. Ann 59A-57A-1), the extent of the surprise bill law excludes a bill for health care services when a participating provider is available to render the treatment and the covered person knowingly elects to obtain the services from a nonparticipating provider without prior authorization from their insurer.

Determination of Insurance Reimbursement Rate Payment

The applicable formula for determining the reimbursement rate standard to an out-of-network provider varies greatly among the states. Under the Georgia Statute (Ga. Code Ann. 33-20E-1), the insurance rate for reimbursement payment of nonemergency medical services is determined by the patient's healthcare insurance policy. The insurer is instructed to make the payment directly to the provider for services according to a rate schedule. The payment rate amount is based upon the greater of the verifiable contracted rate amount by all eligible insurers; or the most recent verifiable rate amount agreed to during the time the provider was in-network; or a higher rate amount as deemed appropriate by the insurer given the complexity and circumstances of the services.

The New Mexico Statute (N.M. Stat. Ann 59A-57A-1) takes a more comprehensive approach. The Insurance Superintendent assembles various stakeholders including rural providers, health insurers, and consumer advocates to review the reimbursement rate for surprise bills on an annual basis. The collaborate process is expected to ensure fairness to providers and to evaluate the impact on health insurance premiums and health benefits plan networks.

Under the Virginia Statute (Va. Code Ann. 14VAC5-405-30), the health insurance carrier must reimburse the out-of-network provider at the commercially reasonable rate according to payments for similar services for a similar geographic area. According to the Colorado Statute (Colo. Rev. Stat. 12-30-113), the reimbursement rate is established by factoring one hundred ten percent of the insurance carrier's median in-network rate of reimbursement for the service in the same geographic area.

The Oregon Statute (Or. Rev. Stat. 743B.287) requires the insurer to reimburse the out-of-network provider for emergency services in an amount that is established by the rules of the Department of Consumer and Business Service. The reimbursement rate is required to be equal to the median amount normally paid to an in-network provider that reflects the rate in that particular geographic area of the state.

In the Michigan Statute (Mich. Comp. Laws Ann. 333.24501), the payment rate is calculated by applying the median amount negotiated by the insurance carrier for the region and provider specialty. If a nonparticipating provider maintains that a higher rate is warranted, the provider may file a claim with the insurance carrier for a greater reimbursement amount. The provider claim needs to provide clinical documentation to the carrier demonstrating a complicating factor in the treatment to support the request.

Overpayment and Refund

According to the New Mexico Statute (N.M. Stat. Ann 59A-57A-1), the nonparticipating provider has the responsibility to refund to the covered person any amount of payment in excess of the in-network cost-sharing amount for a surprise bill. The Virginia Statute (Va. Code Ann. 14VAC5-405-30) requires the out-of-network provider to refund to the enrollee any excess amount of payment. The California Health and Safety Code (Cal. Code Regs. HSC 1371.30) addresses overpayments. The noncontracting individual health professional is required to refund any overpayment to the enrollee whenever an amount in excess of the in-network cost-sharing amount is received from the enrollee.

Arbitration Process

In the event of a reimbursement dispute, the surprise bill statutes make arbitration an option for the parties. According to the Colorado statute (Colo. Rev. Stat. 12-30-113) and the Georgia Statute (Ga. Code Ann. 33-20E-1), an out-of-network provider is entitled to initiate a claim through arbitration for insufficient payment from the insurance carrier. The Virginia Statute (Va. Code Ann. 38.2-3445.01) stipulates the process for unresolved disputes by requiring the parties to resolve the disagreement through arbitration.

According to the Washington Statute (Wash. Rev. Code 48.43), out-of-network payment disputes are covered by arbitration between a health carrier and the health care provider. If the parties are unable to agree on a reimbursement rate for the services, the New Jersey Statute (N.J. Rev. Stat. 26:2SS) affords the carrier or the out-of-network health care facility the ability to initiate binding arbitration. The arbitrator will consider offers supplied by the parties including the written submissions of the final offer for payment by the carrier and the final offer by the out-of-network provider for the amount the provider will accept from the carrier.

If the health plan insurer and the out-of-network provider reach an impasse and are unsuccessful in the negotiation of a reimbursement dispute, the Ohio Statute (Ohio Rev. Code Ann. 3902.50) permits the provider to send a request for arbitration to the Superintendent of Insurance and notify the issuer of the request.

According to the Illinois Statute (215 Ill. Comp. Stat. 5/356z.3a), either the insurer or the non-participating provider may initiate binding arbitration to determine the payment amount on a per bill basis. Under the provision of the New Hampshire Statute (N.H. Rev. Stat. Ann 329:31-b), the health care provider and the insurance carrier are required to present to each other evidence supporting their calculation of the commercially reasonable fee for services. The information needs to be submitted prior to applying to the insurance commissioner for resolution of the payment dispute.

Payment Dispute Valuation Standard

In the event of a payment dispute between the provider and the insurance carrier, the New Hampshire Statute (N.H. Rev. Stat. Ann 329:31-b) provides that the standard for the determination of payment is the commercially reasonable value of the service. Under the New Hampshire Insurance Department rules, the value for the particular services in question is limited to the payments for similar services from insurance carriers to other health care providers in the state jurisdiction.

The Virginia Statutes (Va. Code Ann. 38.2-3445.01 and Va. Code Ann. 14VAC5-405-30) provide a balance billing process that describes the payment mechanism for out-of-network providers. The amount to be paid to an out-of-network provider for health care services in Virginia is the commercially reasonable amount. In addition, the Virginia provision stipulates that the amount is based on payments for the same or similar services provided in a similar geographic area.

The California Health and Safety Code (Cal. Code Regs. HSC 1371.30) designates the Insurance Commissioner to specify the methodology that insurers must use to determine the average contracted rates for services. The methodology takes into consideration the specialty of the individual health professional and the geographic region where the service is rendered.

According to the New Jersey Statute (N.J. Rev. Stat. 26:2SS), to arrive at a determination of payment, the arbitrator considers the level of training, education and experience of the health care professional, the usual charge of the provider, and the circumstances and complexity of the particular case. In addition, the arbitrator considers the average amount paid for similar services to other providers by the carrier.

Ethical Conduct of the Parties

In the event of a dispute, the Virginia Statute (Va. Code Ann. 14VAC5-405-30) requires the provider to notify the carrier in writing and negotiate in good faith. The health insurance carrier is required to pay amounts owed to the out-of-network provider through the good faith negotiation or arbitration directly to the out-of-network provider. If the carrier and the provider do not agree to a commercially reasonable rate, the dispute is resolved through arbitration.

Under the Illinois Statute (215 Ill. Comp. Stat. 5/356z.3a), both the insurer and the non-participating provider have to agree on the selection of the arbitrator from the list of arbitrators approved by the Department of Insurance before the process commences.

Under the New Hampshire Statute (N.H. Rev. Stat. Ann 329:31-b), the health care provider and the insurance carrier are required to make their best efforts to resolve any payment dispute.

Mediation of Disputes

Some states require the parties in dispute to enter into the mediation process. The New Hampshire department of insurance has authority under the New Hampshire Statute (N.H. Rev. Stat. Ann 329:31-b) to require the health care provider and the insurance carrier to engage in the mediation of payment disputes. The Nebraska Statute (Neb. Rev. Stat. 44-6834) stipulates that the out-of-network provider and the insurer follow the Uniform Mediation Act in the dispute process. Upon completion of the mediation process, the cost is split evenly and paid by the insurer and the health care provider.

Discretionary Authority

According to the New Hampshire Statute (N.H. Rev. Stat. Ann 329:31-b), the Insurance Department has exclusive jurisdiction to determine the payment fee to resolve disputes between the provider and the insurance carrier. Under the Georgia Statute (Ga. Code Ann. 33-20E-1), the Insurance Commissioner has authority to dismiss certain requests for arbitration of a disputed claim for matters pending in state or federal court.

According to the New Jersey Statute (N.J. Rev. Stat. 26:2SS), the Department of Banking and Insurance is authorized to contract with entities that have experience in health care pricing arbitration.

The California statute does not indicate if the use of an arbitrator is an option for the parties to address claim payment disputes. According to the California Health and Safety Code (Cal. Code Regs. HSC 1371.30), the Department of Insurance is responsible to establish an independent dispute resolution process to resolve a claim dispute between a health care service plan and a noncontracting health professional. The statute directs the Insurance Commissioner to develop uniform written procedures for the submission receipt, processing, and resolution of claim payment disputes. The parties apparently do not select or nominate the independent organization that is appointed by the Insurance Commissioner. However, the decision of the designated independent organization is binding on the parties.

According to the Illinois Statute (215 Ill. Comp. Stat. 5/356z.3a), arbitration can only be initiated by filing a request with the Department of Insurance.

Use of Resolution Organizations

According to the Georgia Statute (Ga. Code Ann. 33-20E-1), the Insurance Commissioner may select and refer claim disputes to a resolution organization for arbitration between the insurer and the out-of-network provider. The

parties have the option to select an arbitrator by mutual agreement. In the event the parties fail to select an arbitrator, the resolution organization selects an arbitrator.

According to the California Health and Safety Code (Cal. Code Regs. HSC 1371.30), the Insurance Commissioner designates an independent organization to conduct the actual dispute proceedings, however the statute does not mention the use of an arbitrator.

Arbitrator Qualifications and Rules

The Georgia Statute provides the most comprehensive details of the arbitration qualifications for payment disputes. Under the Georgia Statute (Ga. Code Ann. 33-20E-1), the arbitrator must be independent of the parties and not have a personal, professional, or financial conflict with the parties involved in the disputed claim. The arbitrator is expected to have experience and knowledge in healthcare billing and reimbursement rates. The arbitrator is not permitted to hold private communication with either of the parties.

The New Jersey Statute (N.J. Rev. Stat. 26:2SS) requires the arbitrators to be certified by the American Arbitration Association. The Illinois Statute (215 Ill. Comp. Stat. 5/356z.3a) requires the approved arbitrator to be trained by the American Arbitration Association or the American Health Lawyers Association.

Waiver, Rebates, Inducements Prohibition

The New Mexico Statute (N.M. Stat. Ann 59A-57A-1) condones any form of inducement to entice or persuade a person to take a certain course of action. To avoid the inducement of medical services by the “nonparticipating provider”, the New Mexico Statute (N.M. Stat. Ann 59A-57A-1) strictly forbids a “nonparticipating provider” to offer or knowingly waive, rebate, give, or pay the cost-sharing amount obligations of the covered person seeking the health care service.

If an out-of-network provider knowingly waives, rebates, gives or pays the deductible, copayment, or coinsurance obligations of the covered person, the provider is considered in violation of the New Jersey Statute (N.J. Rev. Stat. 26:2SS). The occurrence is considered an inducement by the provider.

Complaint Investigations

According to the Pennsylvania No Surprises Act Implementation Executive Order (Pennsylvania Exec. Order 2021-08), the Insurance Department is authorized to receive inquiries and complaints concerning the No Surprises Act. The Colorado Consumer Health Initiative (CCHI) sponsors a Consumer Assistance Program that affords consumers easy access to file a complaint concerning balance medical billing practices.

Sanctions

Under the New Mexico Statute (N.M. Stat. Ann 59A-57A-1), a nonparticipating provider can be fined by the Insurance Superintendent for unlawful rebate and inducement practices. The nonparticipating provider is entitled to a hearing prior to imposing the sanction. According to the Ohio Statute (Ohio Rev. Code Ann. 3902.50), a provider who violates the No Surprise Medical Billing Act is subject to professional discipline.

According to the New Jersey Statute (N.J. Rev. Stat. 26:2SS), a person that violates the provisions of the statute is liable to a penalty of not more than \$1,000 for each violation. Failure to comply with the statutory requirements would also result in the health care professional being reported to the appropriate licensing board.

Unfair Practice

Under New Mexico Statute (N.M. Stat. Ann. 59-16-21.3), a health care provider can be charged with an unfair practice for submitting a surprise bill to a collection agency. According to the Ohio Statute (Ohio Rev. Code Ann. 3902.50), the health plan issuer may be subject to an unfair and deceptive act or practice in the business of insurance for a pattern of continuous or repeated violations of the No Surprise Medical Billing Act. The California Health and

Safety Code (Cal. Code Regs. HSC 1371.30) prohibits the noncontracting individual health professional from garnishing wages or initiating a lien on a primary residence of the enrollee as a means of collecting unpaid bills.

Credit Reporting Agencies Controls

Under the Georgia Statute (Ga. Code Ann. 33-20E-1), the nonparticipating provider is not permitted to report the nonpayment of a surprise bill by the covered person to any credit reporting agency. The California Health and Safety Code (Cal. Code Regs. HSC 1371.30) constrains the ability of the noncontracting individual health professional from reporting any adverse information to a consumer credit reporting agency for a minimum of 150 days from the date of the initial billing to the enrollee.

Administrative and Legislative Oversight

The Pennsylvania No Surprises Act Implementation Executive Order (Pennsylvania Exec. Order 2021-08) authorizes multiple agencies including the Insurance Department, the Department of State, the Department of Health and the Department of Drug and Alcohol to ensure that business licensees are compliant with their responsibilities under the federal No Surprises Act. In addition, the state government has the ability to adopt policies to support enforcement of the federal statute.

Under the New Mexico Statute (N.M. Stat. Ann 59A-57A-1), the Insurance Superintendent may require health insurance carriers to report their annual percentage of claims and expenditures associated with their payments to nonparticipating providers for health care services.

The Oregon Statute (Or. Rev. Stat. 743B.287) requires the Department of Consumer and Business Services to report all consumer complaints to the Legislative Assembly concerning billing for services provided in in-network facilities by out-of-network providers. According to the Michigan Statute (Mich. Comp. Laws Ann. 333.24501), the Department of Insurance and Financial Services is responsible for administering the law. The role includes the preparation of an annual report that indicates the number of out-of-network billing complaints received by the department from enrollees. The report is delivered to the state senate and house of representatives standing committees on health policy and insurance.

The California Health and Safety Code (Cal. Code Regs. HSC 1371.30) directs the Insurance Commissioner to report data and information concerning the independent dispute resolution process. The information is sent to the Governor, the President pro Tempore of the Senate, the Speaker of the Assembly, and the Senate and Assembly Committees on Health.

The New Jersey Statute (N.J. Rev. Stat. 26:2SS) requires the Department of Banking and Insurance to report information to the Governor and the Legislature on the savings to policyholders and the healthcare system that result from administration of the statute.

Disclosure Requirements

The statutes address various disclosure requirements. According to the Georgia Statute (Ga. Code Ann. 33-20E-1), the healthcare insurer is required to provide the consumer with a written explanation of the coverage protection provisions for balance billing. The New Mexico Statute (N.M. Stat. Ann 59A-57A-1) requires any written communication to the consumer from the provider or the health insurance carrier to clearly inform the covered person of their responsibilities regarding a surprise bill.

Under federal law, the insurance carrier is required to keep their approved provider directories current. State laws also require certain disclosure information. According to the New Mexico Statute (N.M. Stat. Ann 59A-57A-1), the health insurance carrier needs to provide providers access to claims status information.

According to the New Jersey Statute (N.J. Rev. Stat. 26:2SS), the carrier is required to provide access to a telephone hotline that is operated at least 16 hours per day for consumers to call with questions concerning network status and out-of-pocket cost obligations.

Payer Health Claims Data Base

According to the Georgia Statute (Ga. Code Ann. 33-20E-1), the Insurance Department is required to maintain and update on an annual basis the all-payer health claims data base. In addition, the Insurance Department is expected to track insurer payments by healthcare services and by geographic areas of the state. The information is required to be available on a website.

The California Health and Safety Code (Cal. Code Regs. HSC 1371.30) requires the health insurance plans to provide information to the Department of Managed Health Care. The information needs to contain the number of payments made to noncontracting individual health professionals for services at contracting health facilities.

The New Jersey Statute (N.J. Rev. Stat. 26:2SS) requires the Department of Banking and Insurance to provide a website containing consumer information for reporting complaints and arbitration guidance.

Confidentiality of Rate Information

The California Health and Safety Code (Cal. Code Regs. HSC 1371.30) requires the Insurance Commissioner to maintain the confidentiality of the rate information used by the health insurers. The purpose of the protection is to preserve the integrity of the competitive market. Therefore, the statute limits the public's right of access to the insurance carrier rate information.

Educational Provisions

The Pennsylvania No Surprises Act Implementation Executive Order (Pennsylvania Exec. Order 2021-08) contemplates that educational materials may be developed and disseminated to implement the objectives of the federal statute.

Ambulance Transportation Exclusion

The topic of ambulance transportation services is treated differently in the statutes. The consideration is limited because of federal law. According to the Airline Deregulation Act (49 U.S.C. 41713b1), federal law preempts states from enacting a law or regulation related to price of an air carrier that provides air transportation. For example, the New Mexico Statute (N.M. Stat. Ann 59A-57A-1, N.M. Stat. Ann. 59-16-21.3) excludes ambulance transportation services from the definition of health care services and the definition of emergency care.

DISCUSSION

The surprise medical billing protections and prohibitions are determined by the particular state jurisdiction. The scope of research findings demonstrates a divergence in state viewpoints on the development of No Surprises policies and dispute resolution processes. Several states had pre-existing laws that address no surprise billings prior to enactment of the federal No Surprises Act of 2020. The federal law protects consumers in jurisdictions that have not enacted their own billing protection laws.

Surprise billing reflects the amount of money that is owed to the out-of-network provider by the consumer after the payment by the insurance company. The amount that is claimed by the provider from the consumer is calculated by deducting the insurance company payment from the total cost of the medical care.

The states use different approaches to address surprise medical billing practices. The regulation of surprise billing in Georgia is delegated to the Insurance Department. The department has promulgated extensive rules and regulations for the enforcement of the Georgia Surprise Billing Consumer Protection Act. Since the issuance of the Pennsylvania Executive Order (Pennsylvania Exec. Order 2021-08), the Pennsylvania Insurance Department has developed extensive information on its website to inform the public about the federal No Surprises Act.

The Colorado Consumer Health Initiative provides an online consumer guide with information on out-of-network billing protections. The state health initiative project also offers advice concerning medical balance billing, complaint programs and a Consumer Assistance Program.

Both the New Hampshire and Virginia statutes address balance billing practices but not specifically no surprise billing practices. The New Hampshire Statute (N.H. Rev. Stat. Ann 329:31-b) provides that the determination of payment is the commercially reasonable value of the service, in the event of a dispute between the provider and insurance carrier. The vague guidance raises ambiguities for the parties. The Virginia Statute, (Va. Code Ann. 38.2-3445.01) also provides a balance billing process applying the commercially reasonable amount standard and further stipulates that the amount is based on payments for the same or similar services provided in a similar geographic area. The Virginia statute provides additional instruction, but the description of the clinical services and the geographic area also raises ambiguities for the parties. Similar payment uncertainty in the state statutes has prompted litigation.

Some state statutes provide for a waiver of prior authorization from the health care carrier if the consumer is seeking emergency services. The waiver applies irrespective of whether the services are provided by an in-network or out-of-network provider. The laws appear to consider the condition of the patient in establishing the reimbursement rate for the out-of-network provider using terminology such as the complexity of the care. However, statutes may encourage insurance carriers to pre-determine coverage for non-emergency care from out-of-network providers based upon the condition and severity of the enrollee.

Prior to the enactment of the federal statute, some states had enacted no surprise legislation. Colorado instituted out-of-network billing protections that apply to consumers receiving balance medical bills.

Several states with no surprise billing statutes address binding arbitration approaches for the resolution of payment disputes. Few laws provide the mediation approach. States may consider the option of arbitration or mediation depending on the nature of the dispute. Mediation may be encouraged for uncomplicated disputes to avoid unnecessary delays and expenses.

The statutes provide limited sanctions for noncompliance with the no surprise laws. More states may consider constructive guidance for compliance. At a minimum, states may refer instances of noncompliance to the applicable professional licensing boards for review.

The laws may encourage insurance carriers to provide patient information on insurance coverage status. Currently, the enrollee assumes responsibility for determining coverage status which is difficult to obtain.

The findings suggest that the nonparticipating, out-of-network provider is entitled to compensation for rendering professional services. The provider renders services in good faith to the patient. Remuneration is warranted and public policy should reflect the fair compensation to the provider. The patient should be responsible for a reasonable amount of remuneration to the provider for any cost-sharing obligations because the patient derived a direct benefit from the provider services. The insurance carrier should reimburse the provider a reasonable amount even if the provider was out-of-network. The patient would have sought care irrespective of the status of the provider and the insurance carrier has a contractual obligation to the patient.

When a state statute provides a dispute resolution process, the parties have guidelines to assist them in the handling of an outstanding balance. Statutes provide specific factors to apply retroactively in the calculation of the payment amount. The guidelines appear to place an emphasis on the dispute resolution process. The statutes may take a more proactive approach to reduce the volume of disputes by establishing the compensation rate in advance.

Although the no surprise billing statutes vary by jurisdiction and lack uniformity in scope, the protections and prohibitions provide a basis for addressing the issue.

The no surprise billing statutes make vague reference or the lack of reference to established health care standards. These statutes indicate that the health care decisions of the individual are required with no reference to generally accepted health care or medical standards.

The statutes do not appear to take into consideration the role of the employer in situations where the insurance coverage for health care is arranged in the employment relationship. Perhaps, the human resource department has a stakeholder interest in the wellbeing of the employee.

The statutes do not address some important considerations for the insurance carriers which are regulated by the state insurance departments. The statutes may prescribe specific topics for the insurance carriers to address in their internal policies regarding emergency services mandates, benefit notifications, and provider pathways.

The statutes do not contain standard conflict in existing laws, ordinances, orders, rules and regulations if other laws are inconsistent with the no surprise billing statutes. The statutes may direct various executive branches of state government to take steps to rescind, alter or suspend existing administrative rules in conflict with the no surprise billing statute.

The underlying right to choose and treatment decisions are typically made between the patient and the physician under the doctrine of the right of self-determination (Cameron, 2020). The concept enables the person to exercise their right of self-determination. In a typical health care arrangement, the patient develops a relationship with the physician before a course of treatment is determined. The patient selects the treatment from among alternatives identified by the physician. Once the patient is informed by the physician, then the individual assumes responsibility for their own health care decisions.

Under this model, the best interests of the patient are maintained. Many health care statutes contain provisions to address the best interests of the patient, the use of due care and to act with good faith compliance (Cameron, 2020). The no surprise billing laws may affirm these fundamental patient safeguards in the preamble to the legislation.

Implications

The various stakeholders will need to develop mechanisms to implement the no surprise billing laws. The state governments have begun to track certain data. State agencies are anticipated to collect, collate and analyze responses to the dispute resolution process. Under the program, healthcare insurance carriers are required to report payments made to nonparticipating health professionals, results of disputes, and consumer complaints. However, the tracking process will operate under new reporting systems depended on the insurance carriers inputting information. To implement the tracking framework, the stakeholders will need to communicate effectively so that the state agencies have a thorough understanding of the potential benefits and risks of the no surprise billing laws. Although the state statutes declare that surprise medical bills and surprise balance billing practices are prohibited, the review and resolution of claim disputes will be ongoing and take time to interpret.

Many social implications are associated with the proposition for no surprise billing. Privacy protection and security of data, eligibility of benefits, patient health and safety concerns are impacted by the statutes.

To improve the health care guidelines, the statutes may mandate that the state medical licensure boards develop clinical review criteria for patients with special needs. The statutes may specify provisions for clinical guidelines to address matters of atypical patient populations. No surprise billing laws may require further modification to clarify certain situations. One of the criteria that requires more specificity is the exceptions process for patients with special needs. The statutes may require further patient protection measures that address safeguards for patients with physical impairments and special needs.

The statutes may stipulate standards to integrate the no surprise billing information with the electronic medical record. The digital record of the no surprise billing experiences would enhance the ability of the individual to provide feedback to various stakeholders. The information tool would also create a platform to retain the relevant information.

The state health departments may consider establishing a no surprise billing information hotline. This resource would provide guidance and answer questions related to the operation of the no surprise billing process.

The state health department may develop or assist health providers in developing in-service no surprise billing training modules for employees. The shared information may raise the level of awareness in the dispute resolution process.

At the county level, an administrative agency could provide a centralized registry to serve as a clearing house for stakeholders to submit their no surprise billing experiences. The registry would be accessible for other health care providers to query for reimbursement information.

The laws may address annual filing requirements to report the frequency of no surprise billing encounters to the health department and the state medical licensure board. The statutes may require the out-of-network practitioner to demonstrate with sound clinical evidence that the individual understands the risks, benefits, and alternatives of treatment.

As discussed in this paper, few state statutes set forth the duties and responsibilities of out-of-network providers in the no surprise billing protocol. The provider may encounter a situation that could expose the patient receiving care to potentially risky treatments. The exposure may lead to a potentially harmful outcome. Should a conflict occur between the requirements of the employer or state and the patient's best interests, the out-of-network physician may require clear guidance to resolve the conflict. Most of the no surprise billing statutes in the study leave the options to these dilemmas unaddressed in the law.

The role of the provider under emergency situations is to preserve the life of the injured and sick. The provider is trained to render emergency treatment. The resolution of the reimbursement dispute is a secondary matter which does not warrant a delay in immediate intervention. The law may encourage the insurance carrier to inform the policy holder in advance of their reimbursement conditions in the event of a medical emergency. The possibility of an emergency event occurring is not unpredictable. Although unexpected, the likelihood of encountering an emergency is a frequent event. The insurance carrier most likely factors these probabilities into the calculation of risk in underwriting projections.

Limitations

The scope of research in this paper is limited to an analysis of state legislative and administrative actions concerning the regulation of no surprise billing practices. The research does not provide an analysis of related price transparency concerns that requires hospitals to publicize their standard charges. This analysis does not address measures to regulate pharmacy benefit managers. Issues concerning no surprise billing practices in this project are limited to a review of the state legislative and administrative actions and does not address municipalities or federal mandates.

For purposes of this research, the details of the state arbitration process is omitted.

The paper does not address collection practices, and collection agencies regulation.

The depth of research is further limited because of the ongoing legislative and executive activity associated with the No Surprises Act topic. The research studied a sample of state laws during a limited time frame ending on September 1, 2022.

FUTURE CONSIDERATIONS AND CONCLUSION

Future research may address the need for states to better inform the public of the protections and prohibitions afforded to consumers to prevent health care surprise billings.

As states modify their approaches to surprise billings, research may reevaluate these proposals.

The regulatory and legislative initiatives in this review address the protections and prohibitions of surprise medical billing. Future research may consider the availability of additional data that could be stored, maintained and available for research analysis. The retrieval of archived health information is important for forecasting and planning for health care provider and public health initiatives.

The state approaches may consider incentive-based models that encourage compliance with no surprise billing requirements by the various stakeholders including the health care providers, the consumers, companies, and local communities.

The review of no surprise billing statutes reveals that limited information is available to address situations where the patient is uninsured with no apparent healthcare coverage.

Further analysis of the effectiveness of the arbitration process for payment disputes may provide a range of topics for future research.

The New Jersey statute refers to cost savings. The savings may flow to the patients for out-of-pocket expenses however, the cost savings may not necessarily flow to the insurer. More evidence may be reviewed in future research.

The state laws are designed with the assumption of a few primary stakeholders and yet, the private business community appears to be a dominant player. Research and surveys may encourage the input of a wider range of stakeholders in the development of no surprise billing requirements.

The policies that are initiated by the states may consider the public health needs of the community. Because of the nature of emergency care, the concept of community needs to be addressed. Community requirements vary by locality. Without community support, the best policies may elude positive results.

The findings of the study demonstrate that states recognize the right of citizens to make personal health choices, and to preserve the rights of private businesses. With proper safeguards which balance the interests of the parties and the state compelling interests, reasonable approaches may be achieved to maintain these principles.

A competent adult should have the right to make their own health care decisions without the need for third party intervention. Governmental laws will need to be carefully drafted to prevent infringement on individual rights. If reasonable accommodations are available for emergency care, societal interests may be protected. This approach respects the rights of the person but also respects the safety, health, and well-being of the community.

Future research may examine aspects related to conflicts and the level of responsibility between federal, state, and local public health laws and regulations of no surprise billing requirements.

The tracking of incidents of noncompliance with no surprise billing restrictions may be considered.

The impact that the no surprise billing laws have on the quality of population health should be considered in future research including measures of performance and state metrics. The concerns of all parties need to be gathered in public forums. Responses may help to evaluate the accomplishment of program objectives and to assess the impact of the no surprise billing initiatives. The results of these public health measures by the medical community need to be documented in the medical literature for the advancement of science.

Out-of-network providers may be impeded from their independent practice of medicine if the capability to render services is overly restricted by the no surprise billing initiatives.

Governmental laws will need to be constantly updated to reflect the changes in the delivery of medical services. Future governmental laws and decisions will need to maintain a rational basis to the social needs of public health and safety.

Federal, state and local governments have a shared responsibility to protect the public health of its citizens. Therefore, collaboration among the states and the federal government are essential because access to emergency care affects everyone.

Further research is needed to determine if the no surprise billing protections and prohibitions provide efficiency in the delivery of care and serve the best interests of the public. Continuous outreach and communication are required to provide evidence-based findings. Leaders need to display understanding and support to promote the benefits of no surprise billing laws. Our society has a vulnerable segment of our community. In this situation, the vulnerable segment represents the uninsured and special needs population.

The delegating of authority may require ongoing monitoring and training of public health personnel and community members on the effectiveness of no surprise billing laws.

The individual may be coerced into making treatment decisions despite the possibility of exposure to unforeseeable risks and unintended consequences. Therefore, the administrative agencies responsible for the formulation of public health policies may uphold the right of individuals to make their own autonomous health care decisions that are independent from third party influence (Cameron, 2021).

Courts have long recognized the special relationship between the patient and the physician as well as the right of the community to protect itself. Future statutory frameworks need to balance these principles (Cameron, 2021).

Public policy needs to assure that the right of the individual to make health care decisions regarding no surprise billing is not limited by legislative changes in the law. Our society has championed the principles of the patient-physician relationship and the patient right of self-determination (Cameron, 2020). Our social policies should always preserve these patient rights and afford an individual the opportunity to make informed health care decisions.

Access to emergency services is a public health imperative. In order to advance the public health and safety of our communities, societal barriers need to be addressed through an integrated approach. Public policy will prevail by balancing the state interests and individual rights in the delivery of health care services that also protect the public from surprise balance billing practices.

REFERENCES

- Airline Deregulation Act, 49 U.S.C. 41713(b)1 (1994).
- American Medical Association v United States HHS, Civ. Action No. 1:21-cv-03231 (2021). Retrieved at <https://www.ama-assn.org/system/files/ama-v-hhs-as-filed-complaint.pdf>
- California Health and Safety Code, Cal. Code Regs. HSC 1371.30 (2017).
- Cameron, J.C. (2020). Comparison of health care power of attorney approaches. *National Association of Business, Economics and Technology Proceedings*. Retrieved at <http://www.nabet.us/proceedings-archive/NABETProceedings-2020.pdf>
- Cameron, J.C. (2021). Governmental response to vaccine passports. *National Association of Business, Economics and Technology Proceedings*. Retrieved at <http://www.nabet.us/proceedings-archive/NABET-Proceedings-2021.pdf>
- CMS Manual System, Interpretive Guidelines for Hospitals, 42 CFR 482.13(b)(2). Retrieved at: <https://www.cms.gov/Regulations-and-Guidance/Guidance/Transmittals/downloads/R37SOMA.pdf>
- Colorado Statute, Colo. Rev. Stat. 10-16-102 (15).
- Colorado Statute, Colo. Rev. Stat. 12-30-113(2019).
- Colorado Consumer Health Initiative, CCHI (2020). Retrieved at: <https://cohealthinitiative.org/need-help/surprise-medical-bills/>
- Department of Justice Memorandum Opinion for the Deputy Counsel to the President (2021). Retrieved at <https://www.justice.gov/olc/file/1415446/download>
- Executive Order, Exec. Order No. 14043, 86 Fed. Reg. 50989 (2021).
- Georgia Statute, Ga. Code Ann. 33-20E-1 (2020).
- Georgia Rules and Regulations, Ga. Comp. R. & Regs. 120-2-106 (2020).
- Haller v United States HHS, 2022 U.S. Dist. LEXIS 142813, 2022 WL 3228262 (E.D.N.Y. Aug. 10, 2022)
- Illinois Statute, 215 Ill. Comp. Stat. 5/356z.3a (2019).
- Michigan Statute, Mich. Comp. Laws Ann. 333.24501 (2020).
- Nebraska Statute, Neb. Rev. Stat. 44-6834 (2020).
- New Hampshire Statute, N.H. Rev. Stat. Ann 329:31-b (2018).
- New Hampshire Insurance Department. Retrieved at https://www.nh.gov/insurance/consumers/documents/balance_billing_surprise_billing.pdf
- New Jersey Bulletin, N.J. Department of Banking and Insurance Bulletin No. 18-14 (2018).
- New Jersey Statute, N.J. Rev. Stat. 26:2SS (2018).
- New Mexico Statute, N.M. Stat. Ann. 59-16-21.3 (2019).

New Mexico Statute, N.M. Stat. Ann 59A-57A-1(2020).

No Surprises Act, P.L. 116-260, 134 Stat. 2758 (2020).

Ohio Statute, Ohio Rev. Code Ann. 3902.50 (2022).

Oregon Statute, Or.Rev.Stat. 743B.287 (2022).

Pennsylvania No Surprises Act Implementation Executive Order, Pennsylvania Exec. Order 2021-08 (2021).

Texas Medical Association v United States Department of Health and Human Services, et.al., 2022 U.S. Dist. LEXIS 31807, 2022 WL 542879 (E.D.Tex. Feb.23, 2022).

Title XVIII, Medicare Act, 42 USC 1395.

Virginia Statute, Va. Code Ann. 38.2-3445 (2020).

Virginia Statute, Va. Code Ann. 14VAC5-405-30 (2021).

Washington Statute, Wash. Rev. Code 48.43 (2019).

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FALSIFICATION AND MISREPRESENTATION IN PROFESSIONAL CREDENTIALS: HISTORICAL AND CONTEMPORARY ISSUES IN CREDENTIALING

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ABSTRACT

In a contemporary world, falsification of academic degrees and misrepresentation of academic credentials has become a challenging and overly widespread phenomena. Unfortunately, just as most of the public cannot distinguish an authentic painting from a forgery so too many are unaware of the proliferation of the falsification of academic degrees and professional credentials. In fact, one government office found hundreds of federal employees had successfully secured federal employment despite false credentials. Tragically, universities and academics are not beyond such misrepresentation and the accounting profession, too, has engaged in public deception of professional credentials. This in hand this paper explores the historical perspective of academic fabrication of credentials, with a key discussion on falsification. The use of prominent examples of falsification help provide illumination to this notable ethical and moral dilemma.

INTRODUCTION

Falsification of academic credentials can destroy professional and public trust. Unfortunately, such facets are more widespread than commonly known. In 2002, St. John noted that after a long career one distinguished professor at The University of California was discovered to have falsified the attainment of his bachelor's degree, the only degree he noted as having attained. While certification and licensure are intended to protect the public, cases of falsification are widespread. In *United States v. Williams* (2000), it was learned, as example, that the expert witness who had testified in "thousands of cases" had misrepresented his credentials as a board-certified pharmacist and during depositions he indicated he had multiple degrees from Howard University including a bachelor's degree and master's and doctoral degrees in pharmacology! Interestingly, he was a witness for the government!

In a contemporary world of widespread violence, many of us cannot tell a fake gun from a real one. Similarly, we cannot decipher authentic art from a forgery. In the business world, we can begin to understand that the use of false credentials can create great challenges. In fact, credentialing misrepresentation and falsification represents a critical issue in higher education as well, and as relevant to this paper, among faculty in the discipline of accounting. This paper first explores misrepresentation in a more universal realm before exploring it in the accounting credential context. The second part of this paper explores the historical perspective of accounting credentials followed by the ethics of using and abusing such credentials, whether fake or real, outdated, inactive or current. The paper ends with a conclusion and suggestions for future research.

HISTORICAL PERSPECTIVE ON MISREPRESENTATION OF CREDENTIALS

In higher education, in California, for instance, the first officially nominated California State Poet Laureate, University of California at San Diego tenured professor Quincy Troupe, a professor of creating writing and literature, resigned from the university, and stepped down from this governor appointed and honored post as Poet Laureate after acknowledging he had been dishonest on his resume about graduating with a bachelor's degree from Grambling State University (St. John, 2002).

"I deeply regret my ill-advised decision to include inaccurate information on my curriculum vitae. While I attended Grambling College, I never earned a college degree." (Associated Press, 2002).

Watts (2002) noted that Troupe, according to the Vice Chancellor for Research and Dean of Graduate Studies, Richard Attiyeh, was not asked to resign from the university and could have stayed but Attiyeh was "extremely impressed by the dignity with which [Troupe] handled himself" (Watts, 2002). Further, Chancellor Dynes agreed with Troupe's decision to resign (Watts, 2002). Subsequently, Troupe was awarded emeritus status by the university as the website titled *Quincy Troupe* notes that currently he is Professor Emeritus at the University of California, San Diego (Quincy Troupe, 2022).

Questions for consideration:

1. What motivated Troupe to misrepresent and falsify his credentials?
2. If Troupe indeed could have remained as faculty, why was an academic degree required for employment?
3. Why was this lack of degree completion not verified by the University?
4. Why hadn't chairs and Deans ever verified a degree?
5. Why wasn't Human Resources thorough in the initial hiring process?

Multiple references in 2002 noted Troupe had authored 13 books and won several awards and the website in 2022 notes that Troupe had authored 21 books to-date and received various awards including the Paterson Award for Sustained Literary Achievement, the Milt Kessler Poetry Award, three American Book Awards, the 2014 Gwendolyn Brooks Poetry Award, a 2014 Lifetime Achievement Award from Furious Flower, and the Charles H. Wright Museum of African American History Award, January 25, 2018 (Quincy Troupe, 2022). Still, despite such accomplishments, he had falsified information in his hiring materials, a degree, to secure employment and his position as professor might have helped provide authenticity to these accomplishments.

Still, this is only one illustration of falsification. In an investigation of diploma mills, the United States General Accounting Office ("GAO") found that 463 federal employees earned degrees from diploma mills or from unaccredited schools (Cramer, 2004 and Johnson, 2006).

Markedly, though, such misrepresentations and falsifications are not rare. According to Papandrea (2022), Monster.com, an international employment website, and their Monster Future of Work: 2021 Outlook survey noted, "66% of employers agreed that candidates exaggerate skills and competencies" (2022). Further, Checkster, a reference checking software company conducted a survey of 400 applicants and 400 hiring professionals. The results, reported in 2020, noted that 78% of applicants falsify information. Further, 66% of hiring managers are willing to disregard such falsifications and misrepresentations. (PE Newswire, 2020).

CASES AND CREDENTIALING CONCERNS

Falsification can sometimes assume national prominence with the academic arena. Notably, former Notre Dame University football coach George O'Leary did not hold the master's degree from New York University he suggested when he was hired to coach this renowned university's football team (Fontaine 2001).

A Notre Dame spokesperson, John Heisler noted "I don't know if someone's academic credentials were a top priority. This is a person who is an established head coach. There was no apparent reason to challenge him on those lines" referring to the academic credentials (Fontaine, 2001). Still, why hadn't the university verified his degree? Why did he falsify his background? Was he less than truthful in other areas of employment? If not necessary, why was it required for employment?

O'Leary noted:

"Many years ago, as a young, married father, I sought to pursue my dream as a football coach," the statement reads. "In seeking employment, I prepared a résumé that contained inaccuracies regarding my completion of course work for a master's degree and also my level of participation in football at my alma mater. These misstatements were never stricken from my résumé or biographical sketch in later years."

Unfortunately, though, such misrepresentations and falsifications are not a rarity.

In 2002, as example, Judy Werra, part of a headhunting firm, confided to The New Yorker that from CEOs to VPs approximately 23 percent of employees engage in falsification. That is to say, misrepresentation is common and widespread.

Yet too few articles within the academic community have explored this facet. How many academic professionals have falsified degrees and credentials? Sadly, falsification is not solely confined the universities. As example, Kenneth Lonchar, the former CFO of Veritas Software fabricated an MBA, supposedly from Stanford University. Sandy Baldwin, former President of the US Olympic Committee suggested he held a doctorate that was not accurate. Truly, the problem seems widespread and suggests a challenge of integrity, honesty, as well as academic integrity.

Fundamentally, we have a problem. Falsification seems more widespread than generally recognized. In fact, purposive sampling within accounting faculty in the last six months suggests more than isolated illustrations of accounting faculty who report a CPA while it is lapsed, and other misrepresentations of degrees seem more commonplace than generally known.

From falsification of degrees to lapsed credentials such as a CPA the issues are troubling. Still, many faculty are unaware of the depth and breadth of these issues, nor, at times, of the consequences of falsification. Adding further complexity are individuals who may have had licenses or certifications revoked and/or terminated. A high school business teacher whose certification is revoked for unethical behavior, a tax attorney who is disbarred, a CPA who has their credential revoked, or a faculty in accounting who list a CPA when it has lapsed illustrate issues highly fertile for discussion and future research. Do practitioners maintain a current CPA? Are their degrees verified by employers? Do faculty monitor the academic community?

Still, the issues and challenges are not new. In 1989 – more than 30 years ago, Grant noted in the Journal of Professional Services Marketing that misrepresentation by CPA firms was a significant problem. In fact, that article itself raised concerns still not generally addressed.

Within this larger world of misrepresentation and falsification, then, the world of accounting is not without its own tarnish. How do we teach moral, ethical integrity within such widespread misdoings? Are these individuals' educational imposters? Whose responsibility is it if university promotional or informational materials is not up to date? Is it an outdated program brochure? Has the faculty noted the lapse to the University?

With the recent challenge of the pandemic virtually every university in the United States has offered on-line education raising questions on course delivery, academic integrity, and challenges comparing “brick and mortar” universities with online schools. Does the academic pedigree matter? Are faculty with a Ph.D. from a prestigious university comfortable with colleagues with a Ph.D. or D.B.A. from an online program? Should a CPA maintain that credential? Should “lapsed” credentials be used by faculty?

Quincy Troupe enjoyed a long career at The University of California with his falsification of a qualifying academic degree. Now a Professor Emeritus, he apparently has not experienced legal nor financial challenges as a result. In contrast, an art forger who sells a forged artwork might well expect significant legal prosecution. If that artist faces criminal charges, why do faculty who falsify academic credentials seem to face few sanctions? How can students learn integrity and ethical standards if the implications are missing?

Michelangelo, however, attributed his “Sleeping Cupid” as a Roman sculpture and while this piece catapulted Michelangelo as a master, the dealer involved with selling it was imprisoned because it was falsely misrepresented. Those who fabricate money – forged currency – will be arrested. Should the academic community further examine the falsification and misrepresentation of academic credentials? Minimally, it seems worthy of further discussion. What are the implications. Why are consequences for art forgeries or those who counterfeit money so much higher than for those who fabricate academic degrees and professional credentials?

CONCLUSION

BizTimes (2019) notes that approximately a quarter of business professionals engage in falsification on a resume, suggesting that a large number of potential employees misrepresent and falsify resume information. The cases included in this narrative highlight notable illustrations of falsification and misrepresentation of academic credentials. Notably, the Professor Emeritus at The University of California who falsified his qualifying degree, the University of Notre Dame football coach who falsified his degree, and the hundreds of federal employees with false credentials illustrate a challenging problem. Notably, too, these cases lacked serious repercussions. Academics who fabricate and falsify?

Who is concerned? Are ethical boards notified? Do colleagues care? Indeed, why do employers lack background verification? The questions seem pressing. The problem seems widespread.

REFERENCES

- Associate Press (2002, October 20). Poet laureate quits after a resume lie. *The New York Times*. Retrieved October 2, 2022, from <https://www.nytimes.com/2002/10/20/us/poet-laureate-quits-after-a-resume-lie.html>
- BizTimes Staff (2019, July 2). People lie on their resumes more during recession. *BizTimes*. Retrieved October 2, 2022, from <https://biztimes.com/people-lie-on-their-resumes-more-during-recession/>
- Cramer, R.J. (2004). Diploma mills are easily created and some have issued bogus degrees to federal employees at government expense. Retrieved October 2, 2022, from <https://www.gao.gov/products/gao-04-1096t>
- Fogarty, T. J., & Black, W. H. (2014). Further tales of the schism: US accounting faculty and practice credentials. *Journal of Accounting Education*, 32(3), 223–237. <https://doi.org/10.1016/J.JACCEDU.2014.07.001>
- Fontaine, J.W. & Wong, E. (2001, December 15). Notre Dame Coach Resigns After 5 Days and a Few Lies. *The New York Times*. Sec A, 1. Retrieved October 2, 2022, from <https://www.nytimes.com/2001/12/15/sports/notre-dame-coach-resigns-after-5-days-and-a-few-lies.html#:~:text=For%20two%20decades%2C%20O'Leary,education%20from%20New%20York%20University>
- Grant, J. (1989). False, misleading, or deceptive advertising by CPA firms: Opinion of practicing Accountants. *Journal of Professional Services Marketing*, 4(2), 111-116.
- Johnson, C. (2006). Credentialism and the proliferation of fake degrees: The employer pretends to need a degree; The employee pretends to have one. *Hofstra Labor and Employment Law Journal*, 23(2), Art. 1. Retrieved October 2, 2022, from <http://scholarlycommons.law.hofstra.edu/hlelj/vol23/iss2/1>
- King, D. L., Case, C. J., & Senecker, K. M. (2017). Accounting history in perspective: Uniform CPA exam turns 100. *Journal of Business and Behavioral Sciences*, 10(1), 70–84.
- Papandrea, D.. (2022). The biggest resume lies to avoid. Monster.com. Retrieved October 2, 2022, from <https://www.monster.com/career-advice/article/the-truth-about-resume-lies-hot-jobs>.
- Perry, T. (2002, December 4). Poet resigns post at UC San Diego over resume lie. *Los Angeles Times*. Retrieved October 2, 2022, from <https://www.latimes.com/archives/la-xpm-2002-dec-04-me-quincy4-story.html>
- PR Newswire (2020, February 13). New Checkster Research Shows 78% of Job Applicants Lie; and 66% of Hiring Managers Don't Care. Retrieved October 2, 2022, from <https://www.prnewswire.com/news-releases/new-checkster-research-shows-78-of-job-applicants-lie-and-66-of-hiring-managers-dont-care-301004406.html>
- Quincy Troupe (2022). <https://www.quincytroupe.com/>
- St. John, K. (2002, October 20). Poet laureate quits over fudged resume / Creative writing professor admits lying about degree. SFGATE. Retrieved October 2, 2022, from <https://www.sfgate.com/bayarea/article/Poet-laureate-quits-over-fudged-resume-Creative-2781967.php>
- United States v. Williams, 77 F. Supp.2d, 109 (2000).
- Watts, D. (2002, December 5). Troupe resigns from UCSD. *The UCSD Guardian*, 107(20).

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REMARKS ON PRODUCTION POSSIBILITIES, OPTIMAL PRODUCTION CORRESPONDENCE AND CONDITIONAL FACTOR DEMAND

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ABSTRACT

By taking an axiomatic approach, this paper looks at several of the main results in the producer theory to see whether they hold true generally or only conditionally in light of a firm's value-belief system. By employing the language and methodology of multi-dimensional Euclidean spaces, this paper derives its results without imposing those unnecessary conditions as widely done in the literature. By constructing creative counter examples, it is shown that the optimal production correspondence is not generally homogeneous of degree zero; and it reestablishes several well-known results that hold true under very specific conditions in more general terms. At the same time, this paper elevates several other conclusions that are important in producer theory, such as Shepard's lemma, to much stronger versions. A few topics of expected significance are suggested for future research in the conclusion section.

INTRODUCTION

Since the time when Debreu (1959) innovatively used the n -dimensional Euclidean space to lay the foundation of microeconomics, many impressive and mathematically beautiful conclusions have been derived (Mas-Collel et al., 1995). Many of these conclusions are then applied to various empirical studies (e.g., Arif and Scott, 1986; Binswanger, 1974; Collins & Taylor, 1983; Kako, 1978; Lau and Yotopoulos 1972; Trosper, 1978; Young et al., 1987). However, it is found repeatedly (Hammerton, 2020; Lee & Chambers, 1986; Pope 1980, 1982; Taylor, 1984, 1989; Van Fleet, 2021; Yang & Andersson, 2018) that many maintained behavioral hypotheses, such as cost minimization and utility maximization, and consequent results, such as Shepard's Lemma, become invalid when the firm of concern is not a conventional optimizer. Hence, the following natural question arises: if, instead of being a conventional maximizer or minimizer, a firm strives to achieve its desired business outcome, such as revenue, social responsibility and environmental protection, by materializing its stated mission, will the main results of economics still hold true?

The theoretical and empirical importance of this question is apparent, if we look at how incapable the present theory of economics has been when applied to forecasting economic crises and in terms of critical decision-makings (Forrest & Liu, 2022). That explains why a vast amount of related literature has been devoted to the close scrutinization of various commonly adopted assumptions, such as that of rationality (e.g., Hudik, 2019; Lovett, 2006; Rubinstein, 1998; Weyl, 2019). Speaking differently, empirical studies (e.g., Arif and Scott, 1986; Taylor, 1989) and theoretical investigations (e.g., Mullainathan & Thaler, 2000; Kahneman, 2011) have loudly called for scholars to reconstruct economic theories so that more practically tangible benefits can be materialized. For example, after suffering from great losses during the 2008 financial crisis, Paul Krugman provided his point of view regarding why the existing economic theories are incapable of providing needed practical guidance in a timely manner on what had happened in the past and what would follow next. Specifically, he wrote in *New York Times* (2009-09-02) that: "... economists, as a group, mistook beauty ... for truth ... as memories of the Depression faded, economists fell back in love with the old, idealized vision of an economy ..." That is, by riding on the fresh memory of the 2008 crisis, the present time can be and should be well used to address the question posed above.

To this end, this work stands for one dedicated effort towards offering an answer, at least partially, to the previously posed question. Specifically, by adopting only four of the many widely employed assumptions in microeconomics as its starting points, this paper utilizes the method of Euclidean spaces to investigate a series of important topics. That includes, among others, the structure of production possibilities, the conditional homogeneity of the optimal production correspondence, the uniqueness of the optimal production plan, and various properties of the minimum cost of production and the conditional factor demand. Most of the results in this paper are established under fewer conditions, while, at the same time, generalize some of the well-known conclusions developed by various scholars before under more strict conditions, such as the firm of concern produces only one product (Mas-Collel et al., 1995; Levin & Milgrom, 2004).

To make some of our conclusions more general than similar ones in the present theories of microeconomics, this paper emphasizes the fact that each firm has its own particular order relation of real numbers that is defined on the firm's system of values and beliefs. That firm-specific order relation naturally leads to the existence of the firm's specific method of optimization. In other words, firms respectively have their own particular means to prioritize available alternatives when faced with challenges and opportunities. Therefore, firms apply their very individual ways to optimize their objectives. In comparison, the literature widely assumes that the ordering of real numbers and the method of optimization are the same across the entire business world, although some particular details are different.

Due to our emphasis on a firm-specific system of values and beliefs and firm-specific ordering of real numbers, we are able to establish results not revealed before. At the same time, we are able to generalize some of the previously established results of the producer theory many streets forward. More specifically, the marginal contribution this paper makes to the literature consists of showing (i) when additional conditions are needed for a desired conclusion to be true, and (ii) how and when a well-known conclusion holds true only under very specific conditions.

The rest of the paper is organized as follows. The next section provides the basic setup and necessary terminology for contextual information. Following that, the set-theoretical structure of production possibilities, the concept and properties of optimal production correspondence, and various properties of a firm's minimum cost and conditional factor demand are investigated respectively. The paper concludes with a few important questions posted for future research.

BASIC SETUP AND TERMINOLOGIES

This section prepares the reader for a smooth reading of the rest of the paper. It consists of three subsections. The first subsection cites previous works on how each firm has its own particular system of values and beliefs so that it orders real numbers and optimizes subjective functions differently from other firms. The second subsection sets up the necessary terminology for the forthcoming analysis. The third subsection displays four axioms as the starting points of the logical reasoning of the rest of the paper.

A Firm's Value-Belief System and Its Criteria of Priority

It is reasoned (Forrest, Hafezalkotob et al., 2021; Forrest, Shao et al., to appear) that each firm in general has a set of four natural endowments as for the case of individual persons (Lin & Forrest, 2012). Specifically, these endowments are given as follows:

- A firm has the endowment of self-awareness, through which the firm is aware that it exists as a business entity separate from other entities, such as people, firms and things, with its business secrets, such as the proprietary understandings of adopted customer value propositions, operational strategies, protected product designs, etc.
- A firm possesses the capability of imagination, through which the firm learns and acquires new knowledge, innovatively imagines what might be the right offer, such as a newly designed product, or an improved product or new (or improved) service, to satisfy an emerging market demand. By using such endowment, the firm develops the necessary process of materially introducing the imagined offer.
- A firm has the endowment of conscience, through which the firm tells which business effort is more beneficial than other efforts.
- A firm has the endowment of free will, through which the firm keeps the promises in its contracts with various business partners.

Through exploring the meaning of the assumption of rationality (e.g., Friedman, 1953; Gilboa, 2010; Hudik, 2019), Forrest, Shao et al. (to appear) systemically establish the following results: (i) each firm has its unique and dissimilar system of values and beliefs, as reflected in the firm's mission statement; and (ii) when a firm faces a decision-making situation, it optimizes the potential subject to some given constraints by using its particular system of values and beliefs, which is formulated out of the firm's natural endowments. To help understand the fundamental construct, the following illustration is extracted from (Hu, 1982; Lin, 1999, p. 136) with some minor wording differences.

Example 1. This simple illustration demonstrates that the specifically employed definitions of optimization can be different from one firm to another due to the differences in their respective systems of values and beliefs. Such

differences can and surely do lead to varied decision choices.

Assume that the production routine of a firm can be abstracted into the directed and weighted network in Figure 1. The firm needs to minimize the path from node A, where the production starts, to node C, where the production ends.

Case 1: The firm orders real-numbers as how they are conventionally ordered. Hence, $A \rightarrow A_1 \rightarrow B \rightarrow C_1 \rightarrow C$ is the path the firm looks for. This path has the weight of 1. And other paths from node A to node C have weights 2, 3, and 4, respectively.

Case 2: The firm orders real-numbers by referring to the mod4 function so that for any two real numbers x and y , $x <_{\text{mod}(4)} y$ if and only if $x(\text{mod}4) < y(\text{mod}4)$. One example for such a situation to occur in real life would be when a supplier of the firm, for reasons related market competition, provides discount as follows: waive all cost if the total spending on their supplies is equal to a natural number multiple of 4. Otherwise, the firm will need to bear the cost.

Within such a system of decision-making, $A \rightarrow A_2 \rightarrow B \rightarrow C_2 \rightarrow C$ is the path the firm looks for. The path's weight is equal to $3 + 0 + 0 + 1 = 4 \pmod{4} = 0$. In comparison, the weights of other paths have weights 1, 2, or 3, respectively.

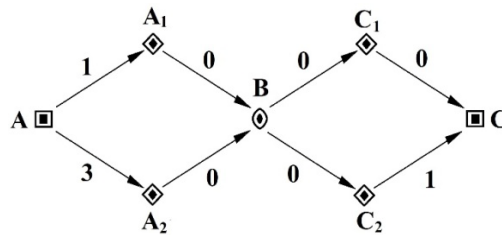


Figure 1. Differences in value-belief systems lead to varied solutions

What this example shows is that differences in firms' systems of values and beliefs lead to different optimal decisions. That is, although the appearance of the objective function is the same, the specifically employed criteria or methods of optimization can be different from one firm to another.

For the rest of this paper, assume that each firm has a particular way, as defined by its system of values and beliefs, to order the real numbers within the domain D of its decision-making activities. Let \leq_F represent the firm-specific order relation of real numbers. Assume that this order relation ranks all pairs of numbers in D and satisfies: (i) transitivity: for any $x, y, z \in D$, $x \leq_F y$ and $y \leq_F z$ imply $x \leq_F z$; (ii) reflexivity: for any $x \in D$, $x \leq_F x$; and (iii) anti-symmetry: for any different $x, y \in D$, $x \leq_F y$ and $y \leq_F x$ do not hold true simultaneously.

The Firm and Its Inputs and Outputs

This paper considers a randomly chosen business entity, known as the firm. Assume that all commodities, for a total of ℓ of them, are linearly ordered and can be exchanged in the marketplace. As commonly done in economic analysis (e.g., Pans, 2018), these commodities are written as a vector $c = (c_1, c_2, \dots, c_\ell)$, whose components represent the corresponding amounts of these commodities the firm needs for its production as inputs or the firm produces as outputs. Hence, most of the components of such a vector are equal to 0, while the amounts of inputs are represented by negative numbers and those of outputs by positive numbers. If $p \in \mathbb{R}_+^\ell$ is a vector of the prices of the commodities, known as a price system, then the dot product $p \cdot c = \sum_{h=1}^{\ell} p_h c_h$ provides the overall cash flow of the firm, where \mathbb{R} is the set of all real numbers and \mathbb{R}_+ that of all positive real numbers. In the rest of this paper, the symbol \mathbb{R}_- represents the set of all negative real numbers.

Considered commodities include specific times when they are available for delivery, although they are exchanged at the present time, and locations where exchanges of ownership take place. So, when the time of delivery and/or place of exchange are different, the same commodity will be seen as different. To simplify our analysis, no interests, no discounts and no exchange rates of money are considered.

As widely done in the producer theory, if the firm is a viable business entity, then it chooses a plan of action, written

as $y = (y_1, y_2, \dots, y_\ell) \in \mathbb{R}^\ell$, that specifies the quantity of each commodity it either consumes or offers. So, the price or return of action y is $p \cdot y = \sum_{h=1}^\ell p_h y_h$. Within its boundary conditions, the firm optimizes its return by choosing the plan that best fits its specific mission that reflects the firm's system of values and beliefs (Forrest, Hafezalkotob, et al., 2021; Forrest, Shao et al., to appear). Let Y be the set of all feasible production plans of the firm.

Basic Axioms

In the rest of this paper, assume that the firm satisfies the properties described in the following Axioms 1 – 4 without further explicit declaration. The first two axioms address the freedom the firm has about what it can do in its business operation and its production decisions. For related details, see Debreu (1959) and Levin and Milgrom (2004).

Axiom 1 (The possibility of inaction). The firm has the option of not making any production plan and not carrying out any production. Symbolically, what is axiomatized is $0 \in Y$.

Axiom 2 (Free disposal). Although inputs are increased, the firm can choose to produce less. Symbolically, what is axiomatized here is that if $y \in Y$ and $y' \leq y$, then $y' \in Y$, where $y' \leq y$ means that for each $h = 1, 2, \dots, \ell$, $y'_h \leq y_h$.

Axiom 3 (Impossibility of free production). The real-life implementation of any non-zero production plan has to use certain amounts of some inputs, such as labor, workspace, etc., and produce certain outputs, such as waste, if nothing useful. Symbolically, what is axiomatized is

$$\forall y \in Y (y \neq 0 \rightarrow y_{h_1} < 0 \text{ and } y_{h_2} > 0, \text{ for some commodities } 1 \leq h_1, h_2 \leq \ell).$$

This end can be rewritten equivalently as follows

$$Y \cap (\mathbb{R}^\ell - \mathbb{R}_+^\ell) = \{0\} = (-Y) \cap (\mathbb{R}^\ell - \mathbb{R}_+^\ell),$$

where $-Y = \{(-y_1, -y_2, \dots, -y_\ell) : (y_1, y_2, \dots, y_\ell) \in Y\}$.

Axiom 4 (Irreversibility of production). No production can be reversed, meaning that if a vector c^{in} of inputs leads to the production of a vector c^{out} of outputs, then when c^{out} is applied as inputs, it does not lead to the production of c^{in} . Symbolically, what is axiomatized is

$$Y \cap (-Y) = \{0\}.$$

Different from the literature, this paper develops generally true results without assuming any other additional assumptions.

THE PROFIT AND PRODUCTION FUNCTIONS

This section introduces the general profit and production functions for the firm. Specifically, the first subsection looks at the particular set-theoretical structure of production possibilities under certain given conditions. Then the second subsection examines what conventional assumptions are implied by these conditions.

The Set-Theoretical Structure of Production Possibilities

Given two sets U and W , $f: U \rightarrow W$ is known as a partial function from U into W , if there are $u^1, u^2 \in U$ such that $f(u^1) \in W$ is a well-defined while $f(u^2)$ is not defined. In other words, $f: U \rightarrow W$ is a partial function, if the domain of f , denoted by $\text{domain}(f)$, is not equal to U .

For the firm of our concern, its profit function $\pi^F: \mathbb{R}_+^\ell \rightarrow \mathbb{R}$ is defined as follows: for any price system $p \in \mathbb{R}_+^\ell$, if the maximum value on the right-hand side of the equation below exists, then

$$\pi^F(p) = \max_{y \in Y} p \cdot y. \quad (1)$$

In the expression \max_*^F , the superscript F represents the specific method of optimization employed by the firm. As demonstrated in the previous section, this firm-specific method of optimization is determined by the firm's system of values and beliefs, as reflected in the firm's mission statement.

Implicitly in the rest of this paper, every time when the expression $\pi^F(p)$ is used, it means that the firm-specific maximum above exists unless stated otherwise. By using this profit function, the following conclusion characterizes the structure of the production possibility set Y under a given condition.

Proposition 1. If for any $z \in \mathbb{R}^\ell$, $z \notin Y$ implies that there is a hyperplane L that separates z and Y so that $z \notin L$ based on the order relation \leq_F of the firm, then

$$Y = \{y \in \mathbb{R}^\ell : \forall p \in \mathbb{R}^\ell (p \cdot y \leq_F \pi^F(p))\} \quad (2)$$

$$= \{y \in \mathbb{R}^\ell : \forall p \in \mathbb{R}_+^\ell (p \cdot y \leq_F \pi^F(p))\}, \quad (3)$$

where if for a particular $p \in \mathbb{R}_+^\ell$, $\pi^F(p)$, as defined in equation (1), does not exist, then the symbol $\pi^F(p)$ is taken to be $\pi^F(p) =_F \sup_{y \in Y} p \cdot y$.

Proof. Let the set defined by equation (2) be \hat{Y} . Then, showing $Y = \hat{Y}$ is equivalent to showing both $Y \subseteq \hat{Y}$ and $\hat{Y} \subseteq Y$. The former case is a direct consequence of the definition of $\pi^F(p)$ in equation (1). Next, let us focus on the argument of latter case $\hat{Y} \subseteq Y$.

To this end, let us pick an arbitrary point $z \in \mathbb{R}^\ell$ such that $z \notin Y$. Assume that the guaranteed hyperplane L that separates z and Y , as given in the if condition, be $p \cdot x = \beta$, for some given nonzero $p \in \mathbb{R}^\ell$ and a scalar $\beta \in \mathbb{R}$, so that for any $y \in Y$, $p \cdot y \leq_F \beta <_F p \cdot z$. Hence, taking either maximum or supremum, as seen fit, produces

$$p \cdot z >_F \beta \geq_F \max_{y \in Y}^F p \cdot y. \quad (4)$$

This end implies $z \notin Y \rightarrow z \notin \hat{Y}$, which establishes the case $\hat{Y} \subseteq Y$ and consequently equation (2).

To show equation (3), let the set defined by equation (3) be \check{Y} . The rest of the proof is similar to that given above until the end of equation (4) by replacing \hat{Y} with \check{Y} . The proof is completed if we can show that the specified p is an element of \mathbb{R}_+^ℓ . That is, for p to be a price system, p cannot have any zero or negative component. By contradiction, assume that there is an $h (= 1, 2, \dots, \ell)$ such that $p_h \leq 0$. Then the firm can use as much commodity h as one of its inputs as it wants without any upper limit. Now, the free disposal axiom implies that the right-hand side of equation (4) is equal to $\max_{y \in Y}^F p \cdot y = \sup_{y \in Y}^F p \cdot y = +\infty$, although the firm's system of values and beliefs might not allow for unnecessary waste of resources, such production plans y are still considered feasible for the firm. A contradiction. So, this argument indicates $p \in \mathbb{R}_+^\ell$. This establishes equation (3). QED

Implied Closedness and Convexity

For the firm, let us define its production function f as follows: For each production $y \in Y \subseteq \mathbb{R}^\ell$, $f(y^{in}) = y^{out}$, where

$$y^{in} = (y_{h_1^{in}}, y_{h_2^{in}}, \dots, y_{h_t^{in}}) \subseteq \mathbb{R}_-^t \text{ and } y^{out} = (y_{h_1^{out}}, y_{h_2^{out}}, \dots, y_{h_s^{out}}) \subseteq \mathbb{R}_+^s$$

are respectively the corresponding input and output sub-vectors of y . In particular, y^{in} is the sub-vector of all commodity inputs in y , $h_1^{in}, h_2^{in}, \dots, h_t^{in}$; and y^{out} that of all commodity outputs of y , $h_1^{out}, h_2^{out}, \dots, h_s^{out}$, satisfying that

$$h_1^{in} < h_2^{in} < \dots < h_t^{in} \text{ and } h_1^{out} < h_2^{out} < \dots < h_s^{out}$$

and

$$y_{h_j^{in}} < 0 \text{ and } y_{h_k^{out}} > 0, j = 1, 2, \dots, t; k = 1, 2, \dots, s. \quad (5)$$

If a production $y \in Y$ satisfies the condition in equation (6), then y is said to have nonincreasing returns to scale:

$$\forall \alpha \in (0, 1) \left(f(\alpha y^{in}) \leq \alpha f(y^{in}) \right). \quad (6)$$

In other words, equation (6) reflects the following fact: if all inputs of production y are decreased by a scale $\alpha \in (0, 1)$, the corresponding outputs decrease in a scale equal to or less than α . This local property of the firm can be generalized to the following holistic, systemic property: If every production $y \in Y$ satisfies equation (6), then Y is said to have nonincreasing returns to scale.

The following result shows what the if-condition of the previous proposition implies in terms of the commonly adopted assumptions in the producer theory (Levin & Milgrom, 2004; Mas-Collel et al., 1995), while these assumptions are avoided purposefully in this work.

Proposition 2. Assume that the firm's order relation \leq_F of real numbers is the same as the conventional one \leq between these numbers. If for any $z \in \mathbb{R}^\ell$, $z \notin Y$ implies that there is a hyperplane L that separates z and Y so that $z \notin L$, then (i) Y is closed, (ii) Y is convex, and (iii) Y satisfies that for any $y \in Y$ and any scalar $\alpha \in [0, 1]$, $\alpha y \in Y$; that is, Y has nonincreasing returns to scale.

Proof. Let us show (i) by contradiction. Assume that Y is not closed. Then there is at least one $z \in \mathbb{R}^\ell$ such that z is a limit point of Y while $z \notin Y$. However, for this point z , it is impossible for a hyperplane L to exist so that L separates Y and z . A contradiction. Therefore, Y is closed.

We also show (ii) by contradiction. Assume that Y is not convex so that there are $y^1, y^2 \in Y$ and $\alpha \in (0, 1)$ such that $z = \alpha y^1 + (1 - \alpha)y^2 \notin Y$. Let L^1 be a hyperplane that separates z and Y , as guaranteed by the given condition, and L^2 the hyperplane $p \cdot x = b$, for some $p \in \mathbb{R}^\ell$ and $b \in \mathbb{R}$, that passes through z and is parallel to L^1 . Therefore, $L^2 \cap Y = \emptyset$ and Y is located on one side of L^2 . Since z is on the hyperplane, we have $p \cdot z = b$, which is the same as

$$p \cdot [\alpha y^1 + (1 - \alpha)y^2] = b. \quad (7)$$

Because no point of Y is on the hyperplane, we have either $p \cdot y^1 < b$ or $p \cdot y^1 > b$. If the former holds true, then from equation (7), it follows that $\alpha b + (1 - \alpha)(p \cdot y^2) > b$ and then $p \cdot y^2 > b$. That is, y^1 and y^2 are located on different sides of L^2 . A contradiction. For the latter case $p \cdot y^1 > b$, the same contradiction follows. So, jointly, what is meant is that the assumption that Y is not convex is incorrect.

Conclusion (iii) follows readily from Axiom 1 and (ii), because for any $y \in Y$ and $\alpha \in [0, 1]$, $\alpha y = \alpha y + (1 - \alpha)0 \in Y$. QED

In the literature, equations (2) and (3) hold true under the conditions that (i) the firm's order relation of real numbers coincides with the conventional one between these numbers; and (ii) the set Y of production possibilities is both closed and convex in \mathbb{R}^ℓ . Therefore, Proposition 2 indicates how Proposition 1 significantly carries the corresponding known conclusion to the general case of any system of values and beliefs a firm might have.

THE OPTIMAL PRODUCTION CORRESPONDENCE

This section contains two subsections. The first one investigates the conditional homogeneity of the optimal production correspondence, while the second subsection examines the uniqueness of elements in the correspondence.

The Conditional Homogeneity of Degree Zero

For given sets U and W , a partial function $f: U \rightarrow W$ from U to W is said to be set-valued, if for any $u \in \text{domain}(f) \subseteq U$, $f(u)$ is a non-empty subset of W . Let us define a partial, set-valued function $\eta^F: \mathbb{R}_+^\ell \rightarrow Y$ as follows: For $p \in \mathbb{R}_+^\ell$, if there is $y \in Y$ satisfying that $p \cdot y =_F \max_{y^q \in Y} p \cdot y^q$, then

$$\eta^F(p) = \{y \in Y: p \cdot y =_F \max_{y^q \in Y} p \cdot y^q\}. \quad (8)$$

This partial, set-valued function η^F is referred to as the optimal production correspondence of the firm (Levin & Milgrom, 2004). Intuitively, for each price system p , $\eta^F(p)$ is the subset of Y that contains all profit-maximizing productions, if this subset exists and is not empty.

Proposition 3. If the firm's order relation \leq_F of real numbers satisfies the condition of positive multiplicativity, that is, for any scalar $\alpha > 0$ and $a, b \in \mathbb{R}$, $a \leq_F b \rightarrow \alpha a \leq_F \alpha b$, then the optimal production correspondence η^F is homogeneous of degree zero. Symbolically, for any scalar $\alpha > 0$, if $a \leq_F b \rightarrow \alpha a \leq_F \alpha b$, for any $a, b \in \mathbb{R}$, then $\eta^F(\alpha p) = \eta^F(p)$.

Proof. Let α be a positive scalar. Then, $\eta^F(\alpha p) = \{y \in Y: \alpha p \cdot y =_F \max_{y^q \in Y} \alpha p \cdot y^q\} = \{y \in Y: \alpha p \cdot y \geq_F \alpha p \cdot y^q, \forall y^q \in Y\}$. So, the condition of positive multiplicativity of the order relation \leq_F guarantees that

$$\{y \in Y: \alpha p \cdot y \geq_F \alpha p \cdot y^q, \forall y^q \in Y\} = \{y \in Y: p \cdot y \geq_F p \cdot y^q, \forall y^q \in Y\}.$$

Therefore, $\eta^F(\alpha p) = \eta^F(p)$. QED

Example 2. A scenario is constructed here to show that not all order relations satisfy the condition of positive multiplicativity.

To achieve our planned purpose, let us make use of the generalized modular function defined on the real number line \mathbb{R} (Forrest, Hafezalkotob et al., 2021). Specifically, for a chosen positive number $a \in \mathbb{R}$, a linear order relation $\leq_{mod(a)}$ on \mathbb{R} can be defined as follows: For real numbers x and $y \in \mathbb{R}$,

$$x <_{mod(a)} y \text{ if and only if } x \bmod(a) < y \bmod(a), \quad (9)$$

where the ordering $<$ is the conventional one defined on \mathbb{R} , $x \bmod(a)$ is the remainder of $x \div a$ and $y \bmod(a)$ the remainder of $y \div a$, such that $0 \leq x \bmod(a) < a$ and $0 \leq y \bmod(a) < a$. Intuitively speaking, the application of the modular operation makes real numbers wrap around a circle of radius a , known as modulus. When $b = x \bmod(a) > 0$, b stands for the point on the circle that is of a circular distance b in the counterclockwise direction from point 0; and when $b = x \bmod(a) < 0$, b stands for the point on the circle that is of a circular distance b in the clockwise direction from point 0. When all the numbers used in discussion, such as a , x , and y above, are limited to the set $\mathbb{Z} = \{\dots, -3, -2, -1, 0, +1, +2, +3, \dots\}$ of integers, the afore-defined order relation $\leq_{mod(a)}$ degenerates into the one widely studied in number theory (Burton, 2012).

By using the concept of equivalence relations of set theory (Kuratowski&Mostowski, 1976), the modular function, for the given modulus $a \in \mathbb{R}$, partitions the real number line \mathbb{R} into equivalence classes:

$$\{x \in \mathbb{R}: \exists q \in \mathbb{Z}(x = aq + r)\}, \quad (10)$$

for any $r \in \mathbb{R}$, satisfying $0 \leq r < a$. Without causing confusion, such an equivalence class is denoted by the real number $r \in \mathbb{R}$ that appears in the defining condition of equation (10). The new order relation $\leq_{mod(a)}$ of any real numbers x and $y \in \mathbb{R}$, assuming that $x \in r_x$ and $y \in r_y$, for $0 \leq r_x, r_y < a$ is defined as follows: $x \leq_{mod(a)} y$ if and only if $r_x \leq r_y$.

Familiar uses of modular operations include 12-hour clocks, 7-day weeks, months of various numbers of days, and durations, which are often of variable time lengths, of projects that follow one after another. In each of these cases, when a cycle is fully traversed, a new round of counting or measurement begins again from the starting mark 0.

Now, we are ready to see that the order relation $\leq_{\text{mod}(4)}$ does not satisfy the condition of positive multiplicativity. In fact, for how positive multiplicativity is violated, we have

$$1 \leq_{\text{mod}(4)} 2 \not\rightarrow 2 \cdot 1 \leq_{\text{mod}(4)} 2 \cdot 2$$

where the left-hand side is actually $2 \cdot 1 = 2 \geq_{\text{mod}(4)} 2 \cdot 2 = 0 =$ the right-hand side. QED

This example suggests that the general homogeneity of the optimal production correspondence may be only conditionally true.

Two Generally-True Properties of the Optimal Production Correspondence

The following result confirms the conjecture posed above.

Proposition 4. The optimal production correspondence η^F of the firm is generally not homogeneous of degree zero. Symbolically, the equation $\eta^F(\alpha p) = \eta^F(p)$ does not generally hold true, for any scalar $\alpha > 0$ and price system $p \in \mathbb{R}_+^\ell$.

To show this conclusion, it suffices for us to construct a counterexample.

Example 3. Assume that the firm has a specific production that involves one unit of each of the commodity inputs A, A₁, A₂, B, C₁, C₂, C, where A₁ and A₂ can substitute for each other and so do C₁ and C₂. A flow chart of the production is shown in Figure 2. The arrows indicate the order with which these commodities are fed into the assembly line one after another. And the weights of arrows stand for the relevant profits created by the production sequence from one node to the next. The manager of the firm wants to maximize the total profit, where the order \leq_F of priority is given to be $\leq_{\text{mod}(4)}$ according to the firm's system of values and beliefs. For the sake of convenience of communication, let I be the set of these commodities as ordered above.

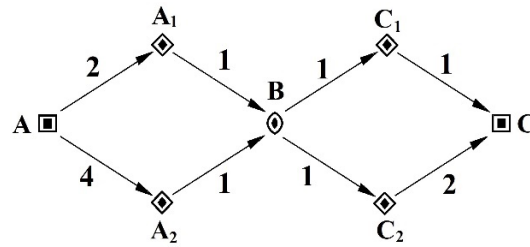


Figure 2. The firm's production line

The four possible paths and their respective total weights are given as follows:

- (a) $I_1: A \rightarrow A_1 \rightarrow B \rightarrow C_1 \rightarrow C$ with weight $5 \bmod(4) = 1$;
- (b) $I_2: A \rightarrow A_1 \rightarrow B \rightarrow C_2 \rightarrow C$ with weight $6 \bmod(4) = 2$;
- (c) $I_3: A \rightarrow A_2 \rightarrow B \rightarrow C_1 \rightarrow C$ with weight $7 \bmod(4) = 3$; and
- (d) $I_4: A \rightarrow A_2 \rightarrow B \rightarrow C_2 \rightarrow C$ with weight $8 \bmod(4) = 0$.

Let the corresponding input and associated out vectors are given respectively by $^j y = (y_j)_{j \in I_j}$ and $^j Z_{AC}, j = 1, \dots, 4$.

Hence, each price system p can be accordingly written as follows:

$$p = ((p_j)_{j \in I}, {}^1 Z_{AC}, {}^2 Z_{AC}, {}^3 Z_{AC}, {}^4 Z_{AC}).$$

It can be seen that for any $y \in Y$, there is $k (= 1, 2, 3, 4)$ such that when all zero components are eliminated, we have

$$y^{in} = {}^k y \text{ and } y^{out} = {}^k Z_{AC}.$$

For any price system $p \in \mathbb{R}_+^\ell$, we have

$$p \cdot y = p^{in} \cdot y^{in} + p^{out} \cdot y^{out},$$

where p^{in} represents the price vector of the commodities in y^{in} and p^{out} that of the commodities in y^{out} . Therefore, we have

$$\eta^F(p) = I_3: A \rightarrow A_2 \rightarrow B \rightarrow C_1 \rightarrow C. \quad (11)$$

Let us choose scalar $\alpha = 3.2$ that is multiplied to each of the individual local values. The corresponding total profits for the four paths are respectively equal to $5 \times 3.2 \pmod{4} = 0$, $6 \times 3.2 \pmod{4} = 3.2$, $7 \times 3.2 \pmod{4} = 2.4$, and $8 \times 3.2 \pmod{4} = 1.6$. Therefore, we have

$$\eta^F(\alpha p) = \eta^F(3.2 \cdot p) = I_2: A \rightarrow A_1 \rightarrow B \rightarrow C_2 \rightarrow C. \quad (12)$$

Hence, equations (11) and (12) jointly imply that $\eta^F(\alpha p) \neq \eta^F(p)$. That is, the optimal production correspondence η^F is not generally homogeneous of degree zero. QED

Evidently, for a price system $p \in \mathbb{R}_+^\ell$, if the optimal production correspondence $\eta^F(p)$ is a non-empty set, then it is likely that $\eta^F(p)$ may very well contain more than one element. For practical purposes, the uniqueness of solutions to the maximization problem $\max_{y^q \in Y} p \cdot y^q$ is often important. For example, facing a challenge of the marketplace, the firm wants to know whether or not a feasible solution is the best solution for it to implement in order to meet the challenge. If the firm can show that the feasible solution is the only possible one for it to employ, then the management of the firm will focus on how to optimally implement the solution instead of wasting energy on finding alternative solutions. For such a uniqueness problem, the following holds true in general no matter what system of values and beliefs the firm has.

Proposition 5. Let p be a nonzero price system satisfying $\eta^F(p) \neq \emptyset$. If for any two different productions $y^1, y^2 \in \eta^F(p)$, there is a scalar $\alpha = \alpha(y^1, y^2) \in (0, 1)$ such that $\alpha y^1 + (1 - \alpha)y^2 \in \text{interior}(Y)$, then $\eta^F(p)$ is a singleton.

Proof. First, we show that $\eta^F(p)$ is a convex set. In particular, for any $y^1, y^2 \in \eta^F(p)$ and any scalar $\alpha \in [0, 1]$,

$$\begin{aligned} p \cdot [\alpha y^1 + (1 - \alpha)y^2] &= \alpha(p \cdot y^1) + (1 - \alpha)(p \cdot y^2) \\ &= \alpha \max_{y^q \in Y} p \cdot y^q + (1 - \alpha) \max_{y^q \in Y} p \cdot y^q \\ &= \max_{y^q \in Y} p \cdot y^q \end{aligned}$$

So, $\alpha y^1 + (1 - \alpha)y^2 \in \eta^F(p)$. That is, $\eta^F(p)$ is convex.

Second, by contradiction assume that $\eta^F(p)$ contains more than one element. Pick $y^1, y^2 \in \eta^F(p)$ such that $y^1 \neq y^2$. So, the given condition implies that there is a scalar $\alpha(y^1, y^2) \in (0, 1)$ such that

$$\alpha(y^1, y^2)y^1 + [1 - \alpha(y^1, y^2)]y^2 \in \text{interior}(Y) \cap \eta^F(p)$$

But, this end is impossible, because a non-trivial linear function, where $p \neq 0$, does not have any local maximum. QED

MINIMUM COST OF PRODUCTION

Let $q = (q_{h_1^{out}}, q_{h_2^{out}}, \dots, q_{h_s^{out}})$ denote the required quantities of production outputs, satisfying that $q_{h_j^{out}} > 0$, for any $j = 1, 2, \dots, s$, and $h_1^{out} < h_2^{out} < \dots < h_s^{out}$. Then, the firm's cost minimization problem can be written as follows, assuming that the firm is a price taker: For a given price system $p \in \mathbb{R}_+^\ell$,

$$\begin{aligned} \min_{y \in Y} & p^{in} \cdot y^{in}, \\ \text{s. t. } & f(y^{in}) \geq q, \end{aligned} \quad (13)$$

where p^{in} stands for p 's sub-vector of prices of the commodities in y^{in} , and $f(y^{in}) = y^{out}$ satisfies that $\{h_1^{out}, h_2^{out}, \dots, h_s^{out}\}$ is generally a subset of the set of all commodity subscripts that appear in the components of y^{out} . Without loss of generality, we assume that these two sets are the same, because producing additional products beyond what are listed in q requires at least an increased amount of labor input.

Let $z = z(p, q)$ be a solution of the minimization problem in equation (13). This solution z is known as a conditional factor demand (Levin & Milgrom, 2004), because of its dependence on the required production outputs q .

The Lagrangian of problem in equation (13) is

$$L(y, p, q) = -p^{in} \cdot y^{in} + \lambda[f(y^{in}) - q] \quad (14)$$

where $\lambda = (\lambda_1, \lambda_2, \dots, \lambda_s) \in \mathbb{R}^s$ is a vector of Lagrange multipliers. So, the Kuhn-Tucker first-order conditions (Wallace, 2004) imply that for any $j = 1, 2, \dots, t$,

$$\begin{aligned} \frac{\partial L}{\partial y_{h_j^{in}}} &= -p_{h_j^{in}} + \lambda_j \frac{\partial f(y^-)}{\partial y_{h_j^{in}}} \leq 0, \\ -y_{h_j^{in}} &\geq 0, \text{ and} \\ y_{h_j^{in}} \frac{\partial L}{\partial y_{h_j^{in}}} &= 0. \end{aligned}$$

Hence, from our initial setup of this study (equation (5)), it follows that $-y_{h_j^{in}} > 0$, which in turn means that

$$p_{h_j^{in}} = \lambda_j \frac{\partial f(y^-)}{\partial y_{h_j^{in}}}. \quad (15)$$

Let $Z = \{z: \exists y \in Y (z = y^{in} \text{ and } f(z) \geq q)\}$ and the optimal value of the objective function in equation (13), be

$$c^F(p, q) =_F \min_{z \in Z} p^{in} \cdot z, \text{ for } p \in \mathbb{R}_+^\ell, \quad (16)$$

which gives the minimum cost at which the required outputs q can be produced. It can be seen readily from Axiom 3 that

$$Z \subseteq \{y^{in}: y \in Y\} \subseteq \bigcup_{t=1}^{\ell-1} \mathbb{R}_+^t. \quad (17)$$

The reason why the union of \mathbb{R}_+^t goes only up to $t = \ell - 1$ from $t = 1$ is because with inputs, at least one output will be produced or expected to be produced even though the firm might choose to produce nothing (Axiom 1). For example, if nothing useful is produced, then some of the inputs, for example, those dated labors, could easily become useless wastes, as the outputs of the strategy of taking no action. Additionally, if the firm decides to take no action (Axiom 1) after taking in certain amounts of inputs, then for the survival of the firm at least one of the inputs will need to be used as output in order to recapture some of the operational expenses.

In equation (16), if $\min_{z \in Z}^F(p^{in} \cdot z)$ does not exist, this expression is assumed to be $\inf_{z \in Z}^F(p^{in} \cdot z)$.

Properties of the Minimum Cost

For given $p \in \mathbb{R}_+^\ell$ and $q \in \mathbb{R}^S$, define the following set-valued function

$$\xi^F(p, q) = \{z \in Z: p^{in} \cdot z =_F \min_{z \in Z}^F p^{in} \cdot z^q\}, \quad (18)$$

known as the set of conditional factor demands (that is conditional on the desired level of outputs). In other words, ξ^F maps each price system p of commodities to the subset $\xi^F(p, q) \subseteq Z$ of all cost-minimizing commodity inputs of productions, if $\xi^F(p, q) \neq \emptyset$. By combining equations (16) and (18), it follows readily that

$$c^F(p, q) = p^{in} \cdot z, \text{ for any } z \in \xi^F(p, q). \quad (19)$$

Proposition 6. The cost $c^F(p, q)$ is a partial function in $p \in \mathbb{R}_+^\ell$. It is homogeneous of degree one in $\text{domain}(c^F)$, nondecreasing in q and concave in p .

Proof. The first conclusion comes from the fact that for some $p \in \mathbb{R}_+^\ell$, $\min_{z \in Z}^F(p^{in} \cdot z)$ might not exist. For the homogeneity of $c^F(p, q)$ in p , let $\alpha \in \mathbb{R}$ be a scalar. Then, we have

$$c^F(\alpha p, q) =_F \min_{z \in Z}^F(\alpha p^{in} \cdot z) = \alpha \min_{z \in Z}^F(p^{in} \cdot z) =_F \alpha c^F(p, q).$$

For the third conclusion, it suffices to show that for any $q_1, q_2 \in \mathbb{R}^S$, $q_1 \geq q_2$ implies $c^F(p, q_1) \geq_F c^F(p, q_2)$. In fact, this last inequality follows directly from the following

$$q_1 \geq q_2 \rightarrow \{z \in Z: f(z) \geq q_1\} \subseteq \{z \in Z: f(z) \geq q_2\}.$$

For the concavity of the cost function $c^F(p, q)$ in p , let $^1p, ^2p \in \mathbb{R}_+^\ell$ be two price systems and $\alpha \in [0, 1]$ be a scalar. Define $^ap = \alpha ^1p + (1 - \alpha) ^2p$. Then, we have that for $z = z(^ap, q) \in \xi^F(^ap, q)$

$$\begin{aligned} c^F(^ap, q) &= ^ap^{in} \cdot z(^ap, q) = \alpha ^1p \cdot z(^ap, q) + (1 - \alpha) ^2p \cdot z(^ap, q) \\ &\geq \alpha ^1p \cdot z(^1p, q) + (1 - \alpha) ^2p \cdot z(^2p, q) \\ &= \alpha c^F(^1p, q) + (1 - \alpha) c^F(^2p, q) \end{aligned}$$

where the second line follows from the fact that $z(^ap, q)$ produces outputs q not necessarily in the cost minimizing way at either 1p or 2p . QED

Proposition 7. For any production $y \in Y$, if $y^{in} \in \mathbb{R}_-^t$, for some $t = 1, 2, \dots, \ell - 1$, and $y^{in} \notin Z \cap \mathbb{R}_-^t$ implies that there is a hyperplane L in \mathbb{R}^t that separates y^{in} and $Z \cap \mathbb{R}_-^t$ in terms of the firm's order relation \leq_F of real numbers so that $y^{in} \notin L$, then

$$Z = \bigcup_{t=1}^{\ell-1} \left\{ z \in \mathbb{R}_-^t: \forall p \in \mathbb{R}^\ell \left(p^{in} \cdot z \geq_F c^F(p^{in}, q) \right) \right\}. \quad (20)$$

Proof. From equation (17), it follows that

$$Z = \bigcup_{t=1}^{\ell-1} Z \cap \mathbb{R}_-^t. \quad (21)$$

So, to show equation (20), it suffices to demonstrate that for each $t = 1, 2, \dots, \ell - 1$,

$$Z \cap \mathbb{R}_-^t = \left\{ z \in \mathbb{R}_-^t: \forall p \in \mathbb{R}^\ell \left(p^{in} \cdot z \geq_F c^F(p^{in}, q) \right) \right\}, \quad (22)$$

due to the fact that terms in the union in equation (20) (respectively, (33c)) are pairwise disjoint.

Let the set defined by equation (22) be \tilde{Z} . It suffices to demonstrate that $Z \cap \mathbb{R}_-^t \subseteq \tilde{Z}$ and $\tilde{Z} \subseteq Z \cap \mathbb{R}_-^t$. The former follows directly from the definition of $c^F(p, q)$ in equation (16). Next, let us examine that $\tilde{Z} \subseteq Z \cap \mathbb{R}_-^t$.

To this end, let us pick an arbitrary $y \in Y$ such that $y^{in} \notin Z \cap \mathbb{R}_-^t$. Then, the if-condition guarantees the existence of a hyperplane L in \mathbb{R}^t that separates y^{in} and $Z \cap \mathbb{R}_-^t$. Assume that the equation of the plane is $p^{in} \cdot x = \beta$, for $x \in \mathbb{R}^t$, some non-zero $p \in \mathbb{R}^\ell$ and a scalar $\beta \in \mathbb{R}$, satisfying that for any $z' \in Z \cap \mathbb{R}_-^t$, $p^{in} \cdot z' \geq_F \beta$ and $\beta >_F p^{in} \cdot y^{in}$. Hence, taking minimum or infimum produces

$$p^{in} \cdot y^{in} <_F \beta \leq_F \min_{z \in Z \cap \mathbb{R}_-^t}^F (p^{in} \cdot z) \text{ or } \inf_{z \in Z \cap \mathbb{R}_-^t}^F (p^{in} \cdot z). \quad (23)$$

Once again, due to differences in dimensionality between $\mathbb{R}_-^{t_1}$ and $\mathbb{R}_-^{t_2}$, for $t_1, t_2 = 1, 2, \dots, \ell - 1$, $t_1 \neq t_2$, it can be seen that $\min_{z \in Z \cap \mathbb{R}_-^t}^F (p^{in} \cdot z) = c^F(p^{in}, q)$, because $p^{in} \in \mathbb{R}_+^t$ the corresponding z in the operation $p^{in} \cdot z$ has to be from \mathbb{R}_-^t . Therefore, equation (23) is the same as

$$p^{in} \cdot y^{in} <_F \beta \leq_F \min_{z \in Z}^F (p^{in} \cdot z) \text{ or } \inf_{z \in Z}^F (p^{in} \cdot z).$$

That is, what is shown is that $y^{in} \notin Z \cap \mathbb{R}_-^t \rightarrow y^{in} \notin \tilde{Z}$, which means $\tilde{Z} \subseteq Z \cap \mathbb{R}_-^t$. Therefore, equation (22), and then equation (20) follows from equation (21). QED

Proposition 8. If the same condition as that in Proposition 7 holds true, then

$$Z = \bigcup_{t=1}^{\ell-1} \left\{ z \in \mathbb{R}_-^t : \forall p \in \mathbb{R}_+^t \left(p^{in} \cdot z \geq_F c^F(p^{in}, q) \right) \right\}. \quad (24)$$

Proof. Define

$$\tilde{Z} = \left\{ z \in \mathbb{R}_-^t : \forall p \in \mathbb{R}_+^t \left(p^{in} \cdot z \geq_F c^F(p^{in}, q) \right) \right\}. \quad (25)$$

Then the rest of the argument is similar to that of the previous proposition until the end of equation (23) by replacing \tilde{Z} with \tilde{Z} . This current argument concludes with showing that the specified $p^{in} \in \mathbb{R}^t$ in the equation of the hyperplane $p^{in} \cdot x = \beta$ is actually an element of \mathbb{R}_+^t . That is, no component of p^{in} can be zero or negative. By contradiction, assume that there is a subscript commodity h ($= 1, 2, \dots, t$) such that the h th component of p^{in} satisfies $p_h \leq 0$. Then the firm can apply as much of commodity h as one of its inputs as it wants to without any upper limit. So, the free disposal axiom (Axiom 2) implies that the right-hand side of equation (23) is equal to $\inf_{z \in Z}^F (p \cdot z) = -\infty$. This end makes equation (23) invalid. Therefore, it follows that $p^{in} \in \mathbb{R}_+^t$ so that equation (25) and then equation (24) are established. QED

Properties of the Set of Conditional Factor Demand

This subsection develops a few important conclusions. The first one demonstrates when a unique solution to the minimization problem in equation (13) exists. The second result examines how changes in the prices of the input commodities cause changes in the corresponding commodity supplies. The third result generalizes the well-known Shepard's lemma. And the fourth conclusion carries a known result in the producer theory (Levin & Milgrom, 2004; Mas-Collel et al., 1995) much forward.

Proposition 9. For any fixed $q = (q_{h_1^{out}}, q_{h_2^{out}}, \dots, q_{h_s^{out}}) \in \mathbb{R}_+^s$ and any $p \in \mathbb{R}_+^\ell$, satisfying $\xi^F(p, q) \neq \emptyset$, if for any $z^1 \neq z^2 \in \xi^F(p, q)$, there is a scalar $\alpha = \alpha(z^1, z^2) \in (0, 1)$ such that $\alpha z^1 + (1 - \alpha)z^2 \in \text{interior}(Z)$, then $\xi^F(p, q)$ is a singleton.

Proof. First, $\xi^F(p, q)$ is a convex set. Specifically, for any $z^1, z^2 \in \xi^F(p, q)$ and $\alpha \in [0, 1]$, we have

$$\begin{aligned}
p^{in} \cdot [\alpha z^1 + (1 - \alpha)z^2] &= \alpha(p^{in} \cdot z^1) + (1 - \alpha)(p^{in} \cdot z^2) \\
&= \alpha \min_{z \in Z}^F p^{in} \cdot z + (1 - \alpha) \min_{z \in Z}^F p^{in} \cdot z \\
&= \min_{z \in Z}^F p^{in} \cdot z
\end{aligned}$$

So, $\alpha z^1 + (1 - \alpha)z^2 \in \xi^F(p, q)$. That is, $\xi^F(p, q)$ is a convex set.

Second, we show that $\xi^F(p, q)$ is a singleton by contradiction. Assume that $\xi^F(p, q)$ contains more than one element. Pick $z^1, z^2 \in \xi^F(p, q)$ such that $z^1 \neq z^2$. Then, for some $\alpha = \alpha(z^1, z^2) \in (0, 1)$, we have

$$\alpha z^1 + (1 - \alpha)z^2 \in \text{interior}(Z) \cap \xi^F(p, q).$$

But, this end is impossible, because a non-trivial linear function, where $p \neq 0$, does not have any local minimum. QED

Proposition 10. For any two price systems ${}^1p, {}^2p \in \mathbb{R}_+^\ell$, and commodity inputs ${}^1z \in \xi^F({}^1p, q), {}^2z \in \xi^F({}^2p, q)$, $({}^2p^{in} - {}^1p^{in})({}^2z - {}^1z) \leq 0$, assuming that the dimensions of 1z and 2z do match up perfectly, otherwise, necessary zero components are used to make them match.

Proof. Because ${}^1p^{in} \cdot {}^1z = \min_{z^q \in Z}^F {}^1p^{in} \cdot z^q$ and ${}^2p^{in} \cdot {}^2z = \min_{z^q \in Z}^F {}^2p^{in} \cdot z^q$, we have ${}^1p^{in} \cdot {}^1z \leq {}^1p^{in} \cdot {}^2z$ and ${}^2p^{in} \cdot {}^2z \leq {}^2p^{in} \cdot {}^1z$. So, ${}^1p^{in} \cdot ({}^1z - {}^2z) \leq 0 \leq {}^2p^{in} \cdot ({}^1z - {}^2z)$, from which $({}^2p^{in} - {}^1p^{in})({}^2z - {}^1z) \leq 0$ follows. QED

What Proposition 10 says is that to maintain minimum cost, when the prices of commodity inputs change, the corresponding changes in the required amounts of these input commodities also change but in the opposite direction. In particular, when the prices of commodity inputs increase, Proposition 10 indicates that the amounts of the required input commodities will be reduced. Therefore, this conclusion can be seen as the property of supplier shortage.

The following results generalizes the well-known Shepard's lemma.

Proposition 11. For a given price system $p \in \mathbb{R}_+^\ell$, assume that the firm's minimization of production cost is based on the conventional Lagrangian approach. Then, $\xi^F(p, q) = \{z(p, q)\}$ is a singleton in a neighborhood of p^{in} , if and only if $c(\cdot, q)$ is differentiable at p^{in} with respect to each $p_{h_j^{in}}$ such that

$$\frac{\partial c(p, q)}{\partial p_{h_j^{in}}} = z_{h_j^{in}}(p, q), \text{ for } j = 1, 2, \dots, t, \quad (26)$$

assuming that $p^{in} = (p_{h_1^{in}}, p_{h_2^{in}}, \dots, p_{h_t^{in}}) \in \mathbb{R}_+^t$, for some $t = 1, 2, \dots, \ell - 1$.

Proof. (\Rightarrow) Because $\xi^F(p, q) = \{z(p, q)\}$ is a singleton in a neighborhood of p , the assumption on how the firm minimizes its cost means that the envelope theorem applies so that we have

$$\frac{\partial c(p, q)}{\partial p_{h_j^{in}}} = \frac{\partial}{\partial p_{h_j^{in}}} [p^{in} \cdot z(p, q)] = \frac{\partial p}{\partial p_{h_j^{in}}} \cdot z(p, q) = z_{h_j^{in}}(p, q),$$

for $j = 1, 2, \dots, t$.

(\Leftarrow) For any $z^1, z^2 \in \xi^F(p, q)$, by filling unmatching components with zeros if needed, we can assume that $z^1 = (z_{h_1^{in}}^1, z_{h_2^{in}}^1, \dots, z_{h_t^{in}}^1)$ and $z^2 = (z_{h_1^{in}}^2, z_{h_2^{in}}^2, \dots, z_{h_t^{in}}^2)$. Hence, we have $c(p, q) = p \cdot z^1 = p \cdot z^2$. So, equation (26) implies that

$$z_{h_j^{in}}^1 = \frac{\partial c(p, q)}{\partial p_{h_j^{in}}} = z_{h_j^{in}}^2, j = 1, 2, \dots, t.$$

Therefore, $z^1 = z^2$. That is, $\xi^F(p, q)$ is a singleton. QED

For the rest of this subsection, we assume that the firm's order relation \leq_F of real numbers is the same as the conventional one \leq .

Proposition 12. For a given price system $p \in \mathbb{R}_+^\ell$, if $\xi^F(p, q) = \{z(p, q)\}$ is a singleton in a neighborhood of p and $z(p, q)$ is continuously differentiable with respect to $p^{in} = (p_{h_1^{in}}, p_{h_2^{in}}, \dots, p_{h_t^{in}}) \in \mathbb{R}_+^t$, then the matrix $D_p z(p, q) = D_p^2 c(p, q) = 0_{t \times t}$.

Proof. First, let us compute $D_p z(p, q)$ as follows:

$$\begin{aligned}
 D_p z(p, q) &= \frac{\partial z(p, q)}{\partial p} \\
 &= \left[\frac{\partial z_{h_1^{in}}(p)}{\partial p}, \frac{\partial z_{h_2^{in}}(p)}{\partial p}, \dots, \frac{\partial z_{h_t^{in}}(p)}{\partial p} \right] \\
 &= \left[\frac{\partial^2 c(p, q)}{\partial p \partial p_{h_1^{in}}}, \frac{\partial^2 c(p, q)}{\partial p \partial p_{h_2^{in}}}, \dots, \frac{\partial^2 c(p, q)}{\partial p \partial p_{h_t^{in}}} \right] \quad \text{from Proposition 11} \\
 &= \left[\frac{\partial^2 c(p, q)}{\partial p_{h_i^{in}} \partial p_{h_j^{in}}} \right]_{t \times t} \\
 &= D_p^2 c(p, q)
 \end{aligned} \tag{27}$$

That is $D_p z(p, q) = D_p^2 c(p, q)$. To show $D_p z(p, q) = 0$, define

$$F(z) \begin{cases} = 0, & \text{if } z \text{ is on the frontier of } Z \\ < 0, & \text{if } z \text{ is in the interior of } Z \\ > 0, & \text{if } z \text{ is outside of } Z \end{cases}$$

Then, the following minimization problem

$$\min_z p \cdot z, \text{ s. t. } z \in Z$$

can be rewritten as

$$\min_z p \cdot z, \text{ s. t. } F(z) \leq 0.$$

The Lagrangian of this problem is

$$L = p \cdot z - \lambda F(z) \tag{28}$$

which implies the first-order conditions:

$$p_{h_j^{in}} = \lambda F_{h_j^{in}}(z^*), F(z^*) \leq 0, \text{ for } j = 1, 2, \dots, t, \tag{29}$$

where $z^* \in \xi^F(p, q)$. From equation (27), it follows that for $z(p, q) = (z_{h_1^{in}}, z_{h_2^{in}}, \dots, z_{h_t^{in}}) \in \xi^F(p, q)$,

$$D_p z(p, q) = \left[\frac{\partial z_{h_j^{in}}}{\partial p_{h_i^{in}}} \right]_{t \times t} = \left[\frac{\partial z_{h_j^{in}}}{\partial p_{h_i^{in}}} \cdot \frac{p_{h_j^{in}}}{p_{h_j^{in}}} \right]_{t \times t}$$

$$\begin{aligned}
&= \left[\frac{\lambda}{p_{h_j^{in}}} \cdot \frac{\partial z_{h_j^{in}}}{\partial p_{h_i^{in}}} \cdot F_{h_j^{in}}(z) \right]_{t \times t} && \text{from equation (29)} \\
&= \left[\frac{\lambda}{p_{h_j^{in}}} \frac{\partial F(z)}{\partial p_{h_i^{in}}} \right]_{t \times t} \\
&= \left[\frac{\lambda}{p_{h_j^{in}}} \cdot 0 \right]_{t \times t} = 0_{t \times t} && \text{from equation (28) or the envelope theorem}
\end{aligned}$$

where $\partial F(z)/\partial p_{h_i^{in}} = 0$ also comes from the fact that $z \in \xi^F(p, q)$ so that $F(z) = 0$ no matter how p changes. Therefore, the derivative of $F(z)$ with respect to $p_{h_i^{in}}$ is zero. Therefore, $D_p z(p, q) = 0_{t \times t}$. QED

This result carries a well-known conclusion in the producer theory much forward. In particular, the known result claims (Levin & Milgrom, 2004; Mas-Collel et al., 1995) that the matrix $D_p z(p, q) = D_p^2 c(p, q)$ is symmetric, negative semidefinite and $D_p z(p, q)p^{in} = 0$.

CONCLUSION

By starting with a firm's four natural endowments (Forrest, Hafezalkotob, et al., 2021; Forrest, Shao et al., to appear), this paper employs a set-theoretical approach to establish a series of 12 propositions, most of which hold true no matter the system of values and beliefs that a firm embraces. Because of the novel application of firms' natural endowments, this paper convincingly demonstrates the existence of firm-specific order relations of real numbers, reflecting differences in the decision criteria of priority from one firm to another, and consequently the existence of firm-specific methods of optimization. For related discussions, see, for example, Hammerton (2020), Van Fleet (2021) and Yang and Andersson (2018). This end represents a major contribution this work makes to the literature, beyond that of establishing the formal set-theoretic conclusions.

By accentuating firms' different decision criteria of priority, this paper is able to address, although only partially, the question about how some of the main results of the producer theory (Levin & Milgrom, 2004; Mas-Collel et al., 1995) still hold true, when each firm strives to achieve its desired business outcome through materializing its stated mission. Because of our innovative starting points adopted for the subsequent reasoning and logical analysis, which is drastically different from those widely adopted in the literature, we are able to redefine a firm's optimal production correspondence and minimum cost production and develop, among others, the following main results:

- In general, a firm's optimal production correspondence is generally not homogeneous of degree zero (Proposition 4), unless the firm's order relation of real numbers satisfies the condition of positive multiplicativity (Proposition 3);
- It is generally true that the minimum cost of a firm is homogeneous of degree one, no matter what system of values and beliefs the firm holds (Proposition 6);
- The set of all conditional factor demands is equal to the union of the subsets of those conditional factor demands from the Euclidean spaces of dimensions 1 to the number of commodities minus one (Propositions 7 and 8);
- If each firm minimizes its business cost no matter how the minimization is defined, changes in the prices of commodity inputs bring forward changes in the demand of these commodities in the opposite direction (Proposition 10);
- In Shepard's lemma, the condition of a single conditional factor demand is equivalent to the equation that the rate of change of the cost in the price of commodity h is equal to the demand of commodity h , for each input commodity h (Proposition 11); and
- When no commodity can be inputted for free, the matrix of rates of change of the unique conditional factor demand in input commodities with respect to prices is equal to 0 (Proposition 12).

To summarize, in addition to demonstrating the existence of firm-specific order relations of real numbers and firm-specific methods of optimization, this paper also reestablishes a few very well-known results to the general case of

whichever system of values and beliefs a firm might embrace. At the same time, because we impose fewer conditions than earlier works in the literature, our results, although developed set-theoretically in this paper, are expected to be more practically relevant than the corresponding results derived previously.

Many important aspects of this research call for future research. For example, this paper explores two different order relations of real numbers – the conventional one and the one defined by the modular function. However, managers and entrepreneurs in real life surely employ other means to prioritize the alternatives available for their decision making. So, to make this work more compatible for real-life applications, it will be desirable for scholars to explore how the results developed in this paper remain reliable for different criteria of priority or different systems of values and beliefs.

In particular, Propositions 2, 3, 11 and 12, most likely, do not hold true for systems of values and beliefs that define order relations of real numbers through the modular function. So, with such an order relation, how will these results vary? Or, in what forms will relevant results appear?

REFERENCES

- Arif, S., & Scott, J.T. (1986). Economic-efficiency in integrated pest-management decisions of Illinois corn farmers. *American Journal of Agricultural Economics*, 68(5), 1385-1385.
- Binswanger, H.P. (1974). A cost function approach to the measurement of elasticities of factor demand and elasticities of substitution. *American Journal of Agricultural Economics*, 56(1974), 377-86.
- Burton, D.M. (2012). *Elementary Number Theory*. New York, NY.: McGraw Hill.
- Collins, G.S., and Taylor, C.R. (1983). TECHSIM: A regional field crop and national livestock econometric simulation model. *Agricultural Economic Research*, 35(2), 1-18.
- Debreu, G. (1959). *Theory of Value: An Axiomatic Analysis of Economic Equilibrium*. New Haven and London: Yale University Press.
- Forrest, J.YL., Hafezalkotob, A., Ren, L., Liu, Y., & Tallapally, P. (2021). Utility and optimization's dependence on decision-makers' underlying value-belief systems. *Review of Economic & Business Studies*, in final production.
- Forrest, J.YL., & Liu, Y. (2022). *Value in Business: A Holistic, Systems-Based Approach to Creating and Achieving Value*. Switzerland: Springer.
- Forrest, J.YL., Shao, L., Liu, J., Sloboda, B.W. (to appear). Optimum and method of optimization are individually defined. Under review for possible publication.
- Friedman, M. (1953). *Essays in Positive Economics*. Chicago: University of Chicago Press.
- Gilboa, I. (2010). *Rational Choice*. Cambridge, MA; London: The MIT Press.
- Hammerton, M. (2020). Deontic constraints are maximizing rules. *Journal of Value Inquiry*, 54(4), 571-588. <https://doi.org/10.1007/s10790-020-09731-8>.
- Hu, T.C. (1982). *Combinatorial Algorithms*. New York, NY.: Addison-Wesley.
- Hudik, M. (2019). Two interpretations of the rational choice theory and the relevance of behavioral critique. *Rationality and Society*, 31(4), 464-489.
- Kahneman, D. (2011). *Thinking, Fast and Slow*. New York, NY.: Farrar, Straus and Giroux.
- Kako, T. (1978). Decomposition analysis of derived demand for factor inputs: The case of rice production in Japan. *American Journal of Agricultural Economics*, 60(4), 628-635.
- Kuratowski, K., & Mostowski, A. (1976). *Set Theory: With an Introduction to Descriptive Set Theory*. Amsterdam: North-Holland.
- Lau, L.J., & Yotopoulos, P.A. (1972). Profit, supply, and factor demand functions. *American Journal of Agricultural Economics*, 54(1), 11-18.
- Lee, H., and Chambers, R.G. (1986). Expenditure constraints and profit maximization in U.S. agriculture. *American Journal of Agricultural Economics*, 68(4), 857-865.
- Levin, J., & Milgrom, P. (2004). Producer theory. <https://web.stanford.edu/~jdlevin/Econ%20202/Producer%20Theory.pdf>, accessed on November 5, 2021.
- Lin, Y. (1999). *General Systems Theory: A Mathematical Approach*. New York, NY.: Springer.

- Lin, Y., & Forrest, B. (2012). *Systemic Structure behind Human Organizations: from Civilizations to Individuals*. New York, NY.: Springer.
- Lovett, F. (2006). Rational choice theory and explanation. *Rationality and Society*, 18(2). 237-272.
- Mas-Collel, A., Whinston, M.D., & Green, J.R. (1995). *Microeconomic Theory*. New York, NY.: Oxford University Press.
- Mullainathan, S., & Thaler, R.H. (2000). Behavioral economics. *NBER Working Paper* no. 7948, October. Cambridge, MA: National Bureau of Economic Research.
- Pancs, R. (2018). *Lectures on Microeconomics: The Big Questions Approach*. Cambridge, MA.: The MIT Press.
- Pope, R.D. (1980). The generalized envelope theorem and price uncertainty. *International Economic Review*, 21(1), 75-85.
- Pope, R.D. (1982). Expected profit, price change, and risk aversion. *American Journal of Agricultural Economics*, 64(3), 581-584.
- Rubinstein, A. (1998). *Modeling Bounded Rationality*. Cambridge, MA; The MIT Press.
- Taylor, C.R. (1984). Stochastic dynamic duality: Theory and empirical applicability. *American Journal of Agricultural Economics*, 66(3), 351-357.
- Taylor, C.R. (1989). Duality, optimization, and microeconomic theory: Pitfalls for the applied researcher. *Western Journal of Agricultural Economics*, 14(2), 200-212.
- Trosper, R.L. (1978). American Indian relative ranching efficiency. *American Economic Review*, 68(4), 503-516.
- Van Fleet, D.D. (2021). Utility, Maximizing, and the Satisficing Concept: A Historical Approach at Reconciliation. *Journal of Behavioral and Applied Management*, 21(2), <https://doi.org/10.21818/001c.29691>
- Wallace, B. (2004). Constrained optimization: Kuhn-Tucker conditions. <http://amber.feld.cvut.cz/bio/konopka/file/5.pdf>, accessed on November 24, 2021.
- Weyl, G.E. (2019). Price theory. *Journal of Economic Literature*, 57(2). 329-384.
- Yang, X., & Andersson, D.E. (2018). Spatial aspects of entrepreneurship and innovation. *The Annals of Regional Science*, 61, 457-462. <https://doi.org/10.1007/s00168-018-0888-z>.
- Young, D.L., Mittelhammer, R.C., Rostamizadeah, A., & Holland, D.W. (1987). *Duality Theory and Applied Production Economics Research: A Pedagogical Treatises*. Washington State University Bulletin 0962.

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PLAYING TAG ALLOWS STUDENT-ATHLETES TO CHASE HIGHER NIL PROFITS

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ABSTRACT

The implementation of name, image and likeness (NIL) practices has continued to impact the collegiate athletics industry, especially in terms of the recruitment of potential high school and transfer student-athletes. For these student-athletes, gone are the days of just considering academic majors, athletic facilities, and relationships with peers and coaches. Now, potential student-athletes need to consider their personal brand growth and earnings potential as part of this process. This study examines the opportunities for brand growth in this process and the impact university athletic departments and individual programs can have on potential student-athletes. An analysis of projected student-athlete NIL valuations and how athletic departments and programs influence these values was conducted.

INTRODUCTION

With the name, image and likeness (NIL) policy, being in effect since July 1, 2021, student-athletes at each level of NCAA collegiate athletics, Division I, II, and III, have been awarded the opportunity to earn compensation aside from simply financial aid. This change has transformed the economic impact of collegiate sports and does not only affect the student-athletes accepting NIL deals but also the organizations offering the deals as well. A major benefit of the NCAA policy change is the opportunity to build brand ambassador relationships as well as partnerships between businesses and student-athletes, allowing the two parties to combine, in order to create what can be seen as a “win-win” scenario. In the interim policy’s first year, it was exactly that, generating an estimated \$917 million in NIL deals alone, with projections only getting higher for future years (Haneman& Weber, 2022).

Considering their exposure and followings, student-athletes have the potential to be effective endorsers and brand ambassadors. Recent advances in technology and the establishment of new social media platforms have allowed professional athletes and social media influencers to reach large audiences and engage with their followers, making them ideal targets for these roles. Using these platforms, NCAA student-athletes can grow their personal brand, attract new followers, and increase engagement, making them attractive candidates to serve as endorsers or brand ambassadors.

Student-athletes' social media presence plays a major role in their ability to attract NIL deals. In today's society social media has become an effective tool for businesses to market their products online. In this study we analyzed Instagram posts to identify ways in which student-athletes can use social media to increase their NIL value.

LITERATURE REVIEW

Social Identity Theory

Boyle and Magnuson (2007) stated how people reflect upon themselves through an evaluation of their personality traits and their different aspects of their social experiences. These aspects of social experiences are also known as an individual's social identity (Tajfel & Turner, 1986). Social identity is a person’s sense of who they are based on their group membership(s). Social identity theory concludes that an individual is defined by the affiliations he or she has with other external groups (e.g., political, ethnic, professional). Tajfel and Turner proposed that there are three mental processes involved when evaluating others as “us” or “them”, those three are social categorization, social identification, and social comparison (McLeod, 2008). The social categorization of “us” and “them” are known as the in group and the out group. The social identity theory states that the in group will discriminate against the outgroup to enhance their self image (McLeod, 2008). The individual has an understanding that he or she is a member of particular social groups and is different from the others. Individuals adopt the identity of the group in which they belong to and have an emotional significance to the identification of the group as well (McLeod, 2008).

The social identification of a person when they are within a group of people serves two different purposes, it helps lessen insecurity about the social environment and enhances an individual's self-esteem (Hickman et al., 2005). If an individual's self esteem is maintained, then the group needs to compare favorably to other groups. If two groups identify themselves as rivals, then they are forced to compete in order for members to maintain their self esteem (McLeod, 2008).

Source Credibility Model

The source credibility model states that a message's effectiveness is dependent on the expertise and trustworthiness levels of the endorsers (Hovland& Weiss, 1951). Some studies have shown that if endorsers show trustworthiness to the product, it's very likely that their consumers will purchase their products (Sternthal et al., 1978). Credibility has a positive effect on the persuasiveness of a message, making a significant impact on the value of endorsements from perceived credible sources (Harmon and Kenneth, 1982). If the opinion of the endorser changes, the opinion of the consumer can change based on what the endorser has said (Hovland& Weiss, 1951). The consumers need to hear it from the endorsers or credible source first before purchasing the product. Having credible and honest endorsers therefore builds a better reputation as consumers will associate the brand with the endorsers whose opinions they value.

Attractiveness Model

The attractiveness model applies to a marketer's ability to draw the attention of potential consumers through the use of marketing their products with attractive models, celebrities, athletes, or other individuals. Much like how individuals are often attracted to others that they view attractive or visually pleasing, consumers can be persuaded to buy products, influenced by attractive individuals associated with the product. To emphasize the power of attraction, (Babel et. al., 2014) describes how attraction is a driving force in the judgments of everyday interactions among individuals, such as associating attractive people with being more desirable. This goes for marketing as well considering that the association of attractive endorsers to products, persuades consumers to think that these products are desirable and popular, persuading consumers to buy the product. By highlighting the appearance and attractiveness of the individual promoting the product, brands can make their products more appealing, attracting consumers that are attracted to and desire to look like the endorser. Abercrombie & Fitch for example uses this model in their marketing by employing attractive employees and endorsers to target and attract consumers that they consider popular, cool, and attractive.

Meaning Transfer Model

The meaning transfer model claims that when an individual or group of individuals endorse a brand or product, consumers associate that individual's hobbies, interests, viewpoints, and much more with the brand or product that they are promoting. Brands often use this marketing model to emphasize their goals, values, and mission. Successful implementation of this technique is when brands find endorsers that have lifestyles, views, and values that are aligned with the values most important to the brand. Through this technique, the endorser is a representation of the brand or product that they are marketing. The forging of this relationship between endorser and product allows the brand to influence consumer perception of the brand or product (Campbell & Warren, 2012). It is therefore critical that endorsers for these products and brands set a good example considering that their actions are associated with the brand. Poor behavior from endorsers can consequently create a bad reputation for the brand and product which they promote since consumers associate the product/brand with the individual. The meaning transfer model is an excellent way for companies to expand their audience, attracting the followers of the celebrities and athletes that market their products. Also, this model is an excellent way for brands to stay relevant, considering they may find current celebrities willing to participate in endorsements for the product.

Product Match-Up Hypothesis

Through the development of technology, and marketing techniques as a whole, product advertising has infiltrated the routine and day-to-day lives of those in our society, exposing consumers to over 1,500 advertising messages daily (Koernig& Boyd, 2009). These messages, commonly featuring celebrities, are used to captivate consumers to buy certain brand products. One technique proven to be effective towards garnering consumer responses, however, is the product match-up hypothesis. This hypothesis follows that the best way to reap the benefits of including an endorser

in advertisements, is to depict a connection between the celebrity's image and the product's image (Parmar et al., 2020). An advertisement including a model and product with similar characteristics, increases the believability of the message conveyed in the advertisement and results in a greater customer response towards the celebrity as well as the product image.

Endorsers and Brand Ambassadors

A common and very effective form of marketing for businesses promoting their products, services, brand or image is word-of-mouth advertising. One of the best ways that companies incorporate this is through individuals who promote a brand by providing information about products, services, or ideas, also known as endorsers and brand ambassadors (Wang & Hariandja, 2016). For the companies, endorsers and brand ambassadors provide details and information about the brand itself, its products and services, as well as further develops brand awareness and involvement, promoting word of mouth marketing aside from traditional advertisements (Belch & Belch, 2007).

Companies use endorsers and brand ambassadors as a way to increase their branding, audience, and communication strategies, allowing them to create, recreate and even broaden their brand image for more efficiency and differentiation from competitors (Jardim et al., 2021). With the recent developments in social media, endorsers and brand ambassadors have the opportunity to spread their brand's image no matter where they are, through online posts and comments. Being an endorser and brand ambassador, has also become popular in recent years as serving in these positions also allows the individual to build their own personal image and make a name for themselves as well, something prevalent in collegiate athletics with the passing of Name Image and Likeness (NIL). These positions serve a great opportunity for the ambassador(s) as well the organization, often sharing similar values and interests, to connect and build upon their social followings.

Name, Image, and Likeness Legislation

In the summer of 2009, former UCLA Bruin basketball player Ed O'Bannon brought a lawsuit against the NCAA, Electronic Arts and Collegiate Licensing Company over the use of NCAA student-athletes' images in video games, DVDs, photographs and other material (Jon Solomon, Jun 6, 2015). O'Bannon's legal action started an undercurrent of pressure against the NCAA regarding student athlete welfare and compensation. Growing pressure led to the NCAA's consideration of name, image and likeness legislation in late 2019 (NCAA, 2021).

The lawsuit initiated the interim policy of what now is known as name, image, and likeness (NIL), which went into effect on July 1, 2021. The policy allows student - athletes at all three levels of the NCAA to earn compensation outside of the financial aid structure established by NCAA legislation. The NCAA is still continuing to work on a national law that will assist colleges and universities, student - athletes and their families to better traverse the NIL landscape. There are currently twenty - nine states that have passed laws governing name, image, and likeness for student - athletes. (Sports.Legal) There are five different states that are slated to take effect in July of 2023, and an additional ten states that have proposed legislation pending.

Some states chose to not propose their own legislation ahead of the NCAA's decision and have since installed their own. Others have amended their earlier laws, making them less restrictive to suit the collective-driven world of NIL. There are still a handful of states who have not made a move or have not had success in passing proposed legislation, choosing to stick with the NCAA's guidelines. Over 500,000 athletes are now accessible for business to use as marketing tools. But each player now has to navigate a separate list of regulations depending on what state their school is in and what policies the institution may have.

NIL Impact on Student Athletes

With the recent addition of NIL for collegiate athletes there are now more than 500,000 athletes that can now acquire money based on their name, image, and likeness. These athletes now have the opportunity to sell themselves because of their status as athletes. Athletes can obtain different partnerships with businesses that are local, regional or national. This opens up a variety of opportunities for student-athletes to profit on their personal brand. It is clear that NIL deals can impact an athlete's following and therefore value. Despite this, not all athletes are equally impacted by the legislation. NIL impact is not consistent and will vary based on the institution the athlete attends, considering that institutions vary in population, athletic support, and engagement. To no surprise, schools that have a strong athletic

following can draw attention to their athletes through social media, impacting the value of their athletes. In many instances players have increased tremendously in value due to social media and their different NIL deals. Players use social media not only to present their talent, interests, and hobbies but also to present their NIL deals and the teams that they play for. Some potential challenges to NIL include tax implications, the concept of new rich culture, and transfer implications.

Social Media and NIL Impact on Student Athletes

There are many different forms of social media that student-athletes utilize but the primary platforms include TikTok, Instagram and Twitter. In this study we will be focusing on Instagram and how student-athletes can use it to expand their NIL value. In October of 2021 Instagram released a new feature called collaborative posts. The collaborative post feature allows for public Instagram accounts to tag another account on their post, whether public or private, as a collaborator. The collaborator can then either accept or reject the request for the collaborative post. If the collaborator accepts the request then the post will show up on their profile as well. This means that the followers of the original account and the followers of the collaborators account will be able to view, like, and comment on the post. Even though the collaborator accepted the request, the original account can remove the collaborator from the post at any point in time. This can be a very effective tool for student-athletes to use as it can increase their number of followers, views, likes and comments that their account has. Student-athletes can also collaborate with the Instagram accounts of their university athletic department or team in order to reach a larger audience. Similarly, universities can increase the NIL value of their student-athletes by creating collaborative posts with their student-athletes. Lastly, student-athletes can create collaborative posts with the Instagram accounts of the businesses that they have NIL deals with.

Kunkel's Formula

Kunkel (Kunkel et. al., 2021) used the formula, $(F \times CPM \times P)/1000$, to calculate the monetized potential of accounts. In this formula, F represents the number of followers an athlete has, CPM represents the monetary equivalent of the cost to reach 1000 people, and P designates the number of monetized posts. This study used Kunkel's monetary equivalent of the cost to reach 1000 people (CPM) to determine the value per post. Like Kunkel, this study estimates the cost-per-like at \$0.16 and the cost-per-comment at \$0.55. Using these estimates, this study was able to determine the value of the posts of the studied athletes. Considering these values, this study was able to compare the influence that each of the Big Ten institutions had on increasing the NIL values of their student-athletes.

METHODOLOGY

The purpose of this study is to examine how social media, specifically Instagram's creation of collaborating posts, affects the value of a student athlete. In order to evaluate the impact that the new feature had on an athlete's value, the social media of athletes, teams, and athletic departments of the Big Ten conference were analyzed and monitored. This study analyzed and collected the instagram posts of Big Ten conference football team accounts as well as individual player's accounts within the conference. From here, the athlete's posts were then sorted into two different categories: collaborative posts and common posts. The collaborative posts are the ones in which the accounts associated with the post, both the team and the athlete, are deemed co-authors using Instagram's Collab Feature. On the other hand, the common posts are posts that are strictly posted by the athlete, which does not give access or co-authorization to the program's account. The common posts are viewed as your regular, or traditional instagram post.

This study then collected the amount of likes and comments of the athlete's collab post with the program and closest date-related common post. The data gathered in the study included the athlete's name, Instagram account username, the date of a collab post with the program, the day it was posted, number of likes, and number of comments. Then, the average number of followers of all of the player accounts was taken. Lastly, the study took the average number of likes and comments from the collaborative posts and compared them to the average number of likes and comments from a common post of the athlete which was closest to the date of the collaborative post. The study used kunkle's formula as a guideline to help formulate the value of an athlete when collaborating with their athletic program on social media compared to posting as the sole creator. Based on the results, the study allowed us to determine which Big Ten programs most successfully used Instagram and its Collab Feature to increase the social media value of their athletes.

RESULTS

Table 1
Instagram Followings for Big Ten Football Programs

Football Program	Number of Followers on October 11, 2022	Football Program	Number of Followers on October 11, 2022
University of Illinois	62,064	University of Nebraska	219,645
Indiana University	75,406	Northwestern University	37,589
University of Iowa	179,144	Ohio State University	1,039,142
University of Maryland	82,842	Pennsylvania State University	423,073
University of Michigan	467,254	Purdue University	88,000
Michigan State University	272,893	Rutgers University	72,006
University of Minnesota	113,951	University of Wisconsin	256,023

Looking at the Instagram accounts of the Big Ten football teams our study found that the team with the most followers was Ohio State University football with 1,039,142 followers and the team with the least followers was Northwestern University football with just 37,589 followers. The average number of followers of Big Ten football team accounts was 242,074 followers.

Table 2
Instagram Followings for Big Ten Athletic Departments

Athletic Department	Number of Followers on October 11, 2022	Athletic Department	Number of Followers on October 11, 2022
University of Illinois	49,103	University of Nebraska	169,170
Indiana University	59,188	Northwestern University	20,569
University of Iowa	106,279	Ohio State University	412,104
University of Maryland	91,763	Pennsylvania State University	62,039
University of Michigan	263,731	Purdue University	59,175
Michigan State University	19,934	Rutgers University	28,243
University of Minnesota	89,208	University of Wisconsin	299,933

When evaluating the accounts of the Big Ten athletic departments, the study found that Ohio State University Athletics had the largest following with 412,104 followers, and that Michigan State University Athletics had the least number of followers with 19,934, well below the Big Ten athletic department average of 123,603 followers.

Table 3
Instagram Collab Posts for Big Ten Football Programs

Football Program	Number of Collab Posts from on September 1, 2022 - October 14, 2022	Football Program	Number of Collab Posts from on September 1, 2022 - October 14, 2022
University of Illinois	16	University of Nebraska	5
Indiana University	6	Northwestern University	5
University of Iowa	0	Ohio State University	29
University of Maryland	24	Pennsylvania State University	70
University of Michigan	28	Purdue University	1
Michigan State University	25	Rutgers University	5
University of Minnesota	0	University of Wisconsin	1

The study determined that there were 215 posts in which Big Ten Football Programs used collaborated posts with a student-athlete between September 1, 2022 and October 14, 2022. The team which utilized Instagram's collaboration tool the most was Pennsylvania State University, posting 70 collab posts during the specified period. The teams with the least amount of collab posts between September 1, 2022 and October 14, 2022 were the University of Iowa and the University of Minnesota. These teams did not post any collab posts including their athletes during the specified period, whereas the average number of collab posts for a Big Team was 30.71.

Examining the 215 posts in which Big Ten Football Programs used collaborated posts with a student-athlete between September 1, 2022 and October 14, 2022, a post had an average of 13,319 followers. The post with the least amount of followers had just 755 followers and the post with the most followers had a whopping 80,865.

Table 4
Fan Engagement Results

	Likes			Comments		
	Min	Mean	Max	Min	Mean	Max
Collab Posts	619	8,086	118,619	2	49.62	257
Common Posts	4	2,906	23,402	4	66.77	266

To determine the valuation of posts, the total number of likes and comments on a post were used as fan engagement measures. From the 208 collab posts, with likes visible to the public, the study found that the average number of likes was 8,086 including a minimum of 619 likes and a maximum of 118,619 likes. In comparison, the average number of likes that the 209 common posts, with likes visible, studied was just 2,906. The minimum number of likes a common post had was 4 and the maximum was 23,402. There were 213 collab posts observed including comment sections. These posts averaged 49.62 comments per post, with a minimum and maximum of 2 and 257 comments respectively. This compares with the 209 common posts, with comment sections, that averaged 66.77 comments per post, including a minimum of 4 comments and a maximum of 266 comments.

Table 5
Post Valuation Results

Type of Post	Min	Mean	Max
Collab Posts	\$143.19	\$1,473.56	\$19,108.84
Common Posts	\$48.74	\$507.49	\$3,866.42

Of the 215 collab posts used by Big Ten Football Programs, the study determined 166 instances in which the collab post of an athlete could be compared to a common post of the same athlete. The study estimated the cost-per-like at \$0.16 and the cost-per-comment at \$0.55. Using these estimates, this study was able to determine the value of the posts of the studied athletes. Of these collab posts the mean valuation was \$1,473.56, the minimum valuation was \$143.19 and the max valuation was \$19,108.84. Whereas the comparable common posts had a mean valuation of a lowly \$507.49, with a minimum valuation of \$48.74 and a maximum valuation of \$3,866.42. By examining and comparing the 166 instances, the study concluded that collab post valuations were higher in 152 pairings (91.57%). Similarly, the study determined that the collab post had more likes in 154 pairings (92.77%). Despite this, collab posts had more comments in only 53 pairings (31.93%). Ultimately, research determined that there was a large disparity in the use of collaborative posts between football programs at different universities (Pennsylvania State University 70 instances; University of Iowa, University of Minnesota, Rutgers University, Northwestern University, Purdue University, University of Wisconsin, & University of Nebraska all had 5 or less instances).

Analysis

With the implementation of NIL into college athletics we have seen a large emphasis placed upon a players social media when it comes to obtaining NIL deals. Social media has become an essential marketing tool for companies in today's society and one of the best ways for someone to market on social media is through influencers, celebrities and athletes. In order for a collegiate athlete to become more desirable they must increase their following on social media. Collaborative posts are a great way for college athletes and universities to increase their following and potentially obtain larger NIL deals.

After gathering the data on each of the Big Ten football team instagram accounts we identified that there were some outliers such as Ohio State University that had 1,039,142 followers while some other accounts such as Northwestern University had 37,589 followers. Although, the average of all the team instagram accounts was 242,074 followers. When comparing the valuation of collaborative posts versus common posts, we found that collaborative posts would allow a collegiate athlete to obtain, on average, nearly three times the amount of money per post than if their school did not utilize collaborative posts. As a result, college athletes should now consider whether or not their schools social media accounts utilize collaborative posts as it can have a large impact on what kind of NIL deals they can receive.

Similarly, the instagram account of Ohio State University's athletic department was an outlier with 412,104 followers while Northwestern University's athletic department only had 20,569 followers. The average followers for the athletic departments instagram accounts was 123,603 which is significantly less than the team accounts. When comparing the number of followers of the team versus athletic department accounts we can identify that the team accounts reach a larger following. The fact that team accounts have more of a following is beneficial to student-athletes because the team accounts repost collaborative posts while athletic department accounts do not.

When looking at the data we can identify that certain schools consistently post collaborative posts with their student-athletes while other schools rarely post or do not post collaborative posts with their student-athletes at all. Pennsylvania State University, Ohio State University, the University of Maryland, the University of Michigan, and Michigan State University all have 24 or more collaborative posts. Indiana University, the University of Nebraska, Northwestern University, Purdue University, Rutgers University, and the University of Wisconsin all have less than 6 collaborative posts. The University of Iowa and the University of Minnesota have 0 collaborative posts. The data shows how team accounts either post collaborative posts consistently or very rarely.

CONCLUSION

For collegiate student athletes looking to capitalize on the passing of the NCAA's name, image and likeness policy, this study provides how the establishment of Instagram's collaborative posts can be utilized. Despite a proven increase in the number of likes on the posts of student athletes, this feature has only been used by a small portion of collegiate athletes contributing to the small sample size of Big Ten football players. This limitation could be due to the recent establishment of the collaborative posts, only being released in October of 2021, thus only having a little over a year of existence. Since this feature is new, student athletes may be skeptical of what comes as a result and may be waiting to see how other athletes utilize it. Another limitation regarding the sample size could be due to the publicity of the Instagram collaborative posts. In order to participate in the Instagram collaborative posts, student athletes need to have a personal account that is "public", or accessible to all Instagram users. Some collegiate athletes are not comfortable having an account that can be seen by all users, making collaborative posts not applicable to them. Furthermore, Instagram's collaborative posts obviously require two co-authors, thus in order for student athletes to utilize collaborative posts, they must be featured by another account, or their football program in this study. This serves as a limitation, as some schools may not utilize the feature, such as the University of Minnesota and the University of Iowa or may only feature a small number of athletes, commonly consisting of only team captains, award-winners, and top playmakers.

Regardless of the limitations of Instagram's collaborative post feature, the results of this study indicate that the feature serves as a way for student athlete's posts to be seen by more Instagram users than traditional "common" posts. For student athletes looking to capitalize on NIL deals, engagement measures such as likes and comments are crucial, serving as a determining factor that organizations look at in order to put a value on athletes. With the results of an increase in likes, going from 2,906 likes on common posts to an average of 8,086 likes on collaborative posts, and a decrease in comments from an average of 66.77 comments to 49.62 comments respectively, it is clear that the use of collaborative posts between a college program and a student athlete increases the athlete's personal value and brand. What this means for student athletes in the future, is the opportunity to leverage NIL deals based on a constantly increasing social media following and strategic decision making when committing to institutions that can increase a student athlete's value, such as through collaborative social media posts.

Since collaborative posts are still new to social media, it is important to examine how they will be utilized by student athletes and sport programs in the future. This study focused primarily on Big Ten conference football programs, leaving a lot of questions. Moving forward, it is important to analyze whether a similar effect is displayed when other sports, athletic programs, and conferences are studied. In the future, a measure of real time follower gain for athletes can be viewed after being featured in collaborative posts, as well as the measure changes for athletic department and specific program accounts, giving a precise amount of change. With further developments in research, changes in valuation methods can also be implemented and analyzed to determine if collaborative posts truly provide student athletes with the increased social media exposure as seen in this study. Until then, a lot of questions remain unanswered and student athletes are left coming up with ways to increase their personal brands and value via social media practices.

REFERENCES

- Babel, M., McGuire G, King J (2014) Towards a more nuanced view of vocal attractiveness. PLoS ONE 9(2): e88616. <https://doi.org/10.1371/journal.pone.0088616>.
- Belch, G. E., & Belch, M. A. (2007). *Advertising and promotion: An integrated marketing communications perspective* (7th ed.). New York: McGraw Hill.
- Campbell, M. & Warren, C. (2012) A risk of meaning transfer: Are negative associations more likely to transfer than positive associations?, *Social Influence*, 7(3), 172-192, DOI: 10.1080/15534510.2012.663740.
- Haneman, Victoria J. and Weber, David P. (2022) The Abandonment of International College Athletes by NIL Policy. North Carolina Law Review.
- Harmon, R.R. and Kenneth, A.C. (1982). The persuasive effects of source credibility in buy and lease Situations. *Journal of Marketing Research*, 19(2), 255–260.
- Hovland, C. I., and Weiss, W. (1951). The influence of source credibility on communication effectiveness. *Public Opinion Quarterly*, 15, 635-650.
- Jardim, R. M. S. (2021). *The influence of brand ambassador on brand image in Social Media-FredericoMoraes and Billabong Brand* (Doctoral dissertation).
- Jon Solomon. (2015, June 2). Timeline: Ed O'Bannon vs. NCAA. CBSSports.com. Retrieved December 1, 2021, from <https://www.cbssports.com/college-basketball/news/timeline-ed-obannon-vs-ncaa/>.
- Koernig, S. K., & Boyd, T. C. (2009). To catch a tiger or let him go: The match-up effect and athlete endorsers for sport and non-sport brands. *Sport Marketing Quarterly*, 18(1), 15-37.
- Kunkel, T., Baker, B. J., Baker III, T. A., & Doyle, J. P. (2021). There is no nil in NIL: examining the social media value of student-athletes' names, images, and likeness. *Sport Management Review*, 24(5), 839–861. <https://doi.org/10.1080/14413523.2021.1880154>.
- McLeod, S. A. (2008). Social identity theory. Retrieved from www.simplypsychology.org/social-identity-theory.html
- NCAA name, image and likeness. NCAA.org - the official site of the NCAA. (2021.). Retrieved November 15, 2021, from <https://www.ncaa.org/questions-and-answers-name-image-and-likeness>.
- Sternthal, B., Dholakia, R. and Leavitt, C. (1978). The persuasive effect of source credibility: Tests of cognitive Response. *Journal of Consumer Research*, 4(4), 252–260.
- Parmar, Y., Ghuman, M. K., & Mann, B. J. S. (2020). The match-up between celebrity associations and product type. *Journal of Creative Communications*, 15(1), 65–89.
- Tajfel, H. and Turner, J.C. (1986) *The social identity theory of intergroup behavior*. In: Worchel, S. and Austin, W.G., Eds., *Psychology of intergroup relation*, Hall Publishers, Chicago, 7-24.
- Wang, F., & Hariandja, E. S. (2016, March). The influence of brand ambassador on brand image and consumer purchasing decision: A case of tous les jours in Indonesia. In *International Conference on Entrepreneurship (IConEnt-2016)*.

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AGILE SALESFORCE FOR A POST-PANDEMIC WORLD

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ABSTRACT

Drastic changes in the workforce and economy throughout the pandemic have forced marketers to find new tactics to be successful. The objective of this paper is to emphasize the various facets of agile salesforce for business-to-business marketing. The focus here is to explore the types of changes that can affect salesforce. Furthermore, marketing agility in relation to salesforce agility and how it empowers workforce has been discussed. Marketing agility refers to the necessary changes a workforce makes to conform to its new environment. This summary focuses on a strong foundation of the business so they can pivot as necessary. It is about putting the customer first and responding to change agilely. Business to business marketing is all about building long-term relationship. The authors focus on the internal relations that a business needs to adopt to be a successful agile workforce. They focus on the top down, where C-Suite leadership needs to provide the proper leadership and resources for their employees. The authors highlight these various sales outcomes behavior in respect to sales agility.

KEY CONTRIBUTIONS TO ACADEME AND PRACTITIONERS

This paper is a response to the need for an analysis of the current state of the salesforce in business-to-business marketing and the trajectory of future years. Related academics have provided us with the foundation to explore additional tactics. This research is a synopsis of those foundational issues along with recommended next steps for a successful business. It should be used as a piece of reference when referring to a time where the sales market was precarious. Marketing agility has withstood the test of time and this paper capitalizes on that. It is an all-inclusive piece that encapsulates the need for humans in the industry. Many processes have become automated throughout the years. This paper emphasizes employee empowerment and intuitiveness within the sales industry. Business to business marketing has many automated aspects, but this research reiterates the psychology imperative to sales objectives. This will hopefully contribute to additional job opportunities in the future when businesses are weighing their automation options. They will hopefully be encouraged to invest in their employees through training and professional development. These findings can also contribute to business analytics in how companies reacted to current events. This research found that customer perception is also essential in business-to-business marketing. Companies do not want to partner with a business that has a poor reputation. Our findings will contribute to the notion that companies need to be consistent in their branding but tailor their messaging appropriately. “Pivoting” is a common theme because marketing is an ever-changing industry. This research will provide companies with the understanding that responsiveness comes at the discretion of the business. It is reaffirmed that salespeople need to be well-informed of their industry and do the proper research for their clients. We hope this paper will be a key contribution to this historical data.

Manuscript

For as long as humans have been around, the need to move quickly and easily made our society so convenient. Whether it has been communication, transportation, or simply cooking a meal, we strive to find ways to make ourselves create a better lifestyle for the generations who follow. As industry formed and businesses were created, becoming traditional was a thing of the past. We have come a long way and now it is time to diversify ourselves and become agile, especially when it comes to sales. We took the characteristics of how we act in human nature to the salesforce; trying to find ways to help people live a more convenient life with the products and services that salespeople provide. We have gotten rid of the ‘bread and butter’ way of doing things as we shift toward this agile way of sales.

One may ask, “What attributes does a salesperson truly possess?” Some perceive this type of profession as an annoyance as others understand their hustle to make a living. Salespeople find the most value in a particular product or service as they try to sell them to the average consumer. A good salesperson was, well, a good salesperson—someone who just knew how to sell. Today, selling ‘know-how’ is still useful, but because of the knowledge explosion, salespeople must wrestle with knowledge value growth versus knowledge value decay (Chonko & Jones, 2005, p. 375). The innovation of a salesperson has changed so much in the recent years as people realized knowledge is power.

Those who sell must understand the past, present and future of what they are selling so that the consumer is on the same page before purchasing what they are willing to buy. The need to be agile nowadays has formed due to different stages of change. These stages include accidental, repeatable, defined, managed, and mastered.

The reason that agility was formed was because of those changes mentioned. Developing a quick and easy way to adapt to these changes was established. First, accidental change is the lack of any change process knowledge, even though change manages to occur (Chonko & Jones, 2005, p. 375). This will happen unexpectedly, as it is important that salespeople adapt to these types of changes quickly. For example, COVID-19 was an accidental change. Processes and ways to fit people's needs changed unexpectedly, but salespeople were able to adapt so they can abide by this change. Next is repeatable change, or change based on conceptual knowledge that is anecdotal (Chonko & Jones, 2005, p. 375). This is change that we do expect and have learned to react to in different ways. Over time, it is important to understand word tracking and rejection, to make the next best decision. Having a lot of experience and understanding the psychological aspect of people's decision making will create a skilled salesperson. Next is defined change. Like repeatable change, defined change involves recognizing formal change processes with documented procedures (Chonko & Jones, 2005, p. 375). This type of change is based on memorization, studying and analysis. You see it with cold calls as salesmen over the phone were known to have a script with different rebuttals used. The next form is managed change, characterized by the identification of change experts with responsibilities to facilitate change with customers (Chonko & Jones, 2005, p. 375). When it comes to being agile, this is the most common form of change mentioned. Having evolving knowledge of the process fundamentals and appreciation for the value provided by others is evident. Lastly, mastered change is characterized by a principle-based appreciation of adaptability (Chonko & Jones, 2005, p. 375). Creation and adaptation to business models occur, and this becomes a part of how a salesperson operates in their professional careers. All these forms of change are what drives the agile lifestyle of how sales have been occurring and enables most who follow these changes become successful.

To be more specific, marketing agility is a key dimension of marketing excellence and conceptualize it as a firm's strategic means for executing growth activities by the marketing organization and its members through simplified structures and processes, fast decision making, and trial and error learning (Kalaigam, Tuli, Kushwaha, Lee, & Gal, p. 36). Salespeople must sell themselves with key aspects for how marketing takes place within a business operation. In other words, marketing agility complements the existing views by offering a more process-based perspective (Kalaigam, Tuli, Kushwaha, Lee, & Gal, p. 36). Some leadership factors that come from marketing agility within a business include CMO attributes and characteristics, CMO structural and expert power, and CMO interface. A CMO must be adaptive, have modern ideas, and must be on top of things to list a few. Having a structure within the marketing plan and exerting their power in the proper ways will help the Chief Marketing Officer maintain that high level of marketing agility. With leadership, comes employee responsibilities. These include understanding personality traits, coping mechanisms, and training requirements. Leaders must understand these to help mentor their employees in the agile structure of the marketing plan provided. This provides an environment of teamwork that strives for diversity, empowerment, incentives, identity, and social cohesion. Then comes organization aspects that include marketing technology advancements, structure, capabilities, budgeting, and culture. The leaders, employees, teamwork, and organization factors are the foundation for how marketing agility will come to form within a business. Business decisions and marketing decisions come in to play for how a business must adapt and approach our changing society. Having this foundation will create speed and effectiveness for the marketing sector of a successful operation.

As mentioned prior, there are five different types of changes that happen in an agile business. There are a few real-life examples that better represent all the information given to us. First and foremost, COVID-19 was the unexpected change that no one saw coming. Not only were changes needed to be made, but they also needed to be made quickly. What used to be normal will never be seen again as we had to adapt to the new society, we are a part of. Businesses who managed to stay open had to adapt to make a profit, while keeping their employees and customers safe from the virus. Salespeople took this challenge inevitably and had to change their process of selling. They find ways to fit the needs that consumers face and create a safe atmosphere to still generate business. Currently, we are still in this battle with COVID-19 and the changes that we made with our business processes today will be forever altered. Another change that happens often is the rapid technology production. A business must be quick to adapt to the new technology that is created as their competitors are on the heels of those in the lead. This type of repetitive change is needed to appeal to consumer's wants and needs as they will continue to try and generate as much revenue as possible. Overall, reacting to these changes in the right ways will help better serve customers for the future.

Salespeople are also an imperative factor in the marketing agility process. They must always keep the customer top of mind when they are navigating their personal selling strategies. Research has shown a significant tie between the customer's perception of the salesperson and success of the transaction (Franke, p. 694). People now have the intuitiveness and resources to see through a salesperson's inability to be honest and transparent. It is a relationship-building field where getting the prospect's attention is the first step of many. A salesperson's appearance, articulation, and enthusiasm resonate with the prospect long after the initial meeting (Jones, Chonko, Jones, & Stevens, p. 60). These are only a few major descriptors that set the tone for a sales presentation. There are also minor descriptors in sales interactions like body language and communication styles that can make an impact on the sales trajectory (Franke & Park, p. 694). The sales process may not always have a direct selling method. Potential customers are put on a "journey" through their interaction with a brand (Kalaigam, 84). Marketing and sales managers must be deliberate in what they put in front of their prospects.

Marketing agility is defined as "the extent to which an entity rapidly iterates between making sense of the market and executing marketing decisions to adapt to the market" (Kalaigam, Tuli, Kushwaha, Lee, & Gal, p. 36). It is the overarching concept that change is the only constant. There is always going to be a new technology, an increase in price, or a change to the economy. Because of this, marketers must prioritize the agility in their selling strategies. They will see growth in their sales if they agree to rapid decision making and research (Kalaigam, Tuli, Kushwaha, Lee, & Gal, p. 36). Kalaigam et al. categorizes marketing agility into four pillars of sensemaking, iteration, speed, and marketing decisions. Sensemaking means understanding and making an organized consensus on an ambiguous development. This strategy has been executed often in recent years. Kalaigam gives the example of Uber dropping surge prices during a taxi strike (Kalaigam, Tuli, Kushwaha, Lee, & Gal, p. 36). Another instance of sensemaking was when Lyft offered free rides to abortion clinics following the new Texas abortion law. The rapid response by these companies is what gives their customers a perceived value (whether good or bad). The second pillar, iteration, gives an entity the power of evolving initiatives. These are firm objectives that can be refined and adjusted as needed. Pivoting is the key word in this realm (Kalaigam, Tuli, Kushwaha, Lee, & Gal, p. 39). The final and key pillar to the marketing agility complex is speed. Like its counterparts, speed is the time it takes to decide. Listening can sometimes be more pivotal than responsiveness. A rash marketing decision can lead to a series of poor decisions and refutes. As a marketer, it is best to work towards a balance of proactivity and reactivity (Kalaigam, Tuli, Kushwaha, Lee, & Gal, p. 39).

In the theme of adaptability and resilience, we move on to the concept of adaptive selling and sales performance. Adaptive selling behavior was heavily studied by Weitz in the 1980s. He found that this phenomenon altered salespeople's behaviors based on the selling atmosphere and situation (Giacobbe, Jackson, Crosby & Bridges, p. 115). This theory also focuses on the balance of the sales performance and the time dedicated to the prospect. In theory, the salesperson's investment in a tailored sales presentation should result in a successful transaction. Porter, Wiener, and Frankwick then studied this model more thoroughly, eventually calling it the Weitz Contingency Model. Their studies emphasize the necessity of personal selling. The two contingencies associated with Weitz's model are the salesperson's capabilities, the selling environment, and strategic modifications (Giacobbe, Jackson, Crosby & Bridges, p. 115). The group of researchers found that these contingencies rely heavily on the salesperson's emotional quotient. This person needs the skills to adjust their behavior per the selling situation.

Marks, Vorhies, and Baovick found that adaptive selling is indirectly influenced by the salesperson's intentions and motivations (Giacobbe, Jackson, Crosby & Bridges, p. 121). If the seller has the motivation to adapt, they are intrinsically practicing adaptive selling. There are several abilities Spiro and Wietz defined that relate to this behavior. The empathic ability or reaction to other's experiences is one trait directly related to adaptive selling behavior. This specific skill gives salespeople the ability to react organically to their client's emotional state. Spiro and Weitz relate this trait to skilled sellers because they gain "unique insights" through their empathy. These insights help to pave the way to the client's needs (Giacobbe, Jackson, Crosby & Bridges, p. 121). Weitz also found that self-presentation adaptability was imperative in a seller. This kind of seller can modify their timing and judgment in relation to the client's objectives (Giacobbe, Jackson, Crosby & Bridges, p. 121). Another influential selling ability relates to the seller's cue perception. These individuals have the ability to sense nonverbals and react accordingly (Giacobbe, Jackson, Crosby & Bridges et al. p. 122). Sellers with this trait have a better sense of the buyer's thoughts and next steps. Finally, experience was also found to be a pivotal factor in adaptable selling. An experienced salesperson uses prior encounters and successes to adjust to a current selling situation. Weitz, Sujan, and Sujan found that efficiency

increases with this trait because the seller intuitively knows which strategy to pursue. From this, sellers also increase confidence and emanate an assurance that will ultimately improve sales performance (Giacobbe, Jackson, Crosby & Bridges, p. 122).

Seller's traits are only a small piece to the puzzle of adaptive selling behavior and marketing agility. These performance abilities ultimately lead to an effective marketplace. So, how does the product-market perform when it has a team of agile marketers? Research has found a direct correlation between marketing agility and customer satisfaction (Kalaigam, Tuli, Kushwaha, Lee, & Gal, p. 53). As noted in the preceding section, adaptable marketers have intuitive knowledge of their customers, which may lead to a successful marketing campaign. These marketers will have a better sense of their customer's needs. This is also all reliant on the internal factors of the employees. Brands who pivot too often may dilute their meaning resulting in disconnected employees and customers (Kalaigam, Tuli, Kushwaha, Lee, & Gal, p. 53). Companies tend to forget that they also need to engage in adaptive selling behaviors. Just as a salesperson would do, companies need to tailor their brand and messaging to the targeted "customer's language" (Roman & Iacobucci, p. 371). With this, Roman's research hypothesizes that adaptive selling behavior is positively correlated with customer satisfaction. It's also important to note that publicly traded firms disclose their marketing agility models to attribute their successes (Roman & Iacobucci, p. 371).

Roman and Iacobucci introduce an additional theory related to a salesperson's inherent confidence and sales approach. They make the hypothesis that a salesperson's capabilities are a reaction to the customer's response and behavior. In this case, adaptive selling confidence is their ability to engage in this behavior. They go on to hypothesize that the situation may supersede a salesperson's confidence in their strategy (Roman & Iacobucci, p. 366). Additional selling challenges may be observed in long-term industries. Substantial timelines for product innovation may become an issue unless the entire supply chain has come to a consensus (Kalaigam, Tuli, Kushwaha, Lee, & Gal, p. 41). This is a factor that firms should consider when they are partnering with an external agency. Kalaigam refers to this realm as the "marketing ecosystem" (Kalaigam, Tuli, Kushwaha, Lee, & Gal, p. 41). There are many considerations when entering a partnership and marketing agility should have a natural place to live. Kalaigam goes on to say that supply chains make for a sustainable market, but agility could be lacking when sales need to pivot (Kalaigam, Tuli, Kushwaha, Lee, & Gal, p. 41). There is also the ongoing risk that companies adopt marketing agility as a one-stop-shop to relevancy. They coin several trendy terms to stay relevant instead of diving deep into organizational development (Kalaigam, Tuli, Kushwaha, Lee, & Gal, p. 41). These types of organizations create the illusion that they are integrating an agile workforce, but instead they use a quick fix to a long-term issue.

Agility selling also requires an agile workforce. With this, companies need to find a sustainable workforce through what Jong and Ruyter refer to as "self-managing teams" (Jong & Ruyter, p. 457). Their study found that customer-centric, proactive, behavior leads to 55% of positive customer experiences (Jong & Ruyter, p. 457). What drives this proactive behavior in a workforce? There are many factors, but empowerment plays a key role in employee's motivation. Employees want to feel like they are making a difference in the organization. They also want the flexibility to make intuitive decisions based on their experience with the customer (Jong & Ruyter, p. 457). Some of the most successful companies in the service industry empower their employees from the ground up. Specific hotels will give their front desk employees the ability to provide free rooms and incentives to guests. This ultimately leads to a positive experience between the desk attendant and customer. What we have learned from this, is the key to an agile salesforce stem from strategy. Research and academic journals will never have the experiential wisdom as the field salespeople. Companies need to engage in "sales enablement" so individuals in the field have the proper tools to be successful (Rangarajan, Dugan, Rouziou, & Kunkle, p. 214).

REFERENCES

- Chonko, L. B., & Jones, E. (2005). The need for speed: Agility selling. *Journal of Personal Selling & Sales Management*, 25(4), 371-382.
- Franke, G. R., & Park, J. E. (2006). Salesperson adaptive selling behavior and customer orientation: a meta-analysis. *Journal of marketing Research*, 43(4), 693-702.
- Giacobbe, R. W., Jackson Jr, D. W., Crosby, L. A., & Bridges, C. M. (2006). A contingency approach to adaptive selling behavior and sales performance: Selling situations and salesperson characteristics. *Journal of personal selling & sales management*, 26(2), 115-142.
- Jong, A. D., & De Ruyter, K. (2004). Adaptive versus proactive behavior in service recovery: the role of self-managing teams. *Decision Sciences*, 35(3), 457-491.
- Kalaighnam, K., Tuli, K. R., Kushwaha, T., Lee, L., & Gal, D. (2021). Marketing agility: the concept, antecedents, and a research agenda. *Journal of Marketing*, 85(1), 35-58.
- Rangarajan, D., Dugan, R., Rouziou, M., & Kunkle, M. (2020). People, process, and performance: Setting an agenda for sales enablement research. *Journal of Personal Selling & Sales Management*, 40(3), 213-220.
- Román, S., & Iacobucci, D. (2010). Antecedents and consequences of adaptive selling confidence and behavior: a dyadic analysis of salespeople and their customers. *Journal of the Academy of Marketing Science*, 38(3), 363-382.

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THE HIDDEN TAXES OF THE NAME, IMAGE, AND LIKENESS FOR STUDENT ATHLETES

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ABSTRACT

The National Collegiate Athletic Association (NCAA) and Pennsylvania Interscholastic Athletic Association (PIAA) have enabled collegiate and high school student athletes to monetize their Name, Image, and Likeness (NIL). This recently added initiative will play an important role in allowing student athletes to build and market their “brands” with national, regional and local companies. This paper examines the tax consequences that student athletes need to consider in monetizing their NIL brands.

INTRODUCTION

The National Collegiate Athletic Association (NCAA) has adopted a uniform interim policy that provides the ability for student athletes to monetize their name, image and likeness.³⁴ This National Collegiate Athletic Association initiative allows student athletes at the Division I, II and III levels to earn compensation on their Name, Image and Likeness.³⁵ This provides an entrepreneurial opportunity for the student athletes and businesses to establish business relationships. These relationships can be monetized for student athletes showcasing the business through social media advertisements, face to face endorsements or brand ambassadorship. Among the unintended consequences of this restructuring, student athletes who market and monetize need to “run their name, image and likeness business” but may not have the necessary business skills needed. As a consequence of the lack of business acumen, student athletes can incur some “hidden” tax consequences. These tax consequences can provide additional hardships on the student athletes if they do not set aside part of their earnings to offset their income tax liabilities.

Additionally, the Pennsylvania Interscholastic Athletic Association has recently granted a similar opportunity with similar initiatives for high school athletes.³⁶ This allows high school student athletes the opportunity to monetize their name, image, and likeness.

The interim NCAA policy provides several guidelines in a few areas for student athletes. The first guideline allows the student athlete to engage in these NIL business activities but the student athlete would need to follow the laws of the state in which the student attends school. They must report the NIL activities back to the school or conference and the student athlete can use a professional service provider for these activities.³⁷ Additional guidance detailing the NIL agreement states that it must be based on a case-by-case analysis of the value that each student athlete brings to the business. This helps to eliminate non-service-related incentives provided to a student athlete just for choosing to enroll in one particular school versus another.³⁸ It also helps businesses to structure agreements with student athletes and remain in compliance with the guidelines.

GENERAL OVERALL OF TAX CONSEQUENCES OF NIL FOR STUDENT ATHLETES

Since student athletes are generally young in age with limited business experience, they need to consider the tax consequences of their NIL agreement and business relationships. Student Athletes who have “earned income” need to consider how to account for income taxes, prepare their tax filings and make certain they have the proper cashflow to pay the federal, state and local taxes. The areas that student athletes need to consider with these tax consequences include the taxation of payments from an individual or business for the use of their NIL, the self-employment taxes associated with this form of compensation and making quarterly tax payments.

Generally, a business relationship between the student athlete and business entails a payment for service. Since the student athlete would not be considered an employee of the business, the business would provide the compensation to the student athlete for services rendered. The student athlete can market their NIL to multiple businesses and be

³⁴*Taking Action*. NCAA.org. (n.d.). Retrieved October 2, 2022, from <https://www.ncaa.org/sports/2021/2/8/about-taking-action.aspx>

³⁵*Ibid*

³⁶*Pennsylvania Interscholastic Athletic Association, Inc.* PIAA. (n.d.). Retrieved September 2, 2022, from <http://www.piaa.org/news/default.aspx?starts=7%2F1%2F2022&ends=7%2F31%2F2022>

³⁷NCAA.org. (2021, December 28). *NCAA adopts interim name, image and likeness policy*. NCAA.org. Retrieved September 2, 2022, from <https://www.ncaa.org/news/2021/6/30/ncaa-adopts-interim-name-image-and-likeness-policy.aspx>

³⁸*Ibid*

provided multiple streams of compensation. Services can consist of social media advertisement or postings, appearances or teaching lessons, use or lease of car, and providing merchandise, equipment or electronics. The business would be required to report to the IRS any compensation over \$600 annually.³⁹ The student athlete would report their income as an independent contractor rather than an employee. There are rules to consider with regard to the independent contractor vs. employee but it is relatively clear from IRS language that the student athlete would be treated as an independent contractor due to the ability to provide services to other companies.⁴⁰ This is a very common business structure as self-employed individuals are generally referred to as sole proprietors and make up 73% of all businesses, according to the IRS.⁴¹

The majority of the student athletes monetizing their NIL would choose the sole proprietorship as the entity of their choice. The sole proprietorship entity status is easy to establish, has ease of compliance and no cost. The only downside to this entity type is the sole proprietor has unlimited liability. Thus, any lawsuits or claims against the student-athlete enables a suitor to attack the personal assets of the sole proprietor. In order to protect their personal assets, sole proprietors, for an investment of under one thousand dollars, can file to become a Single Member LLC. This entity choice, single member LLC, will provide the student athlete limited liability for legal purposes, but the single member LLC is treated as a sole proprietorship for tax purposes. Thus, the compliance reporting for the sole proprietor and single member LLC is the same. Both, the sole proprietor and single member LLC, would complete their profit or loss from business on Form 1040, schedule C. Student-Athletes who engage in the NIL business, either as sole proprietors or single member LLCs, would report their income and expenses on Form 1040, Schedule C, Profit or Loss from Business. The Schedule C is part of the individual's federal and state income tax returns and provides for reduced compliance, especially compared to other business entity choices. The Form Schedule C is completed when the net earnings of the student-athlete (from self-employment) consists of net profit of \$400 or more. Although most student-athletes will utilize the NIL guidelines to profit from their NIL, the tax rules do change if the student-athlete does not intend to make profits. Although this may be limited in nature. A student-athlete who starts an NIL business for recreation or not-for-profit would be considered a hobby. The IRS rules on this review many different factors, but if the business is considered a hobby, any income from the hobby would be taxed as other income. This income would be included on Schedule 1 (Form 1040) and taxed at the highest tax rate of the student-athlete. Any losses from the hobby would not be deductible from other income.

Since the student-athletes are considered self-employed individuals, they are subject to pay two taxes: Income tax on their net profits as well as self-employment tax at the federal income tax level. They will also need to consider state and local income taxes in addition to any local business privilege taxes, depending on their specific location.

The federal income tax is based on the individual's federal taxable income. The student-athlete would report any gross income, such as net profits from their NIL business, interest, dividends and capitals gains or losses. The federal tax formula allows them to subtract any above the line deductions. Above Line deductions that a student-athlete would most likely have include one-half ($\frac{1}{2}$) of their self-employment tax and contributions to self-employed retirement accounts, such as SEP IRAs and SOLO 401(k)s. In the federal tax formula, gross income minus the above line deductions will result in adjusted gross income, or as it is commonly referred to as AGI, adjusted gross income.

In this individual tax formula, taxpayers can deduct the greater of the standard or itemized deductions from their adjusted gross income. The standard deduction is provided annually by the IRS and increases each tax year. Itemized deductions are comprised of another set of computations which include any medical expenses paid above 7.5% of the taxpayer's adjusted gross income; state, local and real estate tax paid (but capped annually at \$10,000); home mortgage interest (on mortgage loans under \$1M or \$750,000, depending on the loan origination date); and charitable contributions.⁴² The average student-athlete would most likely use the standard deduction in their federal individual income tax calculation. After deducting the greater of the standard or itemized deduction from adjusted gross income, the taxpayer has calculated their taxable income. Based upon their filing status of single, head of household or married,

³⁹*Reporting payments to independent contractors*. Internal Revenue Service. (n.d.). Retrieved October 2, 2022, from <https://www.irs.gov/businesses/small-businesses-self-employed/reporting-payments-to-independent-contractors>

⁴⁰*Topic no. 762 independent contractor vs. employee*. Internal Revenue Service. (n.d.). Retrieved September 22, 2022, from <http://www.irs.gov/taxtopics/tc762>

⁴¹*Sole proprietorships*. Internal Revenue Service. (n.d.). Retrieved October 2, 2022, from <https://www.irs.gov/businesses/small-businesses-self-employed/sole-proprietorships>

⁴²*2021 instructions for schedule A - irs tax forms*. (n.d.). Retrieved October 2, 2022, from <https://www.irs.gov/pub/irs-pdf/i1040sca.pdf>

filing joint or separate, the student-athlete will then calculate their federal income tax liability. They will then reduce their tax liability by any amounts paid to the IRS from withholdings, estimated tax payments and tax credits to determine if they owe any additional taxes or receive a refund. Since the US tax system is a progressive system, the federal tax rates increase as more income is earned. The maximum federal income tax rate is 37% for individuals.⁴³

Since the student-athlete is considered an independent contractor, they will pay an additional tax on their net profits, which is the self-employment tax. This additional tax is based on their net profits from their Schedule C income, as long as their net profits are more than \$400. The self-employment tax consists of Social Security and Medicare taxes primarily paid by sole proprietors or single member LLCs. The self-employment total tax rate is 15.3%. It consists of social security tax of 12.4% and Medicare tax of 2.9%. We are familiar with this tax through the employer-employee relationship that taxpayers pay, however, the employee pays one half (or 7.65%) of the social security and Medicare taxes and the employer pays the other one half (or 7.65%).

TAXATION OF NAME, IMAGE, AND LIKENESS COMPENSATION TO STUDENT ATHLETES

The Internal Revenue Code provides that all compensation is taxed under IRC Section 61.⁴⁴ Compensation includes commissions, fees, bonuses and any other type of income. Under most NIL agreements that a student athlete enters, the compensation will be treated as self-employment income. This type of income arises as the student athlete can provide their name, image and likeness to numerous businesses at the same time and collect compensation. They would not be under the employee – employer criteria that would classify the services as wages. Thus, the student athlete would be considered a self-employed individual or sole proprietor. The student athlete would be subject to filing the Form 1040, Schedule C. This form reports all of the NIL earnings as Income. This type of reporting would enable the student athlete to reduce their income by any allowable business expenses.⁴⁵ Allowable business expenses would be any necessary and ordinary business expenses that are derived from dealing within the business. For a business expense to be deductible, under Internal Revenue Code section 162⁴⁶, the IRS requires that the expense be considered ordinary and necessary. An ordinary expense is one that is common and accepted in a specific industry, while a necessary business expense is one that is helpful in business and appropriate for business. Certain expenses considered ordinary and necessary may still be disallowed if they are personal rather than for business.

Business expenses would vary depending on the type of relationship the student athlete has with the business. For example, a student athlete who provides social media advertisements will incur expenses, such as cell phone and internet expenses. While hosting appearances or running a session of athletic lessons for the business client, the student athlete may incur expenses such as mileage to travel to the event, or the purchase of cones and balls to provide athletic lessons. All of these expenses are fully deductible. Some other expenses that the student athlete may incur will be considered capital expenses. Capital expenses must be capitalized rather than deducted. Capital expenses include attorney fees for establishing the single member limited liability company (LLC) and asset purchases, such as a laptop, monitor, or cell phone. There are cost recovery methods that allow an annual deduction from the total income. This is often referred as depreciation or amortization. It is important to use approved methods when using these cost recovery methods, depending upon the capital asset. Examples of other business expenses could be professional service fees for accountants, attorneys, professional service providers, athletic sneakers and apparel to host events, just to name a few. The self-employment income would be treated as ordinary income and taxed at the highest tax rate.

Once the net profits are calculated for the student-athlete, the self-employment tax is calculated on these net profits. This additional tax needs to be calculated for self-employed individuals on their net profits from their Schedule C income, as long as their net profits are more than \$400. Sole proprietors need to remember to include in their tax calculations not only their tax on their net profits and other gross income, but also the self-employment tax that is assessed on their net profits, to the tune of 15.3%. The self-employment tax is calculated on Form 1040, Schedule SE. The IRS allows the taxpayer to calculate self-employment tax based on 92.35% of their Schedule C profits.

⁴³IRS, *Federal Income Tax Brackets by tax year*. efile.com. (n.d.). Retrieved October 1, 2022, from <https://www.efile.com/irs-income-tax-rates-and-brackets/>

⁴⁴Internal Revenue Code (1986), Section 162.

⁴⁵*Self-employment tax*. Internal Revenue Service. (n.d.). Retrieved October 2, 2022, from <https://www.irs.gov/individuals/international-taxpayers/self-employment-tax>

⁴⁶Internal Revenue Code (1986), Section 162.

There are a few nuisances that the student-athlete, as well as all sole proprietors and single member LLCs, need to consider with regard to the self-employment tax:

- a. The Social Security tax part of the self-employment tax is 12.4% of the total net profits.
 - a. This tax is capped on total income of \$147,000 (2022).
- b. The Medicare tax part of the self-employment tax is 2.65%.
 - a. The Medicare tax is calculated on the taxpayer's entire net profits, no cap.
- c. An additional Medicare tax of 0.9% is assessed on taxpayer's net profits if:
 - a. Filing status of student athlete is Single or Head of Household filers and have an income threshold over \$200,000;
 - b. Filing status of Married Filing Joint and have income threshold over \$250,000 (married filing separate is \$125,000).
- d. The student-athlete will receive an Above Line Deduction of ½ of their Self-Employment Income Tax which reduces their adjusted gross income. (The SE Tax is presented on Form 1040, Schedule 2).

One last item that the student-athlete needs to understand is paying quarterly estimated tax payments. Although most taxpayers are familiar with paying income taxes, they are not used to withholding and remitting their tax payments. Most taxpayers are used to earning a salary and having their employer withhold tax from their paychecks. The employer remits the withholdings to the US Treasury on behalf of the employees. Since the student-athlete is running their own business, they need to manage their cash so they can pay their taxes. Estimated tax payments need to be calculated and paid each quarter, based on the student-athlete's net profits. This is required as self-employed business owners do not have any income tax withholding. The IRS suggests sole proprietors calculate their net profits quarterly and pay an estimated tax payment.⁴⁷ If the NIL business is the student-athlete's only source of income, they need to include not only the tax on their overall income (refer to tax table below) but 15.3% of self-employment tax. The overall income tax is taxed at ordinary income tax rates which range from 10% up to 37%.

2021-2022 Tax Brackets and Federal Income Tax Rates⁴⁸

Tax Rate	Single filers	Married filing jointly or qualifying widow(er)	Married filing separately	Head of household
10%	\$0 to \$9,950	\$0 to \$19,900	\$0 to \$9,950	\$0 to \$14,200
12%	\$9,951 to \$40,525	\$19,901 to \$81,050	\$9,951 to \$40,525	\$14,201 to \$54,200
22%	\$40,526 to \$86,375	\$81,051 to \$172,750	\$40,526 to \$86,375	\$54,201 to \$86,350
24%	\$86,376 to \$164,925	\$172,751 to \$329,850	\$86,376 to \$164,925	\$86,351 to \$164,900
32%	\$164,926 to \$209,425	\$329,851 to \$418,850	\$164,926 to \$209,425	\$164,901 to \$209,400
35%	\$209,426 to \$523,600	\$418,851 to \$628,300	\$209,426 to \$314,150	\$209,401 to \$523,600
37%	\$523,601 or more	\$628,301 or more	\$314,151 or more	\$523,601 or more

Quarterly tax payments are due on April 15, June 15, September 15 and January 15. The IRS requires these quarterly payments and will assess penalties and interest if the taxpayer does not calculate or pay properly. The taxpayer can be assessed an underpayment penalty in addition to the taxes owed. A general rule with regard to not having this penalty assessed is for the taxpayer to pay 100% - 110% of the prior year tax, depending on the prior year's adjusted

⁴⁷ *Estimated taxes*. Internal Revenue Service. (n.d.). Retrieved October 2, 2022, from <https://www.irs.gov/businesses/small-businesses-self-employed/estimated-taxes>

⁴⁸ *IRS, Federal Income Tax Brackets by tax year*. efile.com. (n.d.). Retrieved September 2, 2022, from <https://www.efile.com/irs-income-tax-rates-and-brackets/>

gross income. This is referred to as the safe harbor requirement. The student-athlete should be aware of these tax rules to properly manage their cash flow. The cash flow should be monitored to pay the quarterly payments and limit any penalties or interest. These estimated tax payments can be paid quarterly with checks, electronic fund transfers and credit cards. The IRS will charge a fee if the student athlete pays with a credit card. The IRS does not accept cryptocurrency as a form of payment.⁴⁹

These income taxes and quarterly estimated payments need to be consistently monitored so the student athlete complies with the tax laws and does not endure any financial hardships from reckless spending and not paying their tax bill.

SURVEY TO IDENTIFY STUDENT ATHLETE KNOWLEDGE OF NIL

In order to validate the theory that most student athletes do not fully understand the business or tax impact of monetizing their Name, Image or Likeness, a survey was completed by 100 student athletes at the college and high school levels. This simple three question survey asked very remedial questions. The first question pertained to the student athletes' familiarity with the new changes from the NCAA and PIAA that enables them to monetize their NIL. The second question asked what business skills the student athlete needed most help with to understand monetizing their NIL, such as deal sourcing, social media marketing (Facebook, Tik-Tok, Instagram), taxes or other business items. The last question was purely a tax question to survey the student athletes' simple knowledge of a tax calculation on the liability that would be owed if they earned \$5,000 for marketing their NIL. A follow up to that question surveyed the participants to ascertain if the answer was a guess or if they were actually able to estimate the tax liability.

RESULTS FROM SURVEY

Q1: Are you aware of the new developments for student athletes to monetize their Name, Image, and Likeness?

68% of the student athletes were familiar with the new initiative, while 32% did not know that the NCAA had implemented a new initiative. Most of the student athletes who were not familiar with the NIL changes consisted of high school students.

Q2: In what areas would you need assistance if you were going to monetize your Name, Image, and Likeness. The student athlete was asked to choose three of the eight business items. The results are as follows:

Social Media Marketing - Facebook	29%	Deal Sourcing	17%
Social Media Marketing - TikTok	21%	Taxation	13%
Social Media Marketing - InstaGram	19%	Other Business (Legal)	1%

Q3: The student athlete was provided a simple tax question. You, as the student athlete, earn \$5,000 for marketing to a business. What is your approximate tax liability?

Four choices were provided to the student athlete answering the question: \$0; \$250; \$500; \$750.

The correct answer is \$750. The student athlete would be able to reduce their gross income by the IRS provided standard deduction of \$5,000, to have \$0 of taxable income. The student athlete would have to calculate the 15% self-employment tax. \$5,000 times the 15% self-employment tax rate would provide a \$750 tax liability for the student athlete.

From this question on the survey, only 4 student athletes provided the correct answer. These student athletes indicated they did not guess on the question and probably previously took a tax class in college. All of the high school students indicated that they guessed on this question.

In conclusion, based on the survey to college and high school student athletes, student athletes who enter an NIL agreement should educate themselves on the tax consequences of entering the business agreement.

⁴⁹Payments: Internal Revenue Service. Payments | Internal Revenue Service. (n.d.). Retrieved October 2, 2022, from <https://www.irs.gov/payments>

CASE STUDY OF TAX LIABILITY

Let's review the tax consequences for three different scenarios. From our calculations, a case study has been prepared to provide the projected federal tax liability for a student athlete at different levels of NIL earnings.

Alexa is a college student athlete who excels in basketball for the University. Alexa has thousands of followers on numerous social media platforms, including Tik-Tok and Instagram. She strikes an NIL agreement with a local company which consists of guest appearances and social media posts. In order to calculate the taxable income of the student athlete, a Schedule C would need to be completed for the NIL business. Since Alexa is completing the Schedule C, she is allowed to deduct any reasonable and necessary business-related expenses. Such expenses could consist of charges for use of the internet, phone, and mileage expenses. Below is the case study of the income tax and self-employment tax liabilities in three scenarios:

Scenario 1: Alexa has net profit on her Schedule C of \$5,000. She will be filing as single and taking advantage of the standard deduction.

Gross Income (Name, Image, and Likeness)	\$ 5,000.00
Less: Above the Line Adjustments	(\$ 0.00)
Adjusted Gross Income	\$ 5,000.00
Less: Standard Deduction Amount	(\$12,500.00)
Taxable Income	\$ 0.00
Tax Liability	\$ 0.00
Self-Employment Tax	\$ 707.00
Total Tax Liability	\$ 707.00
Percent of Tax compared to Gross Income	14%

Scenario 2: Alexa has net profit on her Schedule C of \$15,000. She will be filing as single and taking advantage of the standard deduction.

Gross Income (Name, Image, and Likeness)	\$15,000.00
Less: Above the Line Adjustments	(\$ 0.00)
Adjusted Gross Income	\$15,000.00
Less: Standard Deduction Amount	(\$12,500.00)
Taxable Income	\$ 1,112.00
Tax Liability	\$ 112.00
Self-Employment Tax	\$ 2,120.00
Total Tax Liability	\$ 2,231.00
Percent of Tax compared to Gross Income	15%

Scenario 3: Alexa has net profit on her Schedule C of \$100,000. She will be filing as single and taking advantage of the standard deduction.

Gross Income (Name, Image, and Likeness)	\$100,000.00
Less: Above the Line Adjustments	(\$ 0.00)
Adjusted Gross Income	\$100,000.00
Less: Standard Deduction Amount	(\$12,500.00)
Taxable Income	\$ 64,358.00
Tax Liability	\$ 9,900.00
Self-Employment Tax	\$ 14,129.00
Total Tax Liability	\$ 24,029.00
Percent of Tax compared to Gross Income	24%

These three scenarios can be very common among student-athletes who market their services. This is seen throughout the marketplace, from the college sophomore Heisman trophy winner, who appears on Nissan commercials, to the sixth man of high seeded St. Pete's University Men's NCAA basketball team appearing on a Buffalo Wild Wing's

commercial. The case in point is that these student-athletes who earn compensation from their NIL agreements need to manage their cash flow to pay their tax liability. From the above scenario 1, the tax liability is \$707 on earnings of \$5,000. The tax liability increases substantially when the student-athlete earns \$100,000. If the student athlete does not set aside a portion of their earnings to pay the tax liability, they can suffer substantial financial hardship when it's time to pay their tax liability. The above scenarios also only account for the federal income tax liability. State, local and local privilege taxes, which are sometimes forgotten, also need to be factored into the total overall tax liability.

CONCLUSION

The National Collegiate Athletic Association (NCAA) and Pennsylvania Interscholastic Athletic Association (PIAA) have enabled collegiate and high school student athletes to monetize their Name, Image, and Likeness (NIL). Student Athletes are building their “brands” and earning profits which most student athletes consider a Big W, or win. These new business owners, sole proprietors or single member LLCs, need to consider the many business and tax consequences from these new earning opportunities. Student-athletes need to consider ways to increase their business knowledge through more education as well as consider surrounding themselves with experts in this field, such as attorneys, accountants and other advisors. They also need to manage their cash to make certain they don't forget the hidden taxes of self-employment tax and state, local and local business privilege taxes.

REFERENCES

- Internal Revenue Service. (n.d.). Estimated taxes. Retrieved October 2, 2022, from <https://www.irs.gov/businesses/small-businesses-self-employed/estimated-taxes>
- Internal Revenue Code (1986), Section 61.
- Internal Revenue Code (1986), Section 162.
- Internal Revenue Service. (n.d.). Federal income tax brackets by tax year (2022). efile.com. (n.d.). Retrieved September 2, 2022, from <https://www.efile.com/irs-income-tax-rates-and-brackets/>
- Internal Revenue Service. (n.d.). Payments: Internal Revenue Service. Retrieved October 2, 2022, from <https://www.irs.gov/payments>
- Internal Revenue Service. (n.d.). Reporting payments to independent contractors. Retrieved October 2, 2022, from <https://www.irs.gov/businesses/small-businesses-self-employed/reporting-payments-to-independent-contractors>
- Internal Revenue Service. (n.d.). Self-employment tax. Retrieved October 2, 2022, from <https://www.irs.gov/individuals/international-taxpayers/self-employment-tax>
- Internal Revenue Service. (n.d.). Sole proprietorships. Retrieved October 2, 2022, from <https://www.irs.gov/businesses/small-businesses-self-employed/sole-proprietorships>
- Internal Revenue Service. (n.d.). Topic no. 762 independent contractor vs. employee. Retrieved September 22, 2022, from <http://www.irs.gov/taxtopics/tc762>
- Internal Revenue Service. (n.d.). 2021 Instructions for schedule A – IRS tax forms. (n.d.). Retrieved October 2, 2022, from <https://www.irs.gov/pub/irs-pdf/i1040sca.pdf>
- NCAA.org. (2021, December 28). NCAA adopts interim name, image, and likeness policy. *NCAA.org*. Retrieved September 2, 2022, from <https://www.ncaa.org/news/2021/6/30/ncaa-adopts-interim-name-image-and-likeness-policy.aspx>
- NCAA.org. (2021, December 28). *NCAA adopts interim name, image, and likeness policy*. *NCAA.org*. Retrieved October 2, 2022, from <https://www.ncaa.org/news/2021/6/30/ncaa-adopts-interim-name-image-and-likeness-policy.aspx>
- NCAA.org. (n.d.). Taking Action. Retrieved October 2, 2022, from <https://www.ncaa.org/sports/2021/2/8/about-taking-action.aspx>
- Pennsylvania Interscholastic Athletic Association, Inc. (n.d.). Retrieved September 2, 2022, from <http://www.piaa.org/news/default.aspx?starts=7%2F1%2F2022&ends=7%2F31%2F2022>

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THE ACQUISITION OF MONSANTO BY BAYER, THE IMPORTANCE OF CONTROLLING, CORPORATE GOVERNANCE, AND THE INFLUENCE OF LOBBYISM

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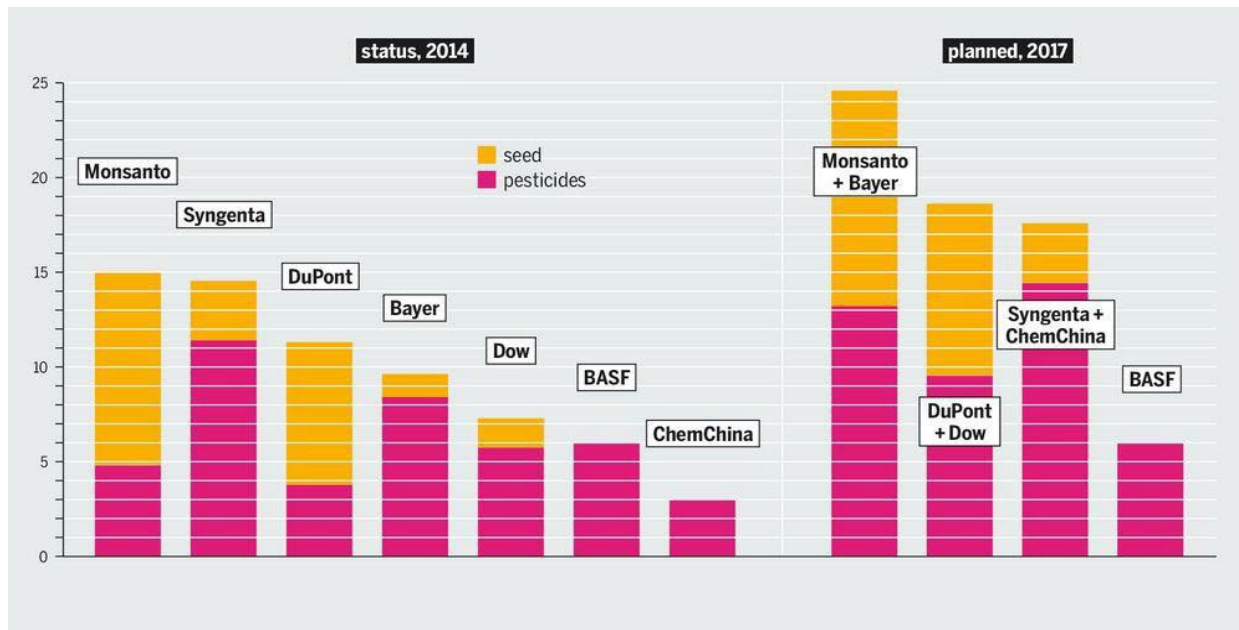
ABSTRACT

This paper analyzes one of the most expensive takeovers in German history, the acquisition of Monsanto by Bayer. The strategic considerations that led to this takeover are examined, as are the high legal risks that were accepted to push the deal through. The lobbying activities carried out by Monsanto and their impact on the takeover by Bayer are also considered. Furthermore, the importance of corporate governance and the role of controlling in mergers and acquisitions are examined. Finally, a conclusion is drawn.

BACKGROUND TO THE ACQUISITION OF MONSANTO BY BAYER

In December of 2015, the two chemical corporations Dow Chemical and DuPont announced their intention to merge. This announcement represented a trend that culminated in 2016 with a series of mergers between big players in the chemical industry. By the time of the announcement, the merger between Dow Chemical and DuPont would have created the world's biggest chemical company. This was preceded by a failed attempt of Monsanto to acquire the agricultural chemical company Syngenta. By that time, the industry giants were looking for suitable partners for mergers to form larger corporations. The agrochemicals segment played an important role in this, as it was classified as a high-yield and growth-proof segment (Hofmann 2019). For Bayer, the merger of Dow Chemical and DuPont posed a threat. Once the merger would have been completed, Bayer could not have kept up with the size of the Dow DuPont, would not have been able to stand up to the competition across the entire product range and would have lacked an equal presence in the well-valued agricultural sector.

Shortly after the plans of Dow and DuPont became publicly known, in May 2016 Bayer announced its own plan to acquire Monsanto. With that acquisition Bayer even overtook DowDuPont becoming the world's biggest agrochemical company by turnover. From that perspective, Bayer's plans to acquire Monsanto can be seen as a direct response to the DowDuPont merger. As a result of the takeover Bayer became the world's largest supplier of seeds and pesticides (see graph on the next page). The companies complemented each other from a strategic market perspective. Bayer's seed business was relatively small while Monsanto was a leading company in that field. In the field of pesticides Monsanto's business, apart from Glyphosate, was relatively small, while Bayer was strong in that field. An important reason for the acquisition was the assumption that the expected growing world population would strengthen not only the agricultural sector, but the agrochemical sector in particular. Additionally, many experts considered size as a success factor for companies in the industry (Hofmann, 2016). Through the takeover Bayer had the opportunity to significantly increase the size of the company and to address all the issues mentioned above. Additionally, Bayer wanted to realize \$1,5 Billion in synergy effects.



*Source: <https://www.greeneuropeanjournal.eu/food-security-at-stake-what-the-bayer-monsanto-merger-means-for-europe/>

However, the prospects of success were offset by considerable risks from the outset. The takeover was financially challenging. Bayer had to carry out a capital increase, issue corporate bonds and take out loans to meet this challenge. The integration of Monsanto posed another challenge as well, cultural and corporate culture differences had to be overcome. Additionally, the takeover of Monsanto was not received positively by all Bayer employees, which led to internal disputes. But it was not only the employees that had to be convinced of the merger, but also the investors. While Bayer had an excellent reputation worldwide, Monsanto had an extremely bad reputation, especially outside the U.S. Although Werner Baumann as the chief executive officer of Bayer was convinced that Monsanto's image problems could be fixed, it was clear from the beginning that this was a very difficult goal to achieve. Among other things, Monsanto was criticized for its genetically modified plants as well as its Glyphosate products that have since been deemed carcinogenic. Being criticized by environmental protection human rights organizations for years, Monsanto was one of the most unpopular companies in the world. It was therefore to be expected that the Monsanto acquisition would damage Bayer's reputation (Fröndhoff, Hofmann, and Jahn, 2016). While Monsanto has been closely watched by the public at times, the court cases that have been brought against the company have been less publicized. However, these were of great importance, as the company's legal disputes represented an enormous risk for Bayer in the event of a takeover.

The reputation of the company was not the only thing that did not develop in the favor of Bayer. To meet the requirements of the regulatory authorities and getting anti-trust approval, Bayer had to make more concessions than planned and had to divest valuable businesses. The profitable plant protection and seed businesses as well as crop science business had to be sold. Additionally, because of the divestments, the synergy that Bayer had originally targeted for the merger with Monsanto later had to be reduced by \$300 Million (Weiss, 2018).

Despite all the foreseeable risks and potential problems Bayer's board of directors and the supervisory board decided in favor of the acquisition. Aiming for the acquisition Bayer agreed to pay Monsanto a \$2 Billion contractual penalty if the deal would fall through due to antitrust issues. Together with the concessions made in favor of the merger the question of whether the merger was desirable at all can certainly be posed. Bayer's leadership may have been concerned about being left out of the big merger wave in the industry. The fact is that the enormous legal risks arising from the merger were either underestimated or ignored, as will be shown in the next section.

Litigation Risks taken by Bayer and their Consequences

This section deals with the legal risks for Bayer arising from the Monsanto deal. The focus is on the lawsuits against Monsanto in the United States that were already concluded or pending before the takeover by Bayer. Somehow all of the court cases that had been found in favor of Monsanto for decades were being reversed predominantly after the takeover by Bayer, a foreign company. The chapter is divided into two sections, polychlorinated biphenyls and Glyphosate. Litigation on both chemicals was particularly successful for the plaintiffs after the acquisition of Monsanto by Bayer.

Polychlorinated Biphenyls (PCBs)

Polychlorinated biphenyls or short PCBs are a group of man-made organic chemicals that were produced by Monsanto in the 20th century. The company was the sole manufacturer of PCBs from 1935 until 1977 and therefore in a monopoly position. Manufacture, sale, and even use of PCBs was generally banned in the United States in 1979 (Environmental Protection Agency 2015). But prior to that ban PCBs were widely used as insulating fluids in electrical equipment and included in many paints, plastics and rubber products. Additionally, they were commonly used for different applications in industry and building construction. For Monsanto, PCBs were a major component of sales before they got banned. Through improper storage or disposal, the burning of waste containing PCBs and leaks, PCBs got released into the environment. Since they are very slow to break down, the chemicals can persist in the environment for decades. Due to their once common use and their durability, PCBs are widely spread environmental contaminants in the U.S. today. Especially water pollution is caused by PCBs. As animals ingest PCBs, through the food chain they also affect humans. Although according to the Environmental Protection Agency (E.P.A.) the dietary intake of PCBs and levels measured in human blood serum have declined since the ban, they remain widely distributed in the environment today. The E.P.A. also states that the rate of decline of PCBs levels in environmental samples has slowed in recent years (EPA, 2016).

Polychlorinated biphenyls cause various health effects to animals and human. Amongst other things, the Environmental Protection Agency lists immune effects, reproductive effects, neurological effects and even classified PCBs as probable human carcinogens (USEPA 2015). Some of the negative effects of PCBs on human health have not been known until recently. For example, a study by the E.P.A. found PCBs likely to be carcinogens as early as 1996. According to the agency, “In 1996, at the direction of Congress, E.P.A. completed a reassessment of PCB carcinogenicity titled “PCBs: Cancer Dose-Response Assessment and Application to Environmental Mixtures”. E.P.A.'s cancer reassessment reflected the agency's commitment to the use of the best science in evaluating the health effects of PCBs. The reassessment was peer reviewed by 15 experts on PCBs, including scientists from government, academia and industry. The peer reviewers agreed with E.P.A.'s conclusion that PCBs are probable human carcinogens (E.P.A. 2015)”.

Monsanto over the years had faced multiple court cases about harmful effects of polychlorinated biphenyls before Bayer took over the company. In 2003 Monsanto agreed to a \$600 Million settlement to end a lawsuit over PCB contamination in Alabama. \$550 Million were to be paid by Monsanto and \$50 Million to be paid by Solutia (Monsanto Quarterly Report 1st Q 2014). (Solutia Inc. was a former subsidiary of Monsanto). From 1935 to 1979 Monsanto operated a factory in the city of Anniston, Alabama. Beginning in 1935 the company disposed millions of pounds of PCBs in and around the city, contaminating the local rivers and lakes until 1971. By 2002 Anniston was one of the most toxic cities in the U.S. Illnesses had soared in the city and Monsanto documents showed that the company had known for decades about the damages the PCBs cause in bodies of water. As early as 1966, Monsanto had a study conducted on the health effects of PCB exposure in Anniston, which came to alarming conclusions. Nevertheless, the company did not take any actions to protect the people living there (Washington, 2019). Instead, the company continued to focus on using the chemical in its products.

The high sum of the settlement from 2003, mentioned above, and the documents pointing out that Monsanto knew about the level of danger posed by PCBs, present a poor precedent for future court cases. Additionally, evidence continued to mount that Monsanto had done everything to keep making profits from PCBs throughout the United States. Not only did the company know about the hazards the chemical was causing but it also covered up the information to keep selling PCBs (Grunwald, 2021). But regardless, the Monsanto legal defense in later legal cases was very successful. An example is a court ruling from 2008 about chemical contamination caused by PCBs in the state of Pennsylvania. Pennsylvania state agencies had successfully sued Monsanto. They held the company

responsible as a manufacturer for chemical contamination by PCBs. However, the Supreme Court of Pennsylvania undid the verdict. The state agencies appealed, but the Supreme Court ruled in favor of the Monsanto defense which thereby managed to turn away the \$90 million verdict against Monsanto (Stefanini, 2021).

In 2014 a jury of the Los Angeles Superior Court decided in favor of Monsanto's legal defense in the first trial of claims that PCBs caused non-Hodgkin's lymphoma (Monsanto Quarterly Report 3rd Q 2015). The plaintiffs claimed they developed non-Hodgkin's lymphoma because toxic polychlorinated biphenyls manufactured by Monsanto permeated their food supply. They argued that Monsanto knew about the harmful effects of PCBs and pointed out that the company acted negligently. But despite that negligence that the jury acknowledged, it found Monsanto's design of PCBs did not substantially cause the plaintiffs non-Hodgkin's lymphoma (Scurria, 2021). Monsanto's lawyers thus won the case.

A year later, in 2015, the Monsanto legal defense achieved another success. Residents of seven states had filed against Monsanto in one suit over deaths and illnesses related to PCBs, but the company's legal defense prevailed over the plaintiffs (MintPress News, 2021). Monsanto's quarterly report from the third quarter of 2015 was the first one to report that personal injury lawsuits had been filed against Monsanto over several years on behalf of approximately 750 persons. The plaintiffs claimed that various forms of non-Hodgkin lymphoma have been caused by trace levels of PCBs. Monsanto in its quarterly report, mentioned that the first jury trial of such claims resulted in a verdict in favor of the company and put its liabilities reported its \$301 Million in total as of May 31st, 2015. Under the paragraph "Note 20. Commitments and Contingencies", the report quotes:

"Monsanto is involved in environmental remediation and legal proceedings to which we are party in our own name and proceedings to which our former parent, Pharmacia LLC ("Pharmacia") or its former subsidiary, Solutia, Inc. ("Solutia") is a party but that we manage and for which we are responsible. In addition, Monsanto has liabilities established for various product claims. With respect to certain of these proceedings, Monsanto has a liability recorded of \$301 million and \$291 million as of May 31, 2015, and Aug. 31, 2014, respectively, for the estimated contingent liabilities. Information regarding the environmental liabilities appears in Monsanto's Report on Form 10-K for the fiscal year ended August 31, 2014.

Litigation: The above liability includes amounts related to certain third-party litigation with respect to Monsanto's business, as well as tort litigation related to Pharmacia's former chemical business, including lawsuits involving polychlorinated biphenyls (PCBs), dioxins, and other chemical and premises liability litigation. Additional matters that are not reflected in the liability may arise in the future, and Monsanto may manage, settle, or pay judgments or damages with respect thereto in order to mitigate contesting potential liability. Following is a description of two of the more significant litigation matters (Monsanto Quarterly Report, 3rd Q 2015)".

The total amount of \$301 Million for all of the company's liabilities, including the ones involving polychlorinated biphenyls, appears miniscule, especially considering the fact that Monsanto settled a 2003 lawsuit concerning PCBs brought by the residents of just one city for \$600 Million (Monsanto Quarterly Report 1st Q 2004).

Monsanto won further court cases against plaintiffs that allegedly developed a non-Hodgkin lymphoma from PCBs. Examples from 2016 are a \$15 Million trial brought by a man and a woman and a \$20 Million trial brought by two men (Lowrey, 2021). All plaintiffs claimed they developed non-Hodgkin lymphoma after being exposed to Monsanto's PCBs. Monsanto prevailed in before a jury in both trials. But in May 2016 it came to a rare loss for Monsanto. Three plaintiffs were awarded in court claiming that their exposure to PCBs caused them non-Hodgkin lymphoma. As other plaintiffs had tried to do before, they emphasized that Monsanto had known about the harmful nature of PCBs. Unlike their predecessors, they were successful and were awarded a total of \$46.5 Million in damages (Chow, 2016). This defeat in court occurred around the same time as Bayer announced its intention to acquire Monsanto. That announcement was made on the twenty third of May 2016 (Dostert, 2019). In the same year Monsanto agreed to a settlement for approximately thirty personal injury lawsuits filed on behalf of the approximately seven hundred and fifty persons, which is documented mentioned Monsanto's third quarterly report from 2015. These suits primarily claimed that the exposure to PCBs caused the plaintiffs' various forms of non-Hodgkin lymphoma. The quarterly report from the first quarter of 2017 quotes under paragraph "Note 18. Commitments and Contingencies":

"In September 2016, the parties reached an agreement that would potentially settle all of these personal injury

lawsuits including those with verdicts on appeal. Under the agreement all litigation is to be stayed pending dismissal upon completion of settlement. The company will be required to pay up to \$280 million into a settlement fund, with the settlement and the final payment amount contingent upon the level of claimant participation (Monsanto Quarterly Report 1st Q 2017).

In 2016 the company therefore was willing to settle several lawsuits claiming that PCBs caused the plaintiffs non-Hodgkin lymphoma while Monsanto had prevailed over such claims in almost every suit before. The 2017 first quarter report further states in the same paragraph:

“The company also has been named in lawsuits brought by various governmental entities claiming that Monsanto, Pharmacia and Solutia, collectively as a manufacturer of PCBs, should be responsible for a variety of damages due to PCBs in bodies of water, regardless of how PCBs came to be located there (Monsanto Quarterly Report, 1st Q 2017).”

The numbers of cities suing Monsanto over PCB pollution had increased. In July 2016 Portland had become the eighth city suing Monsanto over the issue (Reeve, 2016). But it did not stop at cities. In December 2016 Washington became the first state to sue Monsanto over PCBs (Chow, 2016). The Washington lawsuit was settled in June 2020. Monsanto, now belonging to Bayer agreed to pay \$95 million as compensation for PCB related damages (Chow, 2016). Bayer had inherited the legal liabilities of Monsanto through the company's takeover and attempted to settle the legal disputes with several of the cities and municipalities that had brought charges. In June 2020, the company announced that it reached a settlement to “resolve cases representing most of the company's exposure to PCB water litigation (Bayer AG Communications, 2021)”. Bayer wanted to pay \$820 Million in total to settle these lawsuits, \$650 Million to settle local lawsuits, and \$170 Million to the attorneys-general of New Mexico, Washington and the District of Columbia. Overall, a large sum that impacted the company's finances. But in December 2020 a judge of the federal court in Los Angeles rejected the settlement. He said the settlement would shield Bayer too much from future claims by people or entities not included in the lawsuit and called the payments to be received by most of the plaintiffs “very modest” (Stempel, 2021). Bayer is now working on a revised agreement. With this further defeat for Bayer, it is likely that the cost of settling these PCB lawsuits will increase even further. Important is also the judges note about future claims. Considering the contamination that the PCBs, once produced by Monsanto, caused across the United States, future lawsuits seem to be likely. Plaintiffs getting awarded millions of dollars in damages in court might even increase the probability of future lawsuits.

One does not have to do a lot of research to find out that PCBs are still polluting the environment not only in the U.S. but in many parts of the world today. Considering that Monsanto was virtually the only producer of that chemical from 1935 to 1977 it seems to be a logical conclusion that the company bears responsibility for this situation. Monsanto did not put PCBs into circulation unsuspectingly but knew about their harmful effects for decades and kept them a secret. Incriminating internal documents revealed not only that the company was aware of the harmfulness of their product but also the audacity with which it attempted to cover up the danger of the spreading contaminant. For example, the company was already aware of PCB contaminants not only in the U.S. but also on other continents such as Europe by 1966. The results of a Swedish study were sent to Monsanto in a letter citing: “PCB is found in the water and in the air, and not only in the Swedish air, but also in e.g., London air (EWG Environmental Working Group, 1966).” The lead Swedish scientist found PCBs in fish and birds and even in the hair of his entire family. Still Monsanto decided to keep making profits from selling PCBs concealing and trivializing the danger.

With regard to the acquisition of Monsanto through Bayer one fact is particularly important: prior to the time Bayer decided to submit an offer for the acquisition, the documents described above, and parts of their incriminating content were already publicly known (EWG Environmental Working Group, 1966). Also, with the verdict of May 2016 awarding plaintiffs claiming that their exposure to PCBs caused them non-Hodgkin lymphoma, Monsanto's successful legal defense in court had suffered a setback prior to Bayer's second offer for the takeover. The legal risks posed by polychlorinated biphenyls, which led to high fines for Bayer and will remain a legal risk, were therefore already known before the acquisition. The question remains why Bayer nevertheless decided in favor of the acquisition.

Glyphosate

Glyphosate is a chemical compound that is very effective in killing plants/weeds. Monsanto patented Glyphosate in 1974. The chemical compound was the active ingredient of an herbicide that Monsanto marketed under the name Roundup. The product gained importance when Monsanto introduced genetically modified crops that were resistant against Roundup. Farmers were now able to kill weeds in their fields by spraying Roundup while the crops survived. The product became very successful in sales for Monsanto (Monnier, 2020). At the same time the product gained importance for the agricultural sector. Glyphosate is currently the most widely used agriculture chemical and despite the fact that there are other manufacturers today, it is still an important product for Monsanto.

But the product has also been criticized for a long time. In addition to recent studies showing that the chemical has a negative effect on bees (Monnier, 2020), it was linked to cancer before Bayer acquired Monsanto. In March 2015 the International Agency for Research on Cancer (IARC), classified Glyphosate as “probably carcinogenic to humans” (International Agency for Research on Cancer, 2021). The IARC is the World Health Organization’s cancer research arm. The name of the World Health Organization gave weight to the study. Monsanto resolutely worked to reverse study’s credibility but was unable to eliminate concerns about Glyphosate. As a result, the 2015 IARC study was the trigger for a wave of lawsuits against Monsanto (Gillam, 2015). The company was facing lawsuits from former customers claiming that Glyphosate, the active ingredient of Roundup caused them health problems up to and including cancer. In the fall of 2015, several such lawsuits had been filed and the number has continued rising as U.S. law firms began looking for plaintiffs to file more lawsuits and class action suits against Monsanto (Gillam, 2015).

When Bayer made an offer to acquire the company in May 2016, there were only comparatively few lawsuits filed by Americans with cancer against Monsanto. But even then, for Monsanto the risk was high with respect to Glyphosate cancer lawsuits. A success in court for plaintiffs claiming that Glyphosate caused them cancer was likely to entail further lawsuits. Considering the quantities at which Monsanto’s Glyphosate has been and is still used worldwide, such lawsuits posed a serious risk for Monsanto. But the company staunchly defended itself against any accusations that Glyphosate was causing cancer. The vigorous defense went so far that the Monsanto CEO Hugh Grant even called the IARC study “junk science” (Bethge, 2017). And the company had a serious argument: the approval for Glyphosate of regulatory authorities around the world such as the U.S. Environmental Protection Agency, the German Federal Institute for Risk Assessment and the Australian Pesticides and Veterinary Medicines Authority for example. In a statement Monsanto once stated: “The allegation that Glyphosate can cause cancer in humans is inconsistent with decades of comprehensive safety reviews by the leading regulatory authorities around the world” (Hakim, 2017).

But Monsanto's serious argument became increasingly invalidated by science. In December 2016 the New York Times published a review heavily incriminating the agrochemical industry. It showed the influence of the industry and even presented evidence of the industry’s power to manipulate academic research (Hakim, 2016). Although the revelations were more about the entire agrochemical industry than specifically about Monsanto, their content was especially bad for Monsanto’s argumentation of comprehensive safety reviews about Glyphosate by regulatory authorities. The classification of chemicals like Glyphosate by the regulatory authorities relied heavily on the findings of academic research. The review by the New York Times showed that these findings are not unlikely to be influenced by the industry.

In 2017, while the acquisition process of Monsanto through Bayer went on, Monsanto took a severe blow. Files unsealed during litigation, brought by people who claimed their exposure to Glyphosate resulted in the development of non-Hodgkin’s lymphoma, heavily incriminated the company. The documents showed that a deputy division director at the E.P.A. had warned Monsanto in advance about the study of the IARC, that later classified Glyphosate as “probably carcinogenic to humans”. That gave the company time to prepare its defense (Hakim, 2017). The deputy division director also promised Monsanto in an email to stop efforts at the E.P.A. to conduct its own review on the carcinogenicity of Glyphosate. And indeed, the E.P.A. never conducted that review. But it didn’t stop there. The documents further revealed email traffic of a Monsanto executive with company officials where he described the option of hiring academics to ghostwrite research on Glyphosate. The email quotes “We would be keeping the cost down by us doing the writing and they would just edit & sign their names so to speak” (Hakim, 2017). Furthermore, the documents revealed that the E.P.A.’s own findings on Glyphosate from an assessment conducted by the agency’s Office of Pesticide Programs, had been questioned for their robustness within the agency. It was the Office of Pesticide Programs where the previously mentioned deputy division director was a senior official when the assessment was conducted. And the revelations about Monsanto’s actions continued. Amongst other things the unsealed files

uncovered a massive lobbying campaign aiming to whitewash Glyphosate, attempts to discredit researchers whose findings were a potential threat to the company's interests and influence on research results. Additionally, evidence was found that Monsanto had conducted its own studies on Glyphosate which also raised concerns about the safety of the chemical. But instead of warning the public, apparently the company tried everything in its power to cover up any doubt on Glyphosate's medical safety (Bethge, 2017).

The publication of these internal documents of Monsanto became a disaster for the company. But despite all the revelations and the resulting risks, Bayer closed the deal on the Monsanto takeover in June 2018. At the time of acquisition, the number of lawsuits was still relatively small, but the new German owner soon faced losing court cases on Roundup and Glyphosate respectively. Still in the year of acquisition, Bayer lost a court case against the plaintiff Dewayne Johnson claiming that Roundup caused him non-Hodgkin's lymphoma. The jury awarded the plaintiff \$289 Million. Although the sum was later reduced by a trial judge to \$78,5 Million, Monsanto lost its appeal. The verdict still made judgement for the plaintiff that Roundup caused non-Hodgkin's lymphoma. Bayer maintained its defense strategy and lost two additional court cases awarding millions of dollars to the plaintiffs. The court rulings attracted public attention and generated considerable negative publicity. But they also put the share price under pressure. Since the takeover of Monsanto in June 2018, Bayer's share price had fallen significantly and never returned to the valuation it had at the time of the acquisition.

After conducting the most expensive acquisition of a foreign company ever made by a German company in 2018, two years later, in 2020, Bayer also set out to conduct the biggest out-of-court product liability settlement ever made in the U.S. (Burger & Bellon, 2020). To settle the majority of the filed lawsuits claiming that Roundup caused cancer, Bayer announced a 9.6 billion dollar settlement. This settlement was part of a series of settlements of Bayer in order to come to terms with Monsanto's legal legacy. As with PCBs, Bayer again sought to contain the risk of potential future lawsuits. For that purpose, a separate class agreement was made for Bayer to pay 1.25 billion dollar for potential future claims. But the judge did not approve this part of the agreement that is very important for Bayer. Bayer announced a new, even more expensive settlement for the company at the beginning of February 2021. This still requires the approval of the judge who rejected the first settlement (Tagesschau, 2021).

It was especially the losses of Bayer in the Glyphosate court cases that sent its stock into a downward spiral. The defeats in all three court cases and the announced expensive out-of-court settlements represented an enormous burden for the company. In January 2021, Bayer shares were worth forty four percent less compared to their value before the first judgment against the company. This in turn is the reason for a new lawsuit coming from Bayer's own shareholders. They are suing the company for millions in damages for the share price losses in the wake of the Glyphosate legal disputes (Spiegel, 2021). The plaintiffs claim they have not been informed about the risks of the Monsanto takeover.

Considering the scale of the Glyphosate revelations that took place before the takeover was completed, the risks of the Monsanto acquisition have been either underestimated or ignored by Bayer's board of directors. Before Bayer finalized the deal in June 2018, documents had been published showing Monsanto's massive influence on government agencies in favor of Glyphosate. The evidence for Monsanto's coverup of risks caused by Glyphosate mounted and the influence on scientific results, which were decisive for the approval of the agent, could no longer be denied. With the acquisition of Monsanto, Bayer therefore agreed to assume the huge risks posed by Glyphosate. Due to the wide distribution of the agent, it was foreseeable that losing a court case about Glyphosate would wind up costing the company billions of dollars as it would attract further lawsuits. Especially since law firms in the U.S. can find plaintiffs through advertising. Last but not least, the example of Dieselgate (Volkswagen) years earlier had clearly shown how great the risk is for a large foreign company should it become the target of class action lawsuits in the United States.

LOBBYING AND ITS EFFECTS IN THE CASE OF THE MONSANTO TAKEOVER

The agrochemical industry has a decade long history of spending huge amounts of money on lobbying. Monsanto was not an exception. But in 2016, the year of the takeover, the company stood out as the single biggest lobbying client in the U.S. agricultural sector. Monsanto had held this ranking for nine consecutive years up to that point, spending \$60 Million during that time (Kim, 2016). But lobbying was also common for Bayer. Considering the scope and effects of the merger, it is likely that both companies benefited from the money they spent on lobbying to get the deal approved in the first place. This is especially true for Bayer, since the company agreed to pay Monsanto two billion dollars if the takeover would fall apart due to regulators (Kim, 2016). Getting a deal of this size approved, with even fewer

companies controlling the sector as a result of the acquisition, was not self-evident.

Exerting great influence on politics had a tradition at Monsanto. In addition to the high lobbying expenditures the company also had a big network of people who moved from the state to the company or went from the company to the state service. A prominent example of that industry-government revolving door is Michael Taylor. Taylor started his career in 1976 as a staff lawyer at the United States Food & Drug Administration (FDA) and then moved to the private sector. Working as a lawyer for the law firm King & Spalding from 1981 to 1991, he represented Monsanto. He then returned to the FDA as the Deputy Commissioner for Policy. In that position Michael Taylor had influence on genetically modified food regulation. Regulations that also affected Monsanto's business areas in particular. In 1996 Taylor became vice president for public policy at Monsanto. Thirteen years later he returned again to the FDA, this time in the position of deputy commissioner (Gillette, 2021). Although this is a drastic example of an expert switching back and forth between government agencies and the private company Monsanto, it is by far not the only one. Other examples however all have one thing in common: a brisk alternation of experts between government agencies and Monsanto and often the influence of these experts during their time at government agencies on legislation affecting Monsanto's business. Kasey Gillette for example, a senior policy adviser of the senate majority leader Harry Reid, helped to prepare legislation like the FDA Food Safety Modernization Act and the Farm Bill before she joined Monsanto in 2014 as a director of government affairs (Gillette, 2021). Linda Fisher was a vice president at DuPont, became chief of staff at the E.P.A., joined Monsanto as a vice president for government affairs and then returned to the E.P.A. as a deputy administrator (Fischer, L. Open Secrets.org, 2021). Margaret Miller was working as a scientific researcher for Monsanto and prepared a report to get Monsanto's growth hormones approved by the FDA. Shortly before that report was submitted to the FDA, Miller became deputy director of the Office of New Animal Drugs at the FDA. In this position she had to determine whether or not to approve the report by Monsanto that she had worked on herself while being employed at Monsanto (Baum, Hedland, Aristei & Goldman, 2021). All of these examples illustrate Monsanto's influence on the government, government agencies and even on legislation.

There is more evidence of Monsanto's influence on legislation. The "Monsanto Protection Act" for example. Although Monsanto was not the only company benefiting of this provision, shielding biotech companies from litigation in regard of genetically engineered seeds and plants, it was amongst its biggest winners. Signed into law in 2013 the rider of the H.R. 933 bill enabled biotech companies to continue the production of genetically modified products even if court orders stated the opposite (Redstone, 2021).

Another example is a one-paragraph addition that was made to a new version of the Toxic Substances Control Act in 2015. This act regulated the handling of lawsuits by individuals who believed they had been harmed by a chemical substance. The House of Representatives voted in favor of preserving that right for individuals regardless of future federal regulations of a chemical substance. But a paragraph added to the bill then made sure that past regulatory requirements by the Environmental Protection Agency would continue to disqualify such legal claims in the future. Furthermore, the bill referred to a chemical law from 1976 governing polychlorinated biphenyls (PCBs). This old law increased the chances for Monsanto that lawsuits against the company could continue to be dismissed more easily by judges. PCB lawsuits had been increasingly frequent. Monsanto had been virtually the only producer of PCBs from 1935 to 1977, so the advantage of this additional article for the company was clearly recognizable. Monsanto stated it had not requested the clause that was added at the last minute into the House version of the bill. But according to reports the clause was added at the request of Republican staff members. The Republicans were the political party receiving the most money Monsanto spent on lobbying at that time (Gillette, 2021). In addition, a few months later Monsanto knew about the clause in the bill. An attorney representing Monsanto in a federal court in Texas argued the specific clause although it remained locked in negotiation (Lipton, 2016). In the end, the clause did not pass into the new version of the Toxic Substances Control Act, the Frank R. Lautenberg Chemical Safety for the 21st Century Act. However, the E.P.A., the agency to enforce that act, introduced a methodology it called "systematic review" to evaluate scientific data on the chemicals to be regulated. This methodology was incomplete and had flaws, that allowed the companies whose products should be regulated to interpret the law to their advantage (Singla, 2019).

Monsanto had an enormous influence through lobbying. The company spent millions on lobbying politicians and its influence even reached regulation and legislation. The relationship between the state and the company were extremely strong. Not least because of the lively exchange of experts between the two sides. There is no doubt that Monsanto benefited from this close-meshed lobby network. Bayer, however, may have been doomed by precisely that. The ties between government officials and representatives of Monsanto have been close, so often both sides benefited from protecting Monsanto. Bayer, on the other hand, a foreign company, was not as well connected to the government and

had no history of a clear link between the government and the company. Accordingly, it can be assumed that Bayer, as an uninvolved takeover candidate, did not enjoy the same protections Monsanto enjoyed.

CORPORATE GOVERNANCE AND THE ROLE OF CONTROLLING IN THE MONSANTO ACQUISITION

Corporate Governance

Corporate crises are based on bad decisions made by managers. As a consequence, the companies themselves, but also their stakeholders, are damaged. In reality, the starting point for establishing corporate governance are often mismanagement scandals and corporate crises (Kreipl, 2021). Corporate governance is a framework of rules and processes for the management and supervision of a company that is installed to avoid mismanagement and to balance the interests of a company's different stakeholders. From a business perspective, corporate governance is a holistic approach to successful management. In the operational area, it has the goal of ensuring responsible corporate management. This enables the financial goal of monetary success. Although in the short term greater monetary success through disregard for rules and responsibility may attract investors, in the long run the trust created by responsible management and sustainable financial success are decisive in convincing investors of the company's merits (Kreipl, 2021). In the context of corporate governance, not only stakeholders in the narrower sense are considered, but also those in the broader sense. While the focus is often on the shareholders, corporate governance is a concept to build trust of all stakeholders in the management of the company.

In 1776, economist Adam Smith recognized that as a rule, managers who manage investors' money cannot be expected to handle it as carefully as they would handle their own money. In doing so, he pointed out the potential conflict of interest between investors and a company's board of directors. While shareholders provide the financial basis of a corporation. It is the board of directors that has the most influence on the corporation's monetary success. Shareholders do not take direct influence on corporate management. As shareholders are not involved in the day-to-day running of the business and they generally do not have detailed knowledge of the activities of the board of directors. This leads to information asymmetries between owners and decision-makers. To prevent management decision-makers from making decisions that are not in the best interests of the company, corporate governance offers various approaches. These can be categorized as: incentive systems, control systems, information systems, and signaling and screening (Kreipl, 2020). Incentive systems aim to promote the motivation of the board of management in the interests of the shareholders, for example through performance-related compensation. Negative incentives, on the other hand, are to be counteracted by sanctions. The aim of control systems within the framework of corporate governance is to strengthen the existing control systems in the company, such as the existing reporting obligation of the executive board, in order to strengthen the control of the shareholders over the board. Information systems also aim to integrate relevant information into reports. Only when sufficient information is available, for example on the general economic situation or developments in the industry can management decisions be better understood and evaluated. Signaling and screening can be used to better assess suitability and capabilities of managers (Kreipl, 2020).

The supervisory board forms the bridge between the shareholders and the executive board, as it is elected by the shareholders and assumes monitoring and control tasks. The role of the supervisory board is strengthened by corporate governance. The strengthened role of the supervisory board leads to an increase in transparency and a strengthening of responsibility and accountability.

In conclusion, corporate governance as a set of rules and policies is a system by which companies are directed and controlled. An important goal of corporate governance is to balance the interests of the various stakeholders. Stakeholders range from shareholders, customers and suppliers to the government and the community. Through the controlling of the board of directors, corporate governance aims to build trust between stakeholders and management. That will contribute significantly to the operational and financial success of the company in the long term. Therefore, an effective corporate governance system must be installed in a company to contribute to its long-term success.

The Bayer - Monsanto case, the Lack of Controlling and the Lessons Learned

While the Monsanto acquisition has turned into a total disaster for Bayer, CEO Werner Baumann, the first acting DAX chief executive officer to be refused discharge by the shareholders, is still in office today. This raises the question of whether control mechanisms failed in the case of the Monsanto takeover.

At the time Bayer first made the offer to acquire Monsanto, there were strategic reasons for the acquisition. The agrochemical industry was dominated by major mergers, such as the mergers between Dow and DuPont or Syngenta and ChemChina. Through these mergers, large companies were formed, and it was expected that they would be dominating the agrochemical and seed business in the future. Bayer had the plan of focusing on exactly that segment, that was expected to be a high-yield and high-growth segment within the industry. This meant a change in strategy by CEO Werner Baumann compared to his predecessor and a shift in the company's strategic focus. In the targeted segment the company had reasons to regard its competitors as superior in the future because of their size.

However, being left as a small player was not only a negative scenario for Bayer as a company, but also for its CEO and the board of directors. The acquisition of Monsanto, on the other hand, was the opportunity to become number one in the industry, not only for the company but also for the top management. A prospect that can be very tempting for managers. Initially, this perspective also appears to be good for shareholders, but all factors and all perspectives must be taken into account when such an important decision is made. As long as the self-interest of managers is aligned with the interests of shareholders, there is no conflict of interests. However, as soon as the interests diverge, such a conflict arises. This is where corporate governance comes into play as the system to control the board of directors. However, in the case of the Monsanto takeover by Bayer, controlling of the board of directors does not seem to have taken place to a sufficient extent.

For a successful acquisition, controlling is very important. In case of a merger or acquisition, the controlling department of the acquiring company is in charge of important tasks like gathering information and company valuation as well as evaluation of the purchase price (Borowicz, 2006). Most importantly in the case of the Monsanto acquisition, the controlling department also takes over the risk analysis and largely handles the due diligence in case of an acquisition.

Considering the information covered in the chapter *Litigation Risks taken by Bayer and their Consequences*, it is clear that there was evidence of the enormous litigation risks a takeover of Monsanto would cause. The decisive factor is that the information referred to here was already available prior to June 7, 2018 when Bayer completed the acquisition. Additionally, revelations in the course of legal proceedings against Monsanto showed how the company was influencing allegedly independent scientific studies and even agencies like the Environmental Protection Agency in the advantage of Glyphosate (Hakim, 2017). Facts that later contributed to Bayer's conviction in lawsuits inherited from Monsanto. While Monsanto's large lobbying expenditures were well known, one had to dig a little deeper to find out to deeply the company was intertwined with state institutions. Although not all the information covered in the chapter *Lobbyism and its effects in the case of the Monsanto takeover* was available prior to Bayer's takeover of Monsanto, the extent of the interconnections between the company and state agencies was evident. The vast majority of this information was even public. Monsanto, which had an extremely poor image compared to other agrochemical companies, was also an example of how much of a liability a company's reputation can be. A big risk for the company Bayer, which had a very good reputation to lose. Summing it all up, a careful due diligence and risk analysis should have argued against the takeover already at the first execution.

It could be argued that the volume of litigation, particularly in connection with Glyphosate, only increased after the takeover bid. The revelations, which were highly damaging to Monsanto, also took place only after work on the takeover had already begun. But as a consequence, a new risk assessment and due diligence based on the new information from the time the tender offer was made to the time the acquisition was actually completed should have been clearly against Monsanto (Financial Times, 2019). On that basis the takeover should have been averted after all. If Bayer's M&A controlling had not pointed out these risks, this would have been a fatal mistake that one can hardly imagine. Taking all this information into account, it is clear that Bayer's management at least severely underestimated the risks, if not ignored them. A possibly decisive factor may have been the concern of playing a rather insignificant role as a manager without a major takeover of its own following the major mergers of competitors. What is certain is that Bayer's management, above all CEO Werner Baumann, lobbied hard for the takeover, leaving the shareholders unquestioned. While the Monsanto shareholders were able to vote on the acquisition, the Bayer shareholders did not,

although much more was at stake for them. The takeover was designed in such a way that, under German law, only the approval of the supervisory board was required, not of the shareholders (Ziesemer, 2016). The Supervisory Board, in turn, which was actually tasked with representing the interests of the shareholders, was headed by Werner Wenning, who not only had a very good relationship with Baumann, but was also behind the Monsanto takeover with him from the very beginning (Caspar-Busse, 2019). When shareholders at the annual general meeting were outraged that they were not allowed to vote on the takeover, Baumann pointed out that shareholder consent was not required by law and could have jeopardized the takeover (Der Spiegel, 2017). The supervisory board approved the takeover and it was ultimately carried out. For the shareholders, the takeover became a total disaster, as it led to a drop in the value of the shares. For Monsanto, Bayer paid a takeover sum of sixty-three billion dollars. Today the company has a market capitalization of 62.2 billion dollars. This means that Bayer, together with Monsanto, is worth less today than Monsanto alone was at the time of the takeover. In addition to the loss of value for shareholders, Bayer now itself is at risk to be a potential takeover candidate. When shareholders refused to discharge the executive board in 2019, the supervisory board expressed its confidence in the Bayer executive board. In the same year the compensation of CEO Baumann, that had decreased due to the decrease in value of the stock-based cash compensation, was even boosted through an increased bonus with the consent of the supervisory board. Although the interrelationship between the supervisory board and the executive board had been criticized, Werner Wenning, as the chairman of the supervisory board, remained in office until April 2020.

In conclusion, the acquisition of Monsanto through Bayer is a clear example of mismanagement that could have been prevented by effective corporate governance. According to CEO Baumann, a vote by the shareholders on the takeover would have jeopardized it. Instead of consulting the shareholders, the takeover was carried out without their approval. The supervisory board was led by Werner Wennig, who had a great deal of influence. He supported CEO Baumann and, above all, stood behind the takeover of Monsanto. An effective corporate governance system would have used signaling and screening to evaluate the suitability of the chairperson. The position of the supervisory board, which is strengthened in corporate governance, was not strengthened at Bayer. Instead of controlling the activities of the executive board, the supervisory board was much more supportive of the executive board. The boosted bonus payment granted to CEO Baumann after Bayer's stock price had fallen dramatically, is in complete contradiction to the incentives created by corporate governance. While the value of Baumann's share-based cash compensation decreased, directly related to the acquisition he pushed through, his bonus for 2018 was increased by twenty eight percent with the approval of the supervisory board. Today Bayer's management and obligation to the shareholders are questioned. The formerly well valued company since the takeover of Monsanto has massively lost value and reputation. Corporate governance aims to install trust between investors and management for a sustainable success of the company that both parties' profit from. Bayer is now being sued by its own investors. This means that there is no longer any question of the all-important trust between investors and management. Taking all these factors into account, it can thus be said that the Monsanto acquisition became a total disaster for Bayer. A disaster that could have been prevented by effective controlling and corporate governance.

REFERENCES

- Aho, B. (2021). Monsanto to pay record \$95 million to end Ferguson's lawsuit over PCBs | Washington State, *Washington State Office of the Attorney General*. Retrieved January 2021, from <https://www.atg.wa.gov/news/news-releases/monsanto-pay-record-95-million-end-ferguson-s-lawsuit-over-pcbs>.
- Der Spiegel. (2017). Arger bei Bayer-Hauptversammlung: Wegen Monsanto-Übernahm, Retrieved January 2017, from <https://www.spiegel.de/wirtschaft/unternehmen/bayer-hauptversammlung- tumulte-wegen-monsanto- uebernahme-a-1145329.html>.
- Baum H., Aristei & Goldman. (2021). Monsanto Government Influence Has Fueled Unrival Corporate Power. Retrieved January 2021, from <https://www.baumhedlundlaw.com/blog/2017/may/monsanto- government- influence-has-fueled-unrival/>.
- Bayer Communications. Bayer announces agreements to resolve major legacy Monsanto litigation. Bayer AG Communications. Retrieved January 2021, from <https://media.bayer.com/baynews/baynews.nsf/id/Bayer- announces-agreements-to- resolve-major-legacy-Monsanto-litigation>.
- Financial Times, Bayer's merger failure is a lesson for other buyers. Retrieved January 2021, from <https://www.ft.com/content/b5c48f46-6d93-11e9-a9a5-351eeaf6d84>.
- Bethge, P. Herbicide Health Dangers: Monsanto Faces Blowback Over Cancer Cover-Up. *Der Spiegel*. retrieved January 2021, from <https://www.spiegel.de/international/world/monsanto-papers-reveal-company-covered-up- cancer-concerns-a- 1174233.html>.
- Borowicz, F. & Mittermair, K. *Strategisches Management von Mergers & Acquisitions: State of the Art in Deutschland und Österreich*. 2006th ed.: Gabler Verlag, 2006. Retrieved January 2021, from <https://www.springer.com/de/book/9783834901279>,.
- Burger, Ludwig, and Bellon, Tina. Bayer to pay up to \$10.9 billion to settle bulk of Roundup weedkiller cancer lawsuits. *Reuters Media*. Retrieved January 2021, from <https://www.reuters.com/article/us-bayer-litigation- settlement-idUSKBN23V2NP>,.
- Busse, C. Bayer - Herr Wenning hat ein Monsanto-Problem. *Süddeutsche Zeitung*. Retrieved January 2021, from <https://www.sueddeutsche.de/wirtschaft/bayer-krise-monsanto-uebernahme-aufsichtsrat-1.4426148>.
- Chow, L. Monsanto Ordered to Pay \$46.5 Million in PCB Lawsuit in Rare Win for Plaintiffs. *EcoWatch*. Retrieved January 2021, from <https://www.ecowatch.com/monsanto-ordered-to-pay-46-5-million-in-pcb-lawsuit-in- rare-win-for-pl-1891143419.html>.
- Chow, L. Washington Becomes First State to Sue Monsanto Over PCBs. *EcoWatch*. Retrieved January 2021, from <https://www.ecowatch.com/monsanto-pcb-lawsuit-washington- 2137816753.html>.
- DER SPIEGEL, Monsanto-Deal: Investoren klagen wegen Kursverlusten gegen Bayer.” Retrieved January 2021, from <https://www.spiegel.de/wirtschaft/unternehmen/bayer-investoren- klagen-wegen-kursverlusten-nach- monsanto-deal-a-fbe229a6-19d7-4b42-a233- 320257a2678c>.
- Dostert, E. “Bayer und Monsanto - Chronik eines Desasters. *Süddeutsche Zeitung*. Retrieved January 2021, from <https://www.sueddeutsche.de/wirtschaft/bayer-monsanto- zusammenfassung-1.4419987>.
- Environmental Protection Agency. Biomonitoring Polychlorinated Biphenyls(PCBs). Retrieved January 2021, from <https://www.epa.gov/sites/production/files/2015- 05/documents/biomonitoring-pcbs.pdf>.

- Environmental Protection Agency. Learn about Polychlorinated Biphenyls (PCBs) |US EPA. Retrieved January 2021, from <https://www.epa.gov/pcbs/learn-about-polychlorinated-biphenyls-pcbs#healtheffects>.
- Environmental Working Group. Anniston, Alabama a town forever changed by Monsanto. Rising & Strand to D. Wood Brussels. Retrieved January 2021, from <https://www.ewg.org/research/anniston-alabama>, .
- Fröndhoff, B., Hofmann, Siegfried, and Jahn, T. Bayer und Monsanto. *Handelsblatt*. Retrieved January 2021, from <https://www.handelsblatt.com/unternehmen/industrie/bayer-und-monsanto-die-sechs-risiken-des-mega-deals/14546988-all.html>.
- Gillam, C. U.S. lawsuits build against Monsanto over alleged Roundup cancer link. *Reuters Media*. Retrieved January 2021, from <https://www.reuters.com/article/us-usa-monsanto-lawsuits-idUSKCN0S92H720151015>.
- tagesschau.de*, Glyphosat-Verfahren in den USA: Bayer erzielt wichtige Einigung. Retrieved February 2021, from <https://www.tagesschau.de/wirtschaft/unternehmen/glyphosat-275.html>.
- Grunwald, G. Monsanto Hid Decades of Pollution. Retrieved January 2021, from <https://www.commondreams.org/headlines02/0101-02.htm>, .
- Hakim, D. Scientists Loved and Loathed by an Agrochemical Giant. *The New York Times*. Retrieved January 2021, from https://www.nytimes.com/2016/12/31/business/scientists-loved-and-loathed-by-syngenta-an-agrochemical-giant.html?_r=0.
- Hakim, D. Monsanto Weed Killer Roundup Faces New Doubts on Safety in Unsealed Documents. *The New York Times*. Retrieved January 2021, from https://www.nytimes.com/2017/03/14/business/monsanto-roundup-safety-lawsuit.html?_r=0.
- Hofmann, S. Glyphosat ist nicht das einzige Problem – Agrochemie in der Krise. *Handelsblatt*. Retrieved January 2021, from <https://www.handelsblatt.com/unternehmen/industrie/chemiebranche-glyphosat-ist-nicht-das-einzige-problem-agrochemie-steckt-in-der-krise/24894788.html?ticket=ST-11628485-PlvPnOPeLYDvfehI4qYg-ap6>.
- Hofmann, Siegfried, Telgheder, Maike, and Fröndhoff. Bayer will Monsanto übernehmen. *Handelsblatt*. Retrieved January 2021, from <https://www.handelsblatt.com/unternehmen/industrie/bayer-will-monsanto-uebernehmen-ein-riskanter-plan/13618282.html>.
- International Agency for Research on Cancer. Monograph on Glyphosate – IARC. Retrieved January 2021, from <https://www.iarc.who.int/featured-news/media-centre-iarc-news-glyphosate/>,.
- Kim, S. Bayer-Monsanto merger: Two Washington-savvy companies get their game on. *The Center for Responsive Politics*. Retrieved January 2021, from <https://www.opensecrets.org/news/2016/09/bayer-monsanto-merger-two-washington-savvy-companies-get-their-game-on/>.
- Kreipl, C. *Verantwortungsvolle Unternehmensführung: Corporate Governance, Compliance Management und Corporate Social Responsibility*. 1st ed. Wiesbaden: Springer Gabler. Retrieved January 2021, from <https://link.springer.com/book/10.1007%2F978-3-658-28140-3#toc>.
- Lipton, E. Chemical Safety Bill Could Help Protect Monsanto Against Legal Claims. *The New York Times*. Retrieved January 2021, from https://www.nytimes.com/2016/03/01/business/monsanto-could-benefit-from-a-chemical-safety-bill.html?_r=0.
- Lowrey, B. Monsanto Beats \$20M PCB Cancer Claims in Calif. Trial - Law360. Retrieved January 2021, from <https://www.law360.com/articles/793104/monsanto-beats-20m-pcb-cancer-claims-in-calif-trial>,.
- Lowrey, B. Monsanto Prevails In \$15M PCB Cancer Trial - Law360. Retrieved January 2021, from <https://www.law360.com/articles/780910/monsanto-prevails-in-15m-pcb-cancer-trial>.

- MintPress News. UPDATE: Monsanto Wins Against Residents Of 7 States in Carcinogens Lawsuit. Retrieved January 2021, from <https://www.mintpressnews.com/residents-of-7-states-sue-monsanto-over-chemical-with-links-to-cancer/206513/>.
- Monnier, J. What is glyphosate? *Live Science*. Retrieved January 2021, from <https://www.livescience.com/glyphosate-round-up.html>, .
- Monsanto. Monsanto Quarterly Report 1st Quarter 2004. Note 10. Commitments and Contingencies, 2017. Retrieved January 2021, from <https://www.sec.gov/Archives/edgar/data/1110783/000111078304000002/a1q200410q.txt>.
- Monsanto. Monsanto Quarterly Report 1st Quarter 2017. Note 18. Commitments and Contingencies, 2017. Retrieved January 2021, from <https://www.sec.gov/Archives/edgar/data/1110783/000111078317000008/mon-20171130xq1.htm>.
- Monsanto. Monsanto Quarterly Report 3rd Quarter 2015. Note 20. Commitments and Contingencies, 2017. Retrieved January 2021, from <https://www.sec.gov/Archives/edgar/data/1110783/000111078315000116/mon-2015531xq3.htm>.
- OpenSecrets. Revolving Door: Kasey Gillette Employment Summary. OpenSecrets. Retrieved January 2021, from https://www.opensecrets.org/revolving/rev_summary.php?id=76271, accessed January 2021.
- OpenSecrets. Monsanto Co PAC Contributions to Federal Candidates. OpenSecrets. Retrieved January 2021, from <https://www.opensecrets.org/political-action-committees-pacs/c00042069/candidate-recipients/2016>.
- Redstone, R. Congress Just Gave Biotech Firms the Green Light to Ignore Court Orders. Retrieved January 2021, from <https://www.scientificamerican.com/article/monsanto-protection-act/>, .
- Reeve, T. Portland formally joins Monsanto PCB lawsuit. *Portland Business Journal*. Retrieved January 2021, from <https://www.bizjournals.com/portland/blog/sbo/2016/07/portland-formally-joins-monsanto-pcb-lawsuit.html>.
- Scurria, A. Jury Finds Monsanto PCBs Not to Blame For Cancer Cases. Law360. Retrieved January 2021, from <https://www.law360.com/articles/540961/jury-finds-monsanto-pcbs-not-to-blame-for-cancer-cases>.
- Singla, V., Sutton, P., and Woodruff, T. 2019. The Environmental Protection Agency Toxic Substances Control Act Systematic Review Method May Curtail Science Used to Inform Policies, With Profound Implications for Public Health. *American Journal of Public Health* 109(7): 982–984.
- Stefanini, S. Monsanto Prevails in Pa. Pollution Suit. Law360. Retrieved January 2021, from <https://www.law360.com/articles/70874/monsanto-prevails-in-pa-pollution-suit>
- Stempel, J. U.S. judge rejects \$648 million Bayer PCB contamination settlement. *Reuters Media*. Retrieved January 2021, from <https://www.reuters.com/article/us-bayer-pcb-settlement-idUSKBN28B3G0>.
- Washington, H. How Monsanto Poisoned Anniston, Alabama. *BuzzFeed News*. Retrieved January 2021, from <https://www.buzzfeednews.com/article/harrietwashington/monsanto-anniston-harriet-washington-environmental-racism>.
- Weiss, P. Bayer cuts Monsanto synergy target by \$300 million due to divestments. *Reuters Media*. Retrieved January 2021, from <https://www.reuters.com/article/us-bayer-agm/bayer-cuts-monsanto-synergy-target-by-300-million-due-to-divestments-idUSKCN1IQ0YG>.
- Ziesemer, B. Niemand fragt die Bayer-Aktionäre. *Capital.de*. Retrieved January 2021, from <https://www.capital.de/wirtschaft-politik/niemand-fragt-die-bayer-aktionaere>.

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ANTECEDENTS AND OUTCOMES OF PRIVACY CONCERNS IN A RETAIL LOYALTY MARKETING CONTEXT

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ABSTRACT

Given the volume of information now being produced, gathered, and analyzed in marketing exchanges, information privacy is a growing concern among consumers and retailers alike. This research made use of an existing and validated model called Antecedents-Privacy Concerns-Outcomes (APCO) to assess the model's applicability in a retail loyalty marketing context. Data was gathered via a survey instrument administered to an online panel of loyalty card shoppers with a major United States grocery store. Structural equation modelling was utilized to analyze and interpret the relationships between the antecedents and outcomes of a concern for information privacy. Research findings suggest that privacy awareness has a direct impact on a concern for information privacy in a retail loyalty marketing context, regardless of age or gender. Furthermore, shoppers with a heightened concern for information privacy also exhibit higher privacy protecting behaviors. Results of this research extend the application of the APCO model and will help inform the decisions made by retailers regarding the privacy elements associated with their loyalty marketing programs.

INTRODUCTION

Spurred by technology advances, the concern for information privacy continues to grow as an area of multi-disciplinary research. Researchers in fields as diverse as marketing, information systems, law, and economics have recognized the importance and relevance of privacy concerns in an era of increasing technological capabilities (S. Okazaki, et al. 2020). Given currently available technological resources, retailers are now able to collect and use customer data to further financial returns, generate customer insights and increase customer loyalty (Martin, Borah and Palmatier 2017). Many customers routinely share their personal shopping data in exchange for some form of benefit. However, the wide-spread nature of personal data collection and usage has also raised serious privacy concerns among customers (S. Okazaki, et al. 2020).

While much of the research surrounding a customer's concern for information privacy has been conducted in an online context, loyalty marketing programs in a retail environment have not yet been a focus of privacy concern research. This is a specific area of opportunity for further investigation since personal data exchange makes up a core component of loyalty marketing programs specifically and relationship marketing strategies in general (Dolnicar and Jordaan 2007; Pavlou 2011).

Driven largely by the rapid advances in technology, much of the activity involved in marketing transactions today is heavily focused on the exchange of personal information. From online activities such as e-commerce, social networking, and web browsing to off-line purchase activity in a retail setting, data-gathering and information exchange has become a focus of all parties engaged in marketing exchanges. Without a considered understanding of a concern for information privacy in the retail environment, firms risk customer alienation, regulatory intervention, and negative public perception (Martin and Murphy 2017).

The pervasive use of loyalty marketing programs across various retail environments makes this research both timely and relevant. According to the Colloquy Loyalty Census, there are 3.8 billion loyalty program members in the United States, an increase of 15% versus the previous year (2017 COLLOQUY Loyalty Census Report 2017). The retail sector, composed of the grocery, drugstore, department store, fuel, and convenience store channels, account for 42% of all loyalty marketing memberships in the United States (2017 COLLOQUY Loyalty Census Report 2017).

One of the main enablers of the increase in data gathering is the increase in retailer capabilities with regard to accessing and analyzing customer data. Retailers possess a wide array of technological capabilities that can help them capture, store, analyze, and act upon customer data from activity that occurs inside the retail environment as well as activity outside of the retail environment (Inman and Nikolova 2017). Concepts such as Big Data, Artificial Intelligence, and Business Analytics play a significant role in a retailer's ability to leverage customer data for competitive advantage (Tirunillai and Tellis 2014).

Given the data-driven nature of customer engagement in a retail setting, retailers face challenges and responsibilities concerning privacy-related issues. Customers are becoming more acutely aware of data privacy issues given factors such as their own experience as well as occurrences routinely highlighted in the press (Union 2008). The amount of data gathered about a customer, how that data is gathered, how it is stored and protected, and how the data is utilized for marketing purposes all represent areas requiring careful consideration to ensure adherence to laws and regulations, and an understanding of the privacy concerns of customers. Research in data privacy in marketing has focused on understanding the customer's view of data privacy and the potential avenues and pitfalls for how marketers make use of the data available to them (Ferrell 2017; Martin and Murphy 2017). Given the competitive nature of the retail environment, a greater understanding of customers' concern for information privacy could lead to improved target-marketing practices, more careful consideration of elements such as privacy protection statements, and a re-evaluation of tactical marketing decisions. All of these outcomes may enable the retailer to compete more effectively in an increasingly data-driven environment, while still maintaining the loyalty of their most important customers.

In addition to the importance of this research to marketing practitioners, it is also of value to marketing academics. The study of information privacy concerns has been almost exclusively tied to the area of management information systems; and specifically, the online environment (Beke, Eggers and Verhoef 2018). While this stream of research in an online context is relevant to marketers given the increasing importance of digital marketing, the academic study of privacy concerns in a retail environment is lacking. The academic study of loyalty marketing can be strengthened by a more complete understanding of the privacy-protecting behaviors exhibited by customers who express a concern for information privacy. Lastly, from an academic perspective, the marketing discipline is suffering from a widening gap between the application and use of customer data and analytics, and its understanding of the implications of their use (Ferrell 2017). As Martin and Murphy determined, marketing practice in the area of customer data and analytics is advancing more rapidly than marketing academic scholarship in the same area (Martin and Murphy 2017).

Previous research in the area of information privacy concerns has utilized several theoretical frameworks, including expectancy theory, social exchange theory, and social contract theory, as well as economic and legal theories of privacy (Dunfee, Smith and Ross 1999; Luo 2002; Martin 2015; Stone, et al. 1983; Stone and Stone 1990). As this research study is the first to utilize a concern for information privacy (CFIP) model in the context of a marketing exchange with the added dynamic of customer decision-making about the disclosure of personal information in the context of that exchange, the main theoretical focuses are social exchange theory and privacy calculus.

The primary objective of this research was to assess the application of an Antecedents-Privacy Concerns-Outcomes model (APCO) in the context of a retailer-customer relationship as expressed through a retail loyalty marketing program. The APCO model was previously used to assess information privacy concerns in a Facebook context and in a peer-to-peer online context (Benamati, Ozdemir and Smith 2016; Li 2012; Ozdemir, Smith and Benamati 2017). While the above-noted work was focused on the online environment, this research focused on an increasingly data-driven customer environment, namely a loyalty marketing program in a retail environment.

This research study applied a validated privacy concern research model and instrument in a new and relevant setting, namely a retail loyalty marketing context. Using the empirical work conducted by Benamati et al. (2017) as a base, this research filled a significant gap in privacy concern research and provided marketers with a greater understanding of the nature of privacy issues in the context of a retailer-customer relationship.

Structural equation modelling (SEM) was used to evaluate the overall research model. A measurement model was developed to understand the relationship between measures and the associated factors developed for this research. Following validation of the measurement model, the APCO model was also validated via confirmatory factor analysis (CFA). The structural model was evaluated by using goodness-of-fit indicators and construct validity measures (Hair, et al. 2010)

The results of the research study indicated privacy awareness had a direct impact on a concern for information privacy in a retail loyalty marketing context. Shoppers with a heightened concern for information privacy also exhibit higher privacy-protecting behaviors. The results of the study also indicate that an older age group of retail loyalty marketing participants, ≥ 50 years of age, demonstrate greater concern for information privacy than those < 50 years of age. Gender, however, showed no statistical difference in a shopper's concern for information privacy.

The remainder of the paper is structured as follows. The study design and methodology are outlined, including development of the study hypotheses. The results of the research are then presented. Finally, a discussion of the results including a summary of implications for researchers and practitioners is provided.

METHODOLOGY

This research was based on replicating Benamati et al.'s (2017) empirical work with the APCO model. The application of the APCO framework and subsequent relationships among constructs in the model has not yet been studied in a retail loyalty marketing context.

As the landscape of technology became more complex and the capabilities that firms had to collect, store, and analyze customer data increased, privacy-related research mushroomed (Beke, Eggers, and Verhoef 2018; Li 2011; Li 2012; Smith, Dinev, and Xu 2011). An interdisciplinary review of privacy-related research resulted in an overarching macro model that was termed APCO, standing for Antecedents, Privacy Concerns, and Outcomes (Smith, Dinev, and Xu 2011). The review found support for the overarching APCO model, demonstrating that previous interdisciplinary privacy research fell into one of three categories: antecedents, privacy concerns or outcomes. The authors noted, however, that almost all the research had been associated with the linkage between privacy concerns and outcomes with very little attention having been paid to the linkage between antecedents and privacy concerns (Smith, Dinev, and Xu 2011).

The APCO model, having been proposed by Smith et al. in 1996, validated by Stewart and Segars in 2002, expanded upon by Smith et al. in 2011, and empirically tested and validated by Benamati et al. in 2017, is a well-studied and applicable approach to understanding privacy-related concerns (Benamati, Ozdemir, and Smith 2017; Smith, Dinev, and Xu 2011; Smith, Milberg and Burke 1996; Stewart and Segars 2002). In evaluating future research directions for the APCO model, Benamati et al. noted the unexplored opportunities represented by its application to other contexts (Benamati, Ozdemir, and Smith 2017).

The research question posed for this study was: To what degree does an Antecedents-Privacy Concerns-Outcomes framework provide an adequate representation of the relationships associated with a concern for information privacy in a retail loyalty marketing context?

The hypotheses used in this study, adapted from Benamati et al. (2017), were as follows:

- H₁: Higher levels of privacy awareness will be associated with higher CFIP.
- H_{2a}: Women will exhibit higher CFIP than will men.
- H_{2b}: Increasing age will be associated with increasing levels of privacy concerns.
- H₃: Higher CFIP will be associated with privacy-protecting behaviors.
- H₄: Higher expressed perceptions of information-related risk will be associated with lower trust.
- H₅: Higher information-related trust will be associated with fewer privacy-protecting behaviors.

Hypotheses were applied to the APCO model as found in Figure 1.

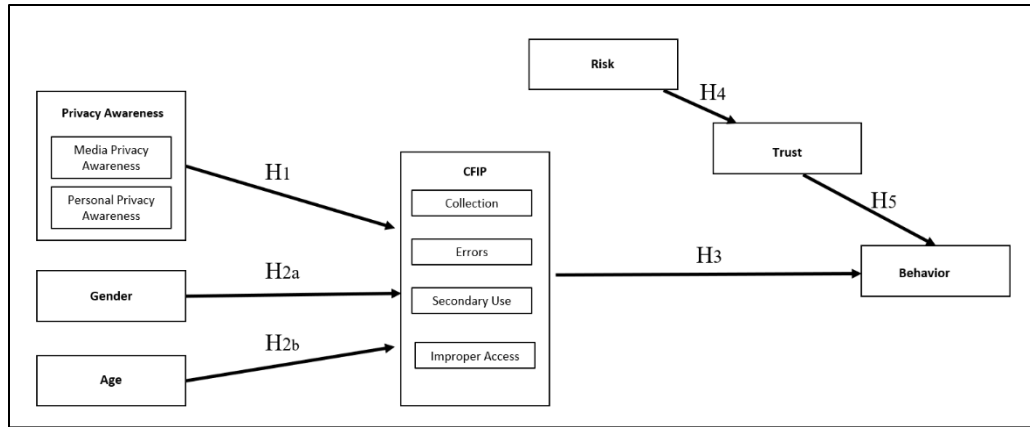


Figure 1. Antecedent – Privacy Concerns – Outcomes model (APCO) being tested in a retail loyalty marketing context; based on Benamati et al., 2017.

The sampling frame was defined as males and females over eighteen years of age who reside in the United States and participate in the retail loyalty marketing program of one of the nation's largest retail grocers. Respondents were recruited via Qualtrics panel and qualified based on the above-noted criteria. An online survey, using previously developed and validated instruments adapted from Smith et al. (1996) as well as Benamati et al. (2017), was used for this research. An email inviting participation to the survey was sent to a random sample of qualified respondents with a target of obtaining 250 completed surveys. The survey did not seek to collect any personally identifiable information and the confidential nature of the data collected was made clear in a notation at the start of the survey. All data collected was kept confidential. Before final data collection via Qualtrics, the survey was re-validated by fielding two pilot studies.

Structural equation modelling (SEM) was used to evaluate the overall research model. A measurement model was developed to understand the relationship between measures and the associated factors developed for this research. Following validation of the measurement model, the APCO model was also validated via confirmatory factor analysis (CFA). The structural model was evaluated by using goodness-of-fit indicators and construct validity measures (Hair, et al. 2010).

RESULTS

Pilot Test Results

Using the APCO instrument in its entirety, and with only slight modifications to questions in the behavior construct based on the context of a retail environment, an initial pilot test survey was launched on August 12, 2020. Data collection was paused on August 14, 2020, with 40 responses. Minitab 19 was used to conduct exploratory factor analysis (EFA) on the data with a maximum likelihood method of extraction, a varimax rotation, and nine factors set to extract. The nine factors were those used in previous privacy concern research conducted by Benamati, et al. (2017).

The results indicated that many of the measured items were multi-dimensional in nature, did not meet the 0.50 coefficient threshold, or both. Several factors did not receive any loadings at all. Given the specific context of this study, a grocery store retail loyalty marketing program, a re-examination of the survey instrument was undertaken to make the questions as specific to the grocery store retail environment as possible.

Following a review of the first pilot test and the modifications to the survey instrument, a second pilot test was launched. The second pilot test was launched on September 14, 2020, via Qualtrics. Data collection was paused on September 15, 2020, with 52 responses. EFA was again conducted using Minitab 19 with a maximum likelihood method of extraction, a varimax rotation, and nine factors set to extract. Coefficients of less than 0.50 were eliminated. The results of the second pilot test produced better and more consistent factor loadings. The results, however, still included several multi-dimensional variables and factors which did not load at all.

Due to these results, a review of the number of factors set to extract and an assessment of measured variables was undertaken. Based on the second pilot test's EFA results, the number of factors set to extract was reduced from nine to seven. This reduction was based on the fact that two factors did not load against any variables, and measures of Media Privacy Awareness (MPA) and Errors (ERR) were highly multi-dimensional. Following these changes, a new EFA was run with parameters consistent with previous EFA tests. Once again, the results were improved with regard to factor loadings and reduced multi-dimensionality, but with two factors that did not load against any variables. Measures of Secondary Use (SU) and Unauthorized Access (UA) were highly multi-dimensional and measured below the 0.50 coefficient threshold. As a result, these factors and their measures were eliminated and the EFA was re-run using five factors. The results of the subsequent EFA with its reduced set of factors produced full factor loadings and variable coefficients equal to or greater than 0.50; as found in Table I.

Table 1

Factor analysis results of pilot test 2

Factors and Items	Privacy Awareness	Concern for Information Privacy	Behavior	Trust	Risk
PPE1	-0.639				
PPE3	-0.785				
PPE4	-0.741				
COLL2		-0.530			
COLL3		-0.633			
COLL4		-0.826			
BEH2			-0.875		
BEH3			-0.591		
BEH5			-0.565		
TR1				-0.964	
TR2				-0.815	
TR4				-0.884	
RSK1					0.831
RSK2					0.856
RSK3					0.845
RSK4					0.864
RSK6					0.778

The remaining factors and their measured variables were still representative of the overall structure of the APCO model. Following these results, full data collection via Qualtrics was initiated.

Pre-analysis Data Review

Full data collection via Qualtrics was initiated using sampling criteria consistent with the parameters used during the pilot tests. Data collection was initiated on September 22, 2020 and was closed on October 3, 2020. A total of 254 fully completed surveys were collected.

Results from the survey included several demographic measures. Of these, age and gender are critical to addressing hypotheses H2a and H2b in this study by assessing the role of age and gender in the influence of a concern for information privacy. Of the 254 completed responses, 50.0% were male, 49.3% were female and 0.7% were non-binary. See Table II. These results closely mirror the gender percentages in the United States where 50.3% of the population are female and 49.7% are male (United States Census Bureau 2020).

Table II

Gender distribution of survey respondents

Selection	Respondents	Percent
Male	127	50.0%
Female	125	49.3%
Non-binary	2	0.7%
Prefer not to comment	0	0.0%

From an age perspective, 56.7% of completed respondents were above the age of 45. The largest age groups were in the age ranges of 45-54, with 19.3%, and 65+ with 20.1%. See Table III.

Table III

Age Distribution of Survey Respondents

Selection	Respondents	Percent
18-24	28	11.0%
25-34	37	14.6%
35-44	45	17.7%
45-54	49	19.3%
55-64	44	17.3%
65+	51	20.1%

Additional demographic measures captured by the survey include age, national origin, race, income, education level, marital status, and employment status.

Structural Equation Modelling

Structural equation modelling (SEM) was used to assess the relationships between variables and help test the hypotheses in this study. Results from the initial measurement model, shown in Figure 2, indicated that the data was non-normal. The multivariate kurtosis using Mardia's Coefficient was equal to 57.69, indicating a leptokurtic non-normal distribution or peakedness of the distribution compared to a normal distribution, with a slightly negative skewness, or shift of the distribution to the right compared to a normal distribution (Hair et al.2010). The results also indicated that five cases (70, 146, 155, 160, and 237) contributed the most toward normalized multivariate kurtosis. The Chi-square result for error terms E17, measuring a variable associated with Risk (RSK4) and E16, measuring a variable associated with Risk (RSK6) was 12.06. Based on these results, the aforementioned error terms were set to covary.

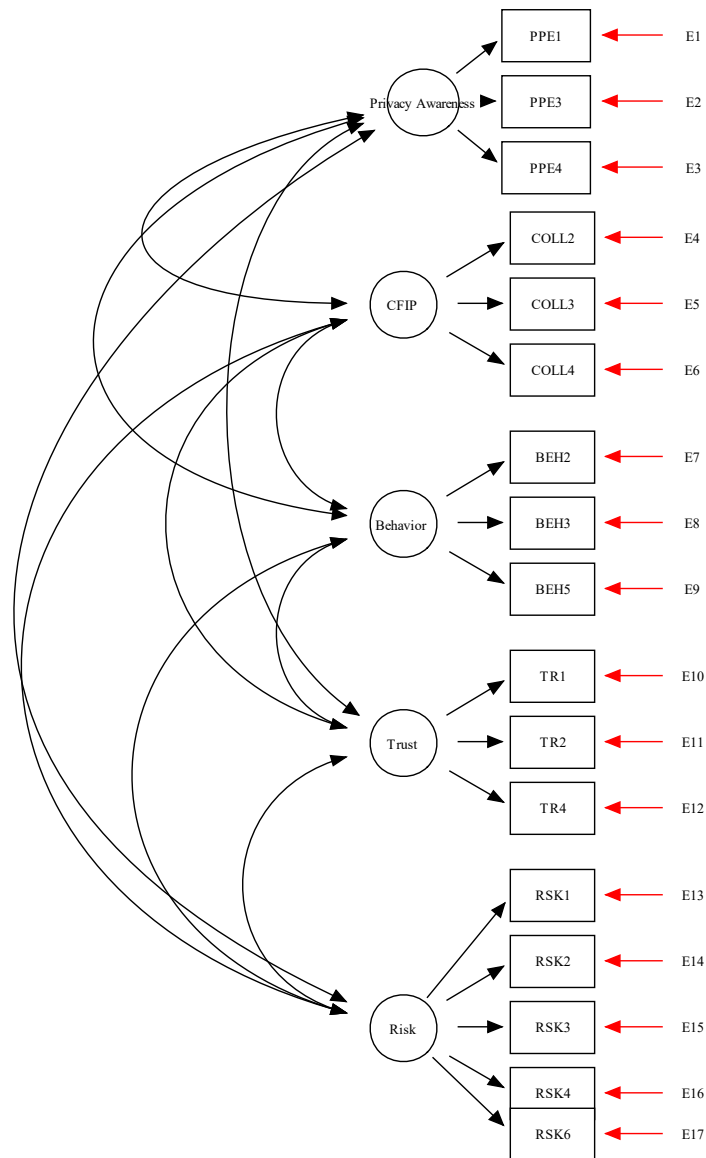


Figure 2. Research measurement model.

The three GOF indices evaluated in this measurement model, NFI, CFI, and RMSEA, indicate a well-fitting measurement model, as noted in Table IV.

Table IV
Measurement Model Fit Indices

Fit Measure	Fit Indices
Reliability Coefficient Rho	0.926
Bentler-Bonnett Normed Fit Index (NFI)	0.932
Comparative Fit Index (CFI)	0.980
Root Mean-Square Error of Approximation (RMSEA)	0.039

The measurement model frequency distribution indicated that 94.77% of the residuals fell between -0.1 and 0.1 indicating a good overall model fit. Lastly, the model reliability coefficient rho, a good estimate of internal consistency in a multifactor model, was found to be .926.

Given the results generated in the analysis of the initial measurement model, five cases contributing the most toward normalized multivariate Kurtosis were removed (70,146,155,160, and 237) and error terms E17, measuring a variable associated with Risk (RSK4) and E16, measuring a variable associated with Risk (RSK6) were set to covary. The measurement model was re-run using EQS in robust mode to adjust for non-normality. The overall fit indices and standardized residuals were re-examined. The measurement model containing the above-noted adjustments, measurement model two, produced fit measures consistent with the prior run of the model.

In addition to the GOF indices and residual distribution, an EFA was also conducted on measurement model two. EFA results for measurement model two produced good loading estimates and associated with their respective latent factors, leading to the conclusion of construct validity. These results are found in Table V.

Table V

EFA matrix for measurement model 2

	Privacy	Concern for Information Privacy	Behavior	Trust	Risk
PPE1	-0.487				
PPE3	-0.657				
PPE4	-0.776				
COLL2		0.514			
COLL3		0.764			
COLL4		0.714			
BEH2			-0.551		
BEH3			-0.723		
BEH5			-0.675		
TR1				-0.868	
TR2				-0.874	
TR4				-0.79	
RSK1					0.829
RSK2					0.82
RSK3					0.843
RSK4					0.777
RSK6					0.749

Following the evaluation and analysis of the measurement model a structural model was developed. The hypothesized relationships between factors, as shown by the direction of single-headed arrows, are found in Figure 3. The model was run in EQS in robust mode to account for the non-normality of the data and the structural fit indices and parameter estimates were evaluated.

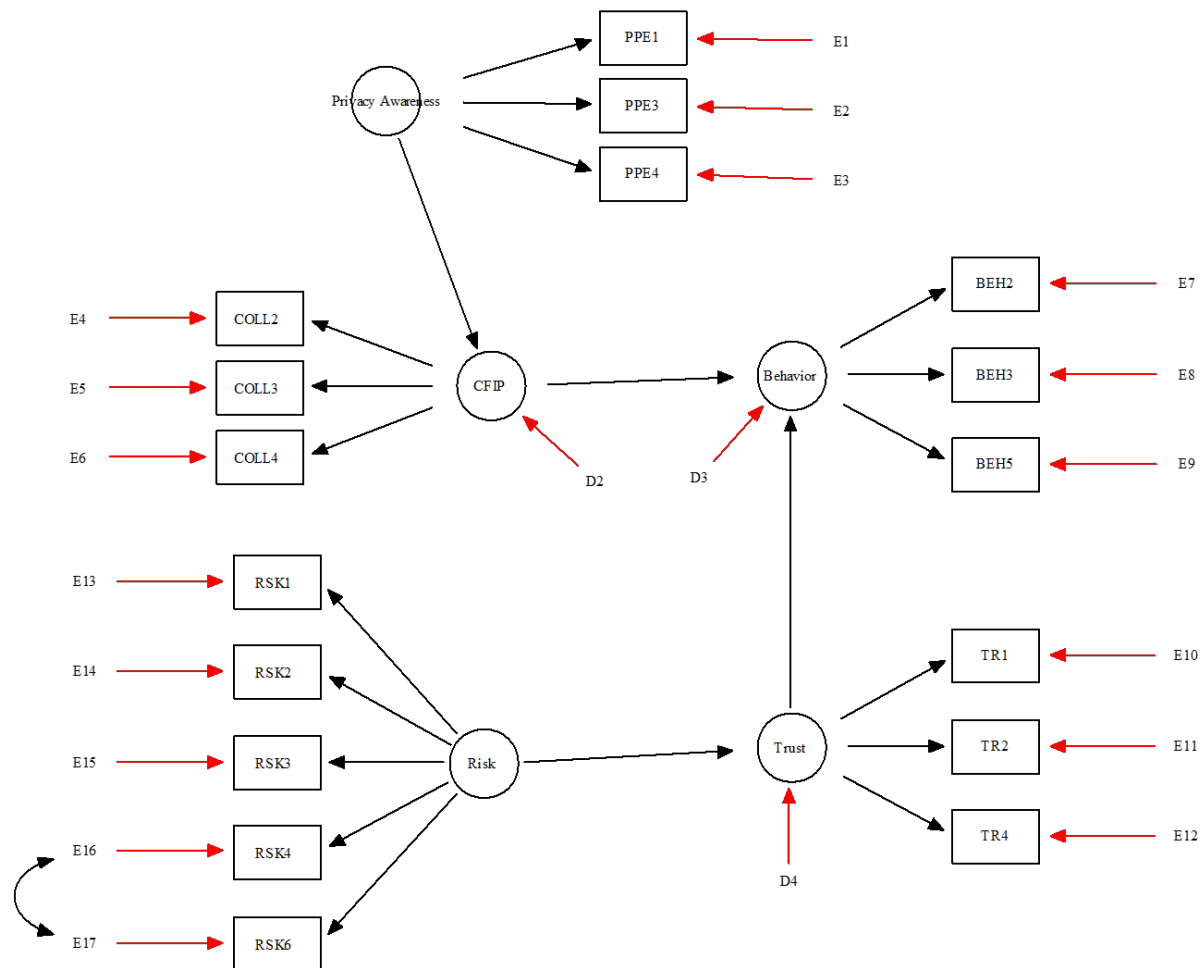


Figure 3. Research structural model.

Results from the structural model indicated that the data was non-normal. The multivariate kurtosis using Mardia's Coefficient was equal to 46.36, indicating a leptokurtic non-normal distribution or peakedness of the distribution compared to a normal distribution, with a slightly negative skewness, or shift of the distribution to the right compared to a normal distribution (Hair, et al. 2010). Given the non-normalized nature of the data collected in the EQS run of the structural model, the GOF indices for the robust method are reported. GOF measures in the structural model indicate a moderate fit; see Table VI.

Table VI
Structural model fit measures

Fit Measure	Fit Indices
Reliability Coefficient Rho	0.894
Bentler-Bonnett Normed Fit Index (NFI)	0.900
Comparative Fit Index (CFI)	0.944
Root Mean-Square Error of Approximation (RMSEA)	0.067

For the structural model, the Robust Independence Model Chi-square value indicates model independence, the NFI indicates a moderate fit, while the CFI and RMSEA indicate a good fit. The residuals for the structural model were uneven in their distribution. Lastly, the model reliability coefficient rhos was found to be 0.90, slightly below that

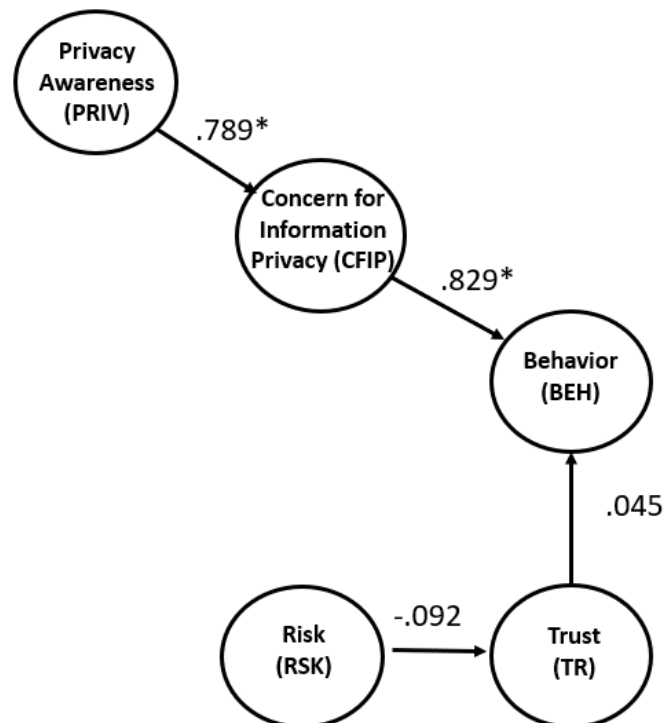
found in the measurement model, but still acceptable. Taken together, these results would indicate an acceptable fit for this structural model.

The structural model parameters were evaluated for their alignment to the model hypotheses and their statistical significance. The structural model path diagram, parameter estimates, and path significance are provided in Table VII, and visually represented in Figure 4. These results demonstrate that Privacy Awareness (PRIV) impacts a Concern for Information Privacy (CFIP) and that CFIP impacts Privacy Protecting Behaviors (BEH). Also, Risk (RSK) negatively impacts Trust (TR), while TR has no impact on BEH. It is important to note that RSK, while negatively impacting TR does not reach statistical significance at the 95% confidence interval.

Table VII
Structural model parameter estimates

Independent Factor	Dependent Factor	Estimate	Std Error	Test Statistic	Robust Std Error	Robust Test Statistic
Privacy Awareness	CFIP	.789	.102	7.78*	.188	4.20*
CFIP	Behavior	.829	.109	7.62*	.183	4.54*
Risk	Trust	-.092	10,7741	-.000	44,117	-.000
Trust	Behavior	.046	.082	.564	.090	.513

Note: * = Statistical significance at 95% confidence interval



Note: * = Statistical significance at 95% confidence interval

Figure 4. Path diagram with significant paths for the antecedents and outcomes of a concern for information privacy in a retail loyalty marketing context.

Model Invariance Testing

The model utilized in this research also included the moderating variables of age and gender attempting to address whether these items operate equally across different population segments. In the case of both gender and age, the EQS output results were reviewed to determine which parameters were not operating equally. Variance was indicated by a review of the robust Lagrange Multiplier (LM) test for releasing constraints. Parameters for any univariate increment Chi-square with a probability of ≤ 0.05 would indicate invariance and therefore represent a difference between the groups.

For the gender groups, the robust LM test indicated that one constraint associated with parameter 40 demonstrated a probability of 0.009 and one constraint associated with parameter 35 demonstrated a probability of 0.05. Parameter 40 was associated with F4 (Trust) and V12 (TR2 - "When it comes to sharing my personal information when shopping, I can rely on the grocery store where I shop most often"). Parameter 35 was associated with F2 (Concern for Information Privacy) and V5 (COLL2 - "It bothers me that so many places where I shop are collecting my personal information").

A 2-sample T-test and Confidence Interval analysis was run on responses between males and females for V12 and V5. Results of this test, as found in Table VIII, indicate that the difference in means for both variables are not statistically significant at the 95% confidence interval, indicating males and females do not differ significantly in their answers to these variables.

Table VIII

Mean differences for V12 and V5 by gender

Sample	n=	Mean	
		V12	V5
Male	127	3.86	3.71
Female	125	3.94	3.79
		$p=0.557$	$p=0.490$

For the age groups, the robust LM test indicated that one constraint associated with parameter 33 demonstrated a probability of 0.011 and one constraint associated with parameter 35 demonstrated a probability of 0.027. Parameter 33 was associated with F1 (Privacy Awareness) and V2 (PPE3 - "My information privacy is invaded all the time"). Parameter 35 was associated with F2 (Concern for Information Privacy) and V5 (COLL2 - "It bothers me that so many places where I shop are collecting my personal information").

To assess if age groups were answering the survey questions differently for each of the variables noted in parameters 33 and 35, an analysis of the question means was undertaken. A 2-sample T-test and Confidence Interval analysis was run between those < 50 years of age and those ≥ 50 years of age for V2 and V5. Results of this test, found in Table IX, indicate that the difference in means for parameter 33 is statistically significant at the 95% confidence interval, while the difference in means for parameter 35 is not statistically significant at the 95% confidence interval, meaning that respondents < 50 years of age differ from those ≥ 50 in their answers to V2 but do not differ significantly in their answers to V5. A lower mean score on the survey question associated with V2 indicates stronger agreement with the question. This finding supports the notion that respondents ≥ 50 demonstrate a higher concern for information privacy.

Table IX

Mean Differences for V2 and V5 by age

Sample	n=	Mean	
		V2	V5
<50 years of age	133	3.10	3.66
≥50 years of age	121	2.52	3.79
		<i>p</i> =0.000	<i>p</i> =0.347

Overall, the results of the research into the antecedents and outcomes of privacy concerns in a retail loyalty marketing context indicated that privacy awareness contributes to a concern for information privacy which, in turn, contributes to privacy-protecting behaviors. Risk was found to be a negative influence on trust, although not at the 95% confidence interval, and trust was not found to be influential on privacy-protecting behaviors. Based on these results, conclusions regarding the hypotheses posited in this research are shown in Table X.

Table X

Summary of research hypotheses

Notation	Hypothesis	Research Result
H ₁	Higher levels of privacy awareness will be associated with higher CFIP.	Supported
H _{2a}	Women will exhibit higher CFIP than will men.	Not Supported
H _{2b}	Increasing age will be associated with increasing levels of privacy concerns.	Partially Supported
H ₃	Higher CFIP will be associated with privacy-protecting behaviors.	Supported
H ₄	Higher expressed perceptions of information-related risk will be associated with lower trust.	Not Supported
H ₅	Higher information-related trust will be associated with fewer privacy-protecting behaviors.	Not Supported

DISCUSSION

The primary objective of this research was to assess the application of an Antecedents-Privacy Concerns-Outcomes model (APCO) in the context of a retailer-customer relationship as expressed through a retail loyalty marketing program; an increasingly data-driven customer environment.

The model employed in this research was designed to assess the antecedents and outcomes of a concern for information privacy in a retail loyalty marketing context. The results of the research study, sourced from the pre-analysis data review, statistical analysis, and hypotheses findings, provide insight into the behavior of shoppers engaged in a grocery store retail loyalty marketing program across the three areas of the model. In addition, these results also provided insight into the relationship between information-related risk and trust, as well as trust and privacy-protecting behaviors. Finally, differences in the moderating variables of age and gender on a concern for information privacy are also revealing.

Privacy Awareness

The results of the study showed a statistically significant relationship between levels of privacy awareness and concern for information privacy. This result is consistent with previous research in the area of information privacy and confirms that privacy awareness, regardless of context, heightens one's concern for information privacy (Benamati, Ozdemir, and Smith 2017; Smith, Milberg, and Burke 1996; Stewart and Segars, 2002). Based on the measurement items associated with this latent variable, those who have been personally impacted by violations of their information privacy are more likely to have a concern for information privacy. These results, taken with the findings of previous research,

can be interpreted to mean that the relationship between privacy awareness and concern for information privacy is not context-specific but more of a reflection of general human behavior.

Concern for Information Privacy

The results of this study demonstrated a significant relationship between concern for information privacy and privacy-protecting behaviors in a retail loyalty marketing context. Once again, these results are consistent with prior findings associated with privacy concern research (Benamati, Ozdemir, and Smith 2017; Smith, Milberg, and Burke 1996; Stewart and Segars, 2002). A concern for one's information privacy leads to certain behaviors that are designed to protect that information. In the context of a retail loyalty marketing program, the relationship between concern for information privacy and privacy-protecting behaviors was the strongest among any of the model paths analyzed. The results can be interpreted as showing the likelihood that an individual with information privacy concerns will take whatever steps necessary to protect their data and information. Given the consistency of these findings with other similar research, the relationship between concern for information privacy and behavior designed to protect said information can be interpreted as not context-specific but more of a reflection of general human behavior.

Privacy Protecting Behaviors

While the findings of this research show a consistent path to privacy-protecting behaviors, the results of this study were particularly interesting considering the study context. For a retailer, the results of their successful use of customer data in a customer loyalty program are reflected in the improvement of several key metrics. These metrics include increasing their most valuable customers' commitment and share of wallet, as well as the firm's customer retention rates, and profitability. Consequently, firms gather, analyze, and use information about their customers' preferences and buying behaviors. This approach of relying on more and more data capture to ensure a competitive advantage has also served to raise information privacy concerns among customers (Leppaniemi, Karjaluoto and Saarijarvi 2017). Results in this study demonstrate how critical it is for retailers to manage a customer's concern for information privacy to gain or maintain customer loyalty. Firms should pay close attention to customers' concerns for information privacy to limit customer leakage to other retailers or reduce the risk of a customer withholding the use of their loyalty card because of information privacy concerns.

Risk and Trust

Study findings showed only a slight inverse relationship between risk and trust, and no relationship between trust and privacy-protecting behaviors. These results run counter to the findings of Benamati et al. (2017) who found a significant inverse relationship between risk and trust and a significant relationship between trust and privacy-protecting behaviors. The contradiction of these findings is interpreted as having more to do with the context of the two studies.

The online context of Facebook used by Benamati, et al. (2017) is much less personal and abstract, and occurs on a larger, much more open platform. Engagement with Facebook takes place on the internet whereas the retail loyalty marketing context in this study takes place in a smaller, more constrained environment. This difference would likely lead one to perceive higher information-related risk with Facebook and therefore less trust. With less trust, one would likely exhibit greater privacy-protecting behaviors. In contrast, the context of this study was limited to a specific retailer. Respondents indicated that they shopped this retailer most often and utilized a shopper loyalty card when making purchases. As such, it is likely that either out of habit or out of experience, the shopper's degree of perceived information-related risk was lower, and thus the relationship to trust was lessened. Similarly, regular shoppers likely already had higher degrees of trust in the retailer and therefore had less of a need for privacy-protecting behaviors. An important distinction in this area of the research relates to the specific reference to "grocery store shopped most often" in questions about risk and trust. This reference was not a part of questions related to the areas of privacy awareness, concern for information privacy, and privacy-protecting behaviors. This likely helps to explain the differences in the path estimate results generated between privacy awareness, a concern for information privacy, and privacy protecting behaviors, compared to the risk-trust portion of the model.

Age

This study utilized the results of invariance testing to determine if differences in concern for information privacy existed between younger respondents (<50 years of age) and older respondents (>50 years of age). These results showed a significant difference between these two groups in one measure of privacy awareness but did not show a statistically significant difference in the relationship in another measure. This result is consistent with those of Benamati et al. (2017) which found only a marginal relationship between age groups in the context of a concern for information privacy. The work of Benamati et al. (2017) evaluated age in cohort groups of increasing age, however, and not within the criteria used in this research study. Much of the extant literature supports the notion that a concern for information privacy increases, almost uniformly, as age increases (Culnan and Armstrong 1999; Equifax Inc. 1990; Regan, Fitzgerald and Balint 2013). One interpretation of the results of this study relates to the context of the study and the degree of familiarity the respondents had with the retailer. It is possible that greater familiarity with the retailer could tend to lessen differences among age groups. Also, as prior research becomes older and individuals age, their attitudes toward information privacy may travel with them. As time goes on, this may tend to lessen the impact of a concern for information privacy as formerly younger age cohorts who are less concerned become members of older age cohorts.

Gender

In this research study, the impact of gender on a concern for information privacy was tested via a group invariance approach. The results of this study showed no statistical difference between males and females with regard to their concern for information privacy. This contradicts earlier research, where females demonstrated a greater concern for information privacy than did males (Benamati, Ozdemir, and Smith 2017). Much of the previous research, however, was conducted in an online context, including social media and peer-to-peer information exchanges. Interpretation of the findings in this research study relates to the role of gender in grocery shopping specifically. Females in this study did not show increased concern for information privacy as compared to men. According to the U.S. Bureau of Labor Statistics, 80% of females with children and 68% of females without children indicate that they are the primary grocery shopper for their household (U.S. Bureau of Labor Statistics 2020). If women are engaged in this activity to such a high degree and the activity is a necessity for their families, information privacy may not be of primary concern. The results of this study can be interpreted as supporting this notion regarding grocery store shopping behavior.

Practitioner Implications

Marketing managers in a retail environment have access to a wide array of technological capabilities that can help them capture, store, analyze, and act upon customer data from activity that occurs inside and outside of the retail environment (Inman and Nikolova, 2017). Given the data-driven nature of customer engagement in a retail setting, however, retailers face challenges concerning privacy-related issues. Customers are becoming more acutely aware of data privacy issues given factors such as their own experience as well as occurrences routinely highlighted in the press (Union 2008). Results from this research study indicate that privacy awareness has a direct impact on a customer's concern for information privacy and, in turn, leads to privacy-protecting behaviors. As a customer acts on privacy-protecting behaviors, such as making purchases without the use of their loyalty card or shopping elsewhere, the retailer loses a loyal customer and/or the precious asset of customer data. Given the wide range of potential antecedents impacting CFIP, only some of which were studied here, retailers must focus on reducing a customer's CFIP to reduce the likelihood of the customer exhibiting privacy-protecting behaviors detrimental to the retailer's objectives. This author would recommend a handful of steps for retailers to take that can help insulate them from this outcome.

Retail marketing practitioners need to gain customer confidence in the key areas which research has defined as CFIP. These include the amount of data gathered about a customer, how that data is gathered, how it is stored and protected, and how the data is utilized for marketing purposes.

Another approach a retailer should consider relates to their security protocols regarding the storage and protection of customer data. Personal privacy awareness, as studied in this research, is a key measure of the CFIP antecedent Privacy Awareness. This concept is directly tied to a customer's own experience with violations of their information privacy. The more a retailer can do to reduce or eliminate potential data breaches or unauthorized customer information exposure, the less likely the customer will be to experience personal privacy issues, leading to a higher CFIP and further privacy-protecting behaviors. Lastly, full disclosure regarding the use of the data gathered is also an important

step retailers should take. Customers should not be surprised when a targeted offer is directed to them and should be allowed to opt-out of future communications.

Retail marketing practitioners need to consider the amount of data gathered about a customer, how that data is gathered, how it is stored and protected, and how the data is utilized for marketing purposes. Given the competitive nature of the retail environment, a greater understanding of customers' concern for information privacy should lead to improved target-marketing practices, more careful consideration of elements such as privacy protection statements, and a re-evaluation of tactical marketing decisions. All these outcomes may enable the retailer to compete more effectively in an increasingly data-driven environment, while still maintaining the loyalty of their most important customers.

Research Implications

This research study is the first to examine the antecedents and outcomes of information privacy concerns in a retail loyalty program context. As such, several directions for future research exist. First, the retail environment selected for this study represents only one type of retail loyalty marketing approach. Future research should expand the study of privacy concerns in loyalty marketing programs by including other channels utilizing loyalty programs such as hospitality, travel, or banking.

Next, and as noted previously, this research model focused on a limited number of antecedents, namely privacy awareness, age, and gender. Further research into other antecedents of a concern for information privacy including education level, household income, and frequency of privacy violations could provide valuable insight into the level of an individual's concern as well as identify those antecedents which influence a concern for information privacy to a greater or lesser degree.

Third, the results of the study concerning risk, trust, and privacy-protecting behaviors did not show a significant relationship between these variables. Based on these findings, a potential area for future research would be to explore how the relationships of risk, trust, and privacy-protecting behaviors in a retail loyalty marketing environment compared to those relationships found in an online retail environment where data and information are also exchanged.

Lastly, the results of this study demonstrated a general path linking privacy awareness to a concern for information privacy and then to privacy-protecting behaviors. A potential direction for future research should include a review of the same path based on the type of product purchased in a retail loyalty marketing context. Consumers may hold a more heightened view of privacy-related concerns if a sensitive or embarrassing product is purchased within the market basket and data about that transaction is captured.

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REFERENCES

- COLLOQUY Loyalty Census Report. (2017). 2017 Loyalty Census: Loyalty One. Loyalty One Web site. June 29. <https://www.loyalty.com/home/insights/article-details/2017-colloquy-loyalty-census-report>.
- Beke, F., Eggers, F., & Verhoef, P. (2018). Consumer informational privacy: Current knowledge and research directions. *Marketing* 1-71. doi:10.1561/17000000057.
- Benamati, J., Ozdemir, Z., & Smith, J. (2016). An empirical test of an antecedents privacy concerns outcomes model. *Journal of Information Science*, 583-600.
- Culnan, M. & Armstrong, P. (1999). Information privacy concerns, procedural fairness, and impersonal trust: An empirical investigation. *Organization Science*, 104-115.
- Dolnicar, S. & Jordaan, Y. (2007). A market-oriented approach to responsibly managing information privacy concerns in direct marketing. *Journal of Advertising* 123-149.
- Dunfee, T., Smith, C., & Ross, W. (1999). Social contracts and marketing ethics. *Journal of Marketing*, 14-32.
- Equifax Inc. 1990. *The equifax report on consumers in the information age*. Atlanta: Equifax Inc.
- Ferrell, O.C. (2017). Broadening marketing's contribution to data privacy. *Journal of the Academy of Marketing Science*, 160-163.
- Hair, J., Black, W., Babin, B., & Anderson, R. (2010). *Multivariate data analysis*. 7th. Upper Saddle River, New Jersey: Prentice Hall.
- Inman, J. & Nikolova, H. (2017). Shopper-facing retail technology: A retailer adoption decision framework incorporating shopper attitudes and privacy concerns. *Journal of Retailing*, 7-28.
- Leppaniemi, M., Karjalainen, H., & Saarijärvi, H. (2017). Customer perceived value, satisfaction, and loyalty: The role of willingness to share information. *International Review of Retail, Distribution, and Consumer Research*, 164-188.
- Li, Y. (2011). Empirical studies on online information privacy concerns literature review and an integrative framework. *Communications of the Association for Information Systems*, 453-496.
- Li, Y. (2012). Theories in online information privacy research: A critical review and an integrated framework. *Decision Support Systems*, 471-481.
- Luo, X. (2002). Trust production and privacy concerns on the internet: A framework based on relationship marketing and social exchange theory. *Industrial Marketing Management*, 111-118.
- Martin, K., Borah, A., & Palmatier, R. (2017). Data privacy: effects on customer and firm performance. *Journal of Marketing*, 36-58.
- Martin, K. & Murphy, P. (2017). The role of data privacy in marketing. *Journal of the Academy of Marketing Science*, 135-155.
- Martin, K. (2015). Privacy notices as tabula rasa: An empirical investigation into how complying with a privacy notice is related to meeting privacy expectations online. *Journal of Public Policy and Marketing*, 210-227.
- Okazaki, S., Eisend, M., Plangger, K., Ruyter, K., & Grewal, D. (2020). Understanding the strategic consequences of customer privacy concerns: A meta-analytic review. *Journal of Retailing*, 458.

- Ozdemir, Z., Smith, J., & Benamati, J. (2017). Antecedents and outcomes of information privacy concerns in a peer context: An exploratory study. *European Journal of Information Systems*, 642-660.
- Pavlou, P. (2011). State of information privacy literature: where are we now and where should we go? *MIS Quarterly*, 989-1015.
- Regan, P., Fitzgerald, G., & Balint, P. (2013). Generational views of information privacy. *Innovation: The European Journal of Social Science Research*, 81-99.
- Smith, J., Milberg, S., & Burke, S. (1996). Information privacy: Measuring individuals' concerns about organizational practices. *Management Information Quarterly*, 167-196.
- Smith, J., Dinev, T., & Xu, H. (2011). Information privacy research: An interdisciplinary review. *MIS Quarterly*, 989-1015.
- Stewart, K. & Segars, A. (2002). An empirical examination of the concern for information privacy instrument. *Information Systems Research*, 36-49.
- Stone, E. & Stone, D. (1990). Privacy in organizations: Theoretical issues, research findings, and protection mechanisms. *Research in Personnel and Human Resources Management*, 349-411.
- Stone, E., Gueutal, H., Gardner, D., & McClure, S. (1983). A field experiment comparing information privacy values, beliefs, and attitudes across several types of organizations. *Journal of Applied Psychology*, 459-468.
- Tirunillai, S. & Tellis, G. (2014). Mining marketing meaning from online chatter. *Journal of Marketing Research*, 463-479.
- U.S. Bureau of Labor Statistics. (2020). *American time use survey*, Retrieved from <https://www.bls.gov/tus/tables.htm>.
- Union, Consumers. (2008). *Consumer reports poll: Americans Extremely Concerned About Internet Privacy*. New York: Consumers Union.0
- United States Census Bureau. (2020). *Quick facts*.. <https://www.census.gov/quickfacts/fact/table/US/SEX255219#SEX255219>.

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**IS FREE CASH FLOW HELPFUL IN INVESTMENT DECISIONS?
THE CASE OF THE U.S. UTILITIES INDUSTRY SECTOR**
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ABSTRACT

The purpose of this study is to identify the accounting definition of free cash flow (FCF) that is the most helpful to investors in the Utilities companies. The results would help retail investors make better decisions and may encourage accounting standards setters to require the Utility Industry Sector companies to use a specific definition of FCF to enhance comparability. Using correlations and multiple regression analysis on a sample of 3,352 observations covering the 30-year period from 1988 to 2021, the author concludes that FCF information is not helpful in investment decision-making with respect to the Utility Industry sector. This result agrees with some prior research in the literature review.

INTRODUCTION

Free Cash Flow (FCF) is a useful piece of information for investors to make investing or divesting decisions because it is difficult to manipulate whereas net income (NI) maybe manipulated. Also, companies cannot pay their bills (for example for salaries, construction of a new factory, or dividends) with NI. All of these should be paid in cash. Thus, it may be argued that a business's ability to generate cash is what really matters. NI, earnings per share (EPS), and return on investment (ROI), which are computed based on accrual accounting, are important metrics of measuring a company's profitability and are used by many to make investment decisions. However, the income statement (I/S), which reports NI and EPS, spreads out the cash spent on long-term investments over time. So, if a company, like Apple, buys \$1 billion in computer equipment, the expense is spread out over 3-5 years on its I/S in the form of depreciation. However, unless Apple gets the equipment and pays for it in bonds or stocks (i.e., a non-cash transaction) it will have to pay for the computer equipment in cash. Thus, while the I/S smooths out a business's use of cash over time, the Statement of Cash Flows (SCF), from which FCF is calculated, offers no such smoothing benefit.

Maksy (2016) observed that prior research is not conclusive as to whether FCF is associated with stock prices, i.e., whether it is relevant to equity valuation. Maksy (2017) noted that the accounting literature has a wide variety of FCF definitions, and he used a sample comprising the U.S. Information Technology sector over 30 years, to identify which FCF definition is value relevant to that sector. He concluded that the FCF computed as "cash flow from operations less capital expenditures less preferred stock dividends" is the most significantly associated with stock price changes. While Cash Flow for Capital Expenditures (CFCE) represents most (and sometimes all) Cash Flow for Investing activities (CFI) for many companies, some companies' CFI is much larger than CFCE. Given that industry sectors vary significantly in terms of their CFCE and CFI activities, the aim in this paper is to identify which FCF definition, if any, is the most value-relevant for the Utilities Industry Sector (UIS) companies. Is it the same as the one that is most value-relevant for the information technology companies? Or is it totally different?

This study aims to provide two contributions to the literature. First, if FCF is helpful to investment decisions with respect to UIS companies, knowing which definition is the most helpful is a valuable piece of information for people contemplating investing in these companies because they would use that definition of FCF in making their investment decisions. If none of the FCF definitions is helpful, then investors may not need to waste their time to include FCF in their decision-making process. Second, if there is a specific definition of FCF that is most value-relevant to UIS companies, there are implications for financial accounting standard setters. While the Financial Accounting Standards Board (FASB) requires companies [in Statement of Financial Accounting Standard (SFAS) No. 95 as originally issued in 1987 and as converted to Topic 230 in the FASB Codification Project], to report CFO on the SCF, it has so far discouraged companies from reporting CFO per share. The FASB is concerned that requiring, or even encouraging, companies to report CFO per share may be construed by some that it is moving away from accrual-basis accounting toward cash-basis accounting. Thus, it requires companies to report EPS, which is based on accrual accounting, on the face of the I/S but discourages companies from reporting CFO per share on the face of the SCF or anywhere else in the annual report. The results of this study might be considered by the FASB if it wants to engage in a project to decide whether to require UIS companies to report a specific definition of FCF (but not FCF per share) in the body of the SCF or in the supplementary disclosures at the bottom of the SCF, together with cash paid for income taxes and cash paid for interest expense. Or the FASB might just consider whether to prohibit UIS companies from voluntarily disclosing FCF of whatever definition they prefer or require those companies to use a specific definition of FCF to

enhance comparability. Companies that voluntarily disclose FCF information use a wide variety of definitions of FCF (apparently, each company is using the definition that shows the highest amount of FCF). These companies, on average, are less profitable and more leveraged than other firms in their own industries (Adhikari and Duru, 2006). Having all companies, in a given industry sector, reporting FCF that is calculated in the same way would enhance comparability of accounting information across firms in that sector (Maksy, 2016 and 2017).

The North American Industry Classification System (NAICS) describes the Utilities sector as comprising establishments engaged in the provision of the following utility services: electric power, natural gas, steam supply, water supply, and sewage removal. Within this sector, the specific activities associated with the utility services provided vary by utility: electric power includes generation, transmission, and distribution; natural gas includes distribution; steam supply includes provision and/or distribution; water supply includes treatment and distribution; and sewage removal includes collection, treatment, and disposal of waste through sewer systems and sewage treatment facilities.

The utilities sector is considered a secular, defensive sector because utility companies have a steady revenue stream, and their performance is unaffected by changes in the economy. When times are bad, consumers are still purchasing these necessities. This is why many investors turn to the sector during times of economic turmoil – the consistent, stable returns of utility companies are especially attractive when it seems like everything else in the economy is going sour. However, even though the utilities sector tends to attract investors during economic downturns, the opposite is true when economic growth is on the horizon. When times are good, most people invest in cyclicals. The utilities industry sector is also heavily regulated, which means the companies within the sector have fewer competitors, giving them certain monopolistic capabilities. This enables utility companies to have predictable cash flows and profits. But regulation also exposes these companies to some significant risks. Because utility companies provide necessary services to society, the government dictates how much these companies can charge customers. This means that utility companies have lower earnings potential, and the companies can't adjust their prices when the costs of the commodities they rely on – like oil or gas – rise. In other words, regulations can increase the cost of doing business for utility companies. Furthermore, utility companies also face challenges as weather trends shift and more natural disasters occur in the U.S. These companies are responsible for repairs from fires, floods and storms, which can eat into their cash flows.

In light of the above discussion of upside potential and downside risk of investment in UIS companies, can FCF be a major factor in deciding whether to invest or not invest in these companies? This study is an attempt to answer this question. While the UIS is the smallest industry sector in the US, it is still a large sector, and an important part of the U.S. economy, with a market capitalization of over \$1.5 trillion as of March 2021 (Murphy 2021). Furthermore, as Maksy (2016) noted, comparability in one specific sector is one of the enhancing qualitative characteristics of useful financial information as stated in FASB's Statement of Financial Accounting Concepts (SFAC) No. 8. The remaining sections of the paper cover the literature review, sample, statistical results, and conclusions of the study, respectively. The final section provides study limitations and some suggestions for further research.

LITERATURE REVIEW

The accounting literature has many definitions of FCF (Maksy 2016). FCF is defined differently from textbook to textbook, professional article to professional article, academic article to academic article, from company to company (and some companies change their definition of FCF from time to time), and from all these to the popular press. A case in point, Mandalay Resort (formerly known as Circus Circus) was one of the first companies to report FCF information in its 1988 annual report. Over the years, it has changed its FCF definition. In 1988 it defined it as Operating Income (OI), but in 2000, it added back pre-opening expenses, abandonment loss, depreciation and amortization expense (D&A), interest, dividend, and other income, as well as proceeds from disposal of equipment and other assets. Coca-Cola defined FCF as CFO less CFI prior to 1999, but in 1999 it changed the definition to CFO less "acquisitions and investments." That change in definition increased its FCF in 1999 by almost \$2 billion. Different definitions of FCF are reported by popular magazines and investment advisory service organizations such as Money, Forbes, the Motley Fool, Value Line, and InvestLink (Mills, et. al, 2002). Also, there are different definitions of FCF in textbooks. For example, Subramanyam (2014) discusses several definitions of FCF but seems to favor one in particular: $FCF = CFO - \text{Cash Flow required to maintain productive capacity} - \text{all preferred and common stock dividends}$. The definition of FCF in Kieso, Weygandt, and Warfield, 18th ed. (2022) remains the same: $CFO - CFCE$ –

Total Dividends. This is the same definition as in the 2019 edition of that most adopted Intermediate Accounting book by U. S. colleges and universities.

A search for “free cash flow definitions” on Google produced about 3.46 million entries for this title, the first of which is “Definitions of Free Cash Flow on the Web” (Maksy 2016). Table 1 presents the 15 definitions under this title, together with the web address associated with each definition. It is interesting to note that every definition is different. Adhikari and Duru (2006) reported that of 548 firms of their sample that voluntarily reported FCF information, 283 (or 51.6%) defined FCF as CFO – CFCE; 117 (or 21.4%) defined FCF as CFO – CFCE – Total Dividends; and 64 (or 11.7%) defined FCF as CFO – CFI. The remaining 84 firms (or 15.3%) defined FCF in four different other ways.

Previous research studies about FCF present conflicting results as to whether FCF is positively associated with stock prices. Some studies report no significant association or even negative association and some report significant positive association. For example, Penman and Yehuda (2009), using a definition of FCF as CFO less cash investments, find negative association and state that “a dollar more of FCF is, on average, associated with approximately a dollar less in the market value of the business.” They also find that this FCF definition has no association with changes in the market value of the equity. Moreover, after they controlled for the cash investment component of FCF, they find that CFO also reduces the market value of the business dollar-for-dollar and is unrelated to the changes in market value of the equity. Additionally, GuruFocus.com, a website that tracks market insights and news of investment gurus, published two research studies, Gurufocus (2013a and 2013b), concluding that earnings and book values are significantly correlated with stock prices but FCF, defined as CFO – CFCE and acquisitions, is not. On the other hand, companies with greater FCF, defined as CFO less CFCE, and greater growth opportunities, have higher value prices and their FCF is positively associated with stock returns (Habib, 2011). Furthermore, Shahmoradi, (2013), using the same definition of FCF (CFO – CFCE) and a sample of listed companies on Tehran Stock Exchange between 2002 and 2011, reported a relationship (significant at the .05 level) between FCF and stock returns.

The literature review presented above, especially the accounting literature, indicates that FCF is defined in so many different ways. The objective of this study is to determine which one of these definitions, if any, is most correlated with (and, thus, is hypothesized to be the best predictor of) stock price changes for the UIS companies in the U.S.

Maksy (2016 and 2017) proposed his own definition of FCF which is CFO less Capital Expenditure required to Maintain Productive Capacity (CEMPC) less Preferred Stock Dividends (PSD). However, he used eight other most commonly used definitions of FCF to determine which one is most significantly associated with stock price changes. To identify which FCF definition is most significantly associated with stock price changes of UIS companies, the author will use the same nine definitions used in Maksy (2016 and 2017) as listed below:

FCF1 = CFO - CEMPC

FCF2 = CFO - CFCE

FCF3 = CFO - CFI

FCF4 = CFO - CEMPC - PSD

FCF5 = CFO - CFCE - PSD

FCF6 = CFO - CFI - PSD

FCF7 = CFO – CEMPC - TD

FCF8 = CFO – CFCE– TD

FCF9 = CFO – CFI - TD

Where: TD = Total Dividends paid on common and preferred stock, and the other abbreviations are as described previously.

FCF2 is the most commonly used FCF definition in the financial press and the web, and FCF8 is Standard & Poor’s definition and is reported directly in its COMPUSTAT database from which the study sample was collected. It should be noted that the second three FCF definitions (FCF4 to FCF6) are the same as the first three FCF definitions (FCF1 to FCF3) except that PSD is subtracted in each definition. Similarly, the third three FCF definitions (FCF7 to FCF9) are the same as the first three FCF definitions (FCF1 to FCF3) except that TD is subtracted in each definition.

The change in the stock price per share (Δ SPPS) may be affected by changes in sales per share (Δ SPS), earnings per share (Δ EPS), dividend per share (Δ DPS), and book value per share (Δ BVPS). For this reason, all these variables are included in the model so they can be controlled for to show the effect of change in FCF per share (Δ FCFPS) on Δ SPPS. Moreover, to control for the size of the firm, the natural logarithm of total assets (*ln*ta) and the natural logarithm of

total sales (*lnsale*) are included in the model. Furthermore, the author controls for year-end fixed effects. Thus, the proposed model as reported in Maksy (2016 and 2017) is as follows:

$$\Delta SP_{PS} = B_0 + B_1 \Delta SP_{PS} + B_2 \Delta EPS + B_3 \Delta DPS + B_4 \Delta BVPS + B_5 \Delta FCFPS_{1-9} + B_6 \ln sale + B_7 \ln at + \epsilon.$$

$\Delta FCFPS$ is computed as follows: $FCFPS_t - FCFPS_{t-1}$ where $FCFPS_t = FCF1 / \text{weighted average number of common shares outstanding during year } t$. This weighted average number of common shares is computed by dividing $(NI - PSD)$ by EPS for year t . The same rule applies to all nine definitions of $FCFPS$ ($FCFPS1$ through $FCFPS9$). Appendix A provides full definitions of the model variables.

THE STUDY SAMPLE

All UIS companies listed in COMPUSTAT for the 34-year period 1988 to 2021 are included in the sample. All firm year observations that have missing variables are eliminated which resulted in a final sample of 3,352 observations. The study period starts from 1988 because SFAS 95 was issued in 1987 (however, all FASB SFASs, including SFAS 95, have been superseded in 2009 when the FASB Codification project became effective and the SCF is now under Topic 230 in the FASB Codification), which requires companies to disclose CFO. Since the model uses the changes from year to year, 1988 observations represent the changes from 1987 to 1988 data and all other years observations are derived in a similar manner. The study period ends in 2021 because this is the last year with available data on COMPUSTAT at the time of collection. As Maksy (2016 & 2017) noted, one of the years of the study period, 2008, was a very abnormal year as total market indexes took a big dive because of the world's financial crisis that started during that year. During 2008, the Dow Jones Industrial average lost 31 percent of its value (but at one point, in November of that year, it was down 39 percent). Also, the NASDAQ index lost 39 percent (but in November 2008 it was down 46 percent). Similarly, the S&P 500 Cash Index lost 36 percent (but in November 2008 it was down 43 percent). It is possible that, because of that abnormality, the change in stock prices during 1988 was affected by psychological factors much more so than by financial factors. Because of that possibility, the author ran the model using a sample of observations ending in 2007 and ran it another time using a sample that excludes 2008 observations. The results from these different samples were not significantly different from the results based on the study entire sample from 1988 to 2021.

STATISTICAL RESULTS

Pearson correlation coefficients for all the study and control variables are presented in TABLE 2. As that TABLE indicates, three of the nine FCF definitions (FCF3, 6, and 9) have negative associations with changes in stock price (Δsp_{ps}) at the .05 significance level. The other six FCF definitions (FCF1, 2, 4, 5, 7 & 8) do not have statistically significant associations with Δsp_{ps} . Among the control variables, changes in sales per share (Δsps) and changes in book value per share ($\Delta bvps$) are negatively associated with Δsp_{ps} at the .05 significance level. However, changes in earnings per share (Δeps) have positive but not significant associations with Δsp_{ps} ; and changes in dividends per share (Δdps) have negative but not significant associations with Δsp_{ps} . [Changes in dividends per share (Δdps), natural log of sales (*lnsale*) and natural log of total assets (*lnat*) are not significantly associated with Δsp_{ps} .] Also, Δsps is significantly and negatively associated with changes in three FCF definitions (2, 5 & 8), significantly and positively associated with changes in two FCF definitions (7 & 9), and not significantly associated with changes in the remaining four FCF definitions (1, 3, 4 & 6). On the other hand, Δeps is significantly and negatively associated with changes in three FCF definitions (2, 5 & 8) and significantly and positively associated with the changes in the remaining FCF definitions (1, 3, 4, 6, 7 & 9). Additionally, Δdps is significantly and negatively associated with changes in three FCF definitions (7, 8 & 9) and significantly and positively associated with the changes in the remaining FCF definitions (1 to 6). Interestingly, $\Delta bvps$ is significantly and positively associated with changes in all nine FCF definitions. Natural log of sales (*lnsale*) and Natural log of total assets (*lnat*) are not significantly associated with any of the FCF definitions suggesting that these variables would be appropriate controls.

TABLE 2 correlations presented some interesting results which are further validated in a multivariate framework shown in TABLE 3 which presents regression coefficients for nine models by including one FCF definition at a time in the model. Besides the control variables specified in the model, the author also includes year fixed effects. These fixed effects control for heterogeneity at the year level that may not be captured by the set of controls. As TABLE 3 indicates, six FCF definitions (FCF1, 3, 4, 6, 7 & 9) have negative associations with Δsp_{ps} at the .01 significance level after controlling for other determinants of changes in stock price. The other three FCF definitions (FCF2, 5 & 8) have

negative but not significant associations with Δsps at the 1% significance level after controlling for other determinants of changes in stock price. Among the control variables, Δsps is significantly and negatively associated with Δsps at the .01 level across all FCF definitions. On the other hand, Δeps is significantly and positively associated with Δsps at the .01 level under three FCF definitions (1, 4 & 7) but not significantly associated with Δsps at the .01 level under the remaining FCF definitions (2, 3, 5, 6, 8 & 9). However, Δdps is significantly and negatively associated with Δsps but only at the .10 level of significance and only under one FCF definition (FCF 7). The associations between Δdps and Δsps are not significant across all other FCF definitions. Finally, there are significant and negative associations between $\Delta bvps$ and Δsps and these associations are statistically significant at the .01 level across all FCF definitions, except FCF 3, 6 & 9 where the negative associations are at the .05 level of significance. As under the univariate correlations, $lnsale$ and $lnat$ are not statistically significantly associated with any of the FCF definitions suggesting that these variables would be appropriate controls.

CONCLUSIONS

In light of the above statistical results, the author concludes that FCF4 (CFO – CEMPC – PSD) is the most value-relevant definition of FCF for UIS companies. It is interesting to note that the most commonly used definition in the financial press and the web (FCF2) and Standard & Poor's definition reported directly in its COMPUSTAT database (FCF8) are negatively and significantly associated with stock price changes. The author does not want to go as far as to recommend that the standards setters, particularly the FASB, should require UIS companies to disclose FCF4 definition in the body of the SCF, or at its bottom, before a more extensive body of research is produced in support of this idea. At this time, the author recommends that UIS companies (that *voluntarily* disclose FCF in their annual reports) should, at the very least, use only the FCF definition identified by this study.

In light of the statistical results above, the author concludes that none of the nine definitions of FCF used in the study is helpful in investment decision-making with respect to the Utility Industry sector of the U.S.. This conclusion is in agreement with some of the results of prior research, specifically Penmann and Yehuda (2009) and GuruFocus.com (2013a and 2013b). In light of this conclusion, investors contemplating investing in the UIS of the U.S. should not consider free cash flow as a factor in their decision-making process. The results of this study show that not only that changes in FCF are not significantly associated with changes in stock prices, but they are actually negatively associated with changes in stock prices. Put in other words, the higher the free cash flows of the utility companies, the lower their stock prices and vice versa. This result may be explained by the assumption that most people who invest in utility companies do so for the dividends paid by these companies. Since, in most FCF definitions, dividends are deducted from cash flows from operations, utility companies that pay higher dividends show lower FCF. Furthermore, not only that FCF is not value relevant to investment in the utility sector but also the univariate test and the multivariate test give conflicting results about the value relevance of sales per share, earnings per share, dividend per share, and book value per share.

LIMITATIONS AND SUGGESTIONS FOR FURTHER RESEARCH

Most research studies are subject to some limitations and this study is no exception. By far, the most important limitation of this study is the possibility that the study model did not include other variables that could have affected stock price changes. When a statistical model does not include all possible variables, the combined effect of those other possible variables is represented by the error term \sum in the model. While the author added year fixed effects, which should help mitigate some concerns, they do not eliminate all concerns regarding unobservable explanatory variables. One other limitation of the study is the possibility that other definitions for FCF which may be value-relevant, have not been included in the study. The author tried to develop as comprehensive a list of FCF definitions as possible, however, other FCF definitions may possibly exist.

For future research, the author suggests that the study be replicated using other variables that could possibly have some effect on stock price changes in addition to the variables included in this study model. A second suggestion is

to include other definitions of FCF that are not tested in this study. A third suggestion is to investigate whether a contrarian investing strategy could be developed buying stocks of UIS companies which have negative change in one or more measures of FCF definition over the prior year.

REFERENCES

- Adhikari, A. and A. Duru. (2006). Voluntary disclosure of free cash flow information. *Accounting Horizons*, (4)20, December, pp. 311–332.
- Financial Accounting Standards Board. SFAC No.8 *Conceptual framework for financial reporting*, Chapter 1, The objective of General Purpose Financial Reporting, and Chapter 3, Qualitative Characteristics of Useful Financial Information. FASB (September 2010).
- Financial Accounting Standards Board. SFAS No. 95: Statement of cash flows. FASB (November 1987).
- Financial Accounting Standards Board. FASB Codification, Topic 230: Statement of cash flows. FASB (2009).
- GuruFocus.com. 2013a. Earnings, free cash flow, and book value? Which parameters are stock prices more correlated to? <http://www.gurufocus.com/news/225255/earnings-free-cash-flow-book-value-which-parameters-are-stock-prices-most-correlated-to-> August 2, 2013.
- GuruFocus.com. 2013b. Is free cash flow overrated for its importance in stock valuations? <http://www.gurufocus.com/news/225642/is-free-cash-flow-overrated-for-its-importance-in-stock-valuation>. August 8, 2013.
- Habib, A. 2011. Growth opportunities, earnings permanence and the valuation of free cash flow. *Australasian Accounting Business & Finance Journal*, (4)5, 101-122.
- Kieso, D., J. Weygandt, and T. Warfield 2022. *Intermediate accounting*, 18th Ed., New York, NY: John Wiley & Sons.
- Maksy, M.M. (2016). Is free cash flow value relevant? The case of the information technology industry, *Journal of Accounting and Finance*, (5)16, 73-84.
- Maksy, M.M. (2017). Is free cash flow value relevant? The case of the U.S. consumer discretionary sector, *Journal of Accounting and Finance*, (5)17, 114-123.
- Mills J., L. Bible, and R. Mason. (2002). Rough waters for comparability: Defining free cash flow. *CPA Journal*, (72), 37–41.
- Murphy, C. B. (2021). What is the utilities sector? In [Utilities and the Utilities Sector: Pros and Cons for Investors \(investopedia.com\)](https://investopedia.com)
- Penman, S. and N. Yehuda. (2009). The pricing of earnings and cash flows and an affirmation of accrual accounting. *Review of Accounting Studies*, (4)14, 453–479.
- Shahmoradi, N.. (2013). The effect of growth opportunities and stable profitability on market value of free cash flows of listed companies in Tehran stock exchange. *Journal of Basic and Applied Scientific Research*, (8)3, 495-501.
- Subramanyam, K. R.. (2014). *Financial statement analysis*, 11th ed., Burr Ridge, IL: McGraw-Hill/Irwin.

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APPENDIX A VARIABLE DEFINITIONS

<i>Δspps</i>	Change in stock price between the end of the current fiscal year and the end of the prior fiscal year.
<i>Δfcfps1</i>	Change in the difference between cash flow from operations (CFO) and depreciation and amortization expense (D& A) over the current fiscal year.
<i>Δfcfps2</i>	Change in the difference between CFO and cash flow for capital expenditures (CFCE) over the current fiscal year.
<i>Δfcfps3</i>	Change in the difference between CFO and cash flow for investing activities (CFI) over the current fiscal year.
<i>Δfcfps4</i>	Change in CFO minus D & A minus preferred stock dividends (PSD) over the current fiscal year.
<i>Δfcfps5</i>	Change in CFO minus CFCE minus PSD over the current fiscal year.
<i>Δfcfps6</i>	Change in CFO minus CFI minus PSD over the current fiscal year.
<i>Δfcfps7</i>	Change in CFO minus D & A minus total dividends (TD) over the current fiscal year.
<i>Δfcfps8</i>	Change in CFO minus CFCE minus TD over the current fiscal year.
<i>Δfcfps9</i>	Change in CFO minus CFI minus TD over the current fiscal year.
<i>Δsps</i>	Changes in total sales per share over the current fiscal year.
<i>Δeps</i>	Change in earnings per share over the current fiscal year.
<i>Δdps</i>	Change in dividends per share over the current fiscal year.
<i>Δbvps</i>	Change in book value per share over the current fiscal year.
<i>Lnsale</i>	Natural logarithm of total sales for the current fiscal year.
<i>Lnat</i>	Natural logarithm of total assets at the current fiscal year end.

**TABLE 1
DEFINITIONS OF FREE CASH FLOW ON THE WEB**

1. In corporate finance, free cash flow (FCF) is cash flow available for distribution among all the securities holders of an organization. They include equity holders, debt holders, preferred stock holders, convertible security holders, and so on. en.wikipedia.org/wiki/Free_cashflow.
2. Net income plus depreciation and amortization, less changes in working capital, less capital expenditure. en.wiktionary.org/wiki/freecashflow.
3. Adjusted operating cash flow less interest and tax paid, prior to distributions to shareholders. This is the cash flow available for payments of dividends and share buybacks as well as repayments of capital on loans. www.reed-lsevier.com/investorcentre/glossary/Pages/Home.aspx
4. Cash flow from operating activities, investments, financial items and tax and the effect of restructuring measures on cash flow. www.investor.rezidor.com/phoenix.zhtml.
5. EBITDA minus net interest expense, capital expenditures, change in working capital, taxes paid, and other cash items (net other expenses less proceeds from the disposal of obsolete and/or substantially depleted operating fixed assets that are no longer in operation). www.cemex.com/ic/ic_glossary.asp.

6. This item on the cash flow statement represents the sum of cash flows generated by operating and investing activities. investors.benettongroup.com/phoenix.zhtml.
7. How much money a company could pay shareholders out of profits without expanding, but without running down its existing operations either. moneyterms.co.uk/d/
8. Represents a common measure of internally generated cash and is defined as cash from operations less fixed asset purchases.
portal.acs.org/portal/PublicWebSite/about/aboutacs/financial/WPCP_012234.
9. Cash available after financing operations and investments, available to pay down debt.
www.graduates.bnpparibas.com/glossary.html.
10. A stock analyst's term with a definition that varies somewhat depending on the particular analyst. It usually approximates operating cash flow minus necessary capital expenditures. www.jackadamo.com/glossary.htm.
11. The amount of money that a business has at its disposal at any given time after paying out operating costs, interest payments on bank loans and bonds, salaries, research and development and other fixed costs. www.premierfoods.co.uk/investors/shareholder-services/Glossary.cfm.
12. Net Operating Profit After Tax minus Year-to-Year change in Net Capital. www.intrinsicvalue.com/glossary.htm
13. The increase in cash from one period to the next.
www.knowledgedynamics.com/demos/BreakevenFlash/GlossaryMain.htm.
14. Cash flow after operating expenses; a good indicator of profit levels.
healthcarefinancials.wordpress.com/2008/01/24/equity-based-securities-terms-and-definitions-for-physicians/.
15. The surplus cash generated from operating activities recognized in the profit and loss account. This expresses a company's internal financing power, which can be used for investments, the repayment of debt, dividend payments and to meet funding requirements.
www.deutsche-euroshop.de/berichte/gb2004/glossar_e.php

Table 2
Pearson Correlation Coefficients

	$\Delta spps$	$\Delta fcfps1$	$\Delta fcfps2$	$\Delta fcfps3$	$\Delta fcfps4$	$\Delta fcfps5$	$\Delta fcfps6$	$\Delta fcfps7$	$\Delta fcfps8$	$\Delta fcfps9$	Δsps	Δeps	Δdps	$\Delta bvps$	$lnsale$	$lnat$
$\Delta spps$	1.00															
$\Delta fcfps1$	0.00	1.00														
$\Delta fcfps2$	0.00	0.68	1.00													
$\Delta fcfps3$	-0.11	0.79	0.22	1.00												
$\Delta fcfps4$	0.00	1.00	0.68	0.79	1.00											
$\Delta fcfps5$	0.00	0.68	1.00	0.22	0.68	1.00										
$\Delta fcfps6$	-0.11	0.79	0.22	1.00	0.79	0.22	1.00									
$\Delta fcfps7$	0.01	0.84	0.50	0.71	0.84	0.51	0.71	1.00								
$\Delta fcfps8$	0.01	0.58	0.86	0.19	0.58	0.86	0.19	0.71	1.00							
$\Delta fcfps9$	-0.10	0.73	0.16	0.97	0.73	0.16	0.97	0.79	0.26	1.00						
Δsps	-0.11	-0.02	-0.25	0.02	-0.02	-0.25	0.02	0.05	-0.19	0.04	1.00					
Δeps	0.01	0.23	-0.09	0.37	0.23	-0.09	0.37	0.24	-0.07	0.38	0.33	1.00				
Δdps	-0.03	0.17	0.24	0.04	0.17	0.24	0.04	-0.40	-0.30	-0.19	-0.11	-0.05	1.00			
$\Delta bvps$	-0.09	0.29	0.34	0.29	0.29	0.34	0.29	0.39	0.46	0.33	-0.06	0.42	-0.23	1.00		
$lnsale$	-0.03	0.01	0.02	0.00	0.01	0.02	0.00	0.01	0.02	0.00	-0.01	-0.02	-0.01	0.03	1.00	
$lnat$	-0.02	0.00	0.02	-0.01	0.01	0.02	-0.01	0.01	0.02	-0.01	-0.02	-0.02	0.00	0.03	0.95	1.00

Variables are defined in Appendix A. Numbers in bold indicate significance at the 5% level.

Table 3
Association Between Various Measures of Free-Cash-Flow and Changes in Stock Prices

Variables	Predicted Sign	$\Delta spps$ (1)	$\Delta spps$ (2)	$\Delta spps$ (3)	$\Delta spps$ (4)	$\Delta spps$ (5)	$\Delta spps$ (6)	$\Delta spps$ (7)	$\Delta spps$ (8)	$\Delta spps$ (9)
$\Delta fcfps1$	+	- 0.206*** (4.11)								
$\Delta fcfps2$	+		-0.059 (-1.19)							
$\Delta fcfps3$	+			- 0.084*** (4.11)						
$\Delta fcfps4$	+				- 0.205*** (4.11)					
$\Delta fcfps5$	+					-0.058 (-1.18)				
$\Delta fcfps6$	+						- 0.084*** (4.11)			
$\Delta fcfps7$	+							- 0.206*** (4.11)		
$\Delta fcfps8$	+								-0.059 (-1.19)	
$\Delta fcfps9$	+									- 0.084*** (4.11)
$\Delta spps$		- 0.051*** (4.27)	- 0.048*** (4.15)	- 0.044*** (3.00)	- 0.051*** (4.27)	- 0.048*** (4.15)	- 0.044*** (3.00)	- 0.051*** (4.27)	- 0.048*** (4.15)	- 0.044*** (3.00)
Δeps		0.183*** (4.04)	0.003 (0.34)	-0.003 (-0.32)	0.182*** (4.03)	0.003 (0.34)	-0.003 (-0.32)	0.183*** (4.04)	0.003 (0.34)	-0.003 (-0.32)
Δdps		-0.212 (-0.9)	-0.225 (-0.95)	-0.212 (-0.9)	-0.213 (-0.91)	-0.225 (-0.96)	-0.212 (-0.9)	-0.417* (-1.74)	-0.284 (-1.17)	-0.295 (-1.26)
$\Delta bvps$		- 0.131*** (3.02)	- 0.108*** (2.77)	-0.081** (-2.04)	- 0.131*** (3.02)	- 0.108*** (2.77)	-0.081** (-2.04)	- 0.131*** (3.02)	- 0.108*** (2.77)	-0.081** (-2.04)
$\ln sale$		-0.021 (-0.07)	-0.028 (-0.1)	-0.06 (-0.22)	-0.021 (-0.08)	-0.028 (-0.1)	-0.06 (-0.22)	-0.021 (-0.07)	-0.028 (-0.1)	-0.06 (-0.22)
$\ln at$		-0.06 (-0.22)	-0.056 (-0.21)	-0.025 (-0.09)	-0.06 (-0.22)	-0.056 (-0.21)	-0.025 (-0.09)	-0.06 (-0.22)	-0.056 (-0.21)	-0.025 (-0.09)
Intercept		4.385*** (3.13)	4.279*** (3.05)	4.415*** (3.15)	4.391*** (3.13)	4.281*** (3.05)	4.417*** (3.15)	4.385*** (3.13)	4.279*** (3.05)	4.415*** (3.15)
Year Fixed Effects		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations		3,352	3,352	3,352	3,352	3,352	3,352	3,352	3,352	3,352
Adjusted R ²		0.208	0.2043	0.2081	0.208	0.2043	0.2081	0.208	0.2043	0.2081

This table provides the results of regressing the change in future stock prices of a firm ($\Delta spps$) on various measures of changes in free cash flow ($\Delta fcfps1 - \Delta fcfps9$) and control variables. Coefficients are provided with t-statistics in parentheses below. Variables are defined in Appendix A. ***, **, and * represent two-tailed p-value significance levels of 0.01, 0.05, and 0.1 respectively.

A PRELIMINARY ANALYSIS OF OPEN WEB PAYMENTS

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ABSTRACT

Open web payments support near-instant financial transactions and reconciliation to facilitate web monetization. The research explores Interledger's open web protocol and payment architecture to enable web monetization through emerging platforms and digital ecosystems, specifically content creators. Alternative open web payment protocols are analyzed to highlight differentiating features. The article seeks to critique available options to aid firm-level strategic decision-making thoroughly. This research evaluates the opportunities and challenges of open web payments and explores the use case for open payments. A systematic literature review and software analysis explore open payment systems.

INTRODUCTION

Web 1.0 is a syntactic web with static informative characteristics permitting users read-only privilege (1990-2000). Web 2.0 was a drastic shift from the interactive nature of web 1.0 to a more interactive experience. Web 2.0 (2000 – till date) could be regarded as a social web or read-write web, allowing some interaction level. The next phase of web evolution, web 3.0, is silently and currently unfolding with its integrated Web experience. Web 3.0 is the future of the web, which permits the read-write-execute features. Web 3.0 is the next evolutionary phase of technology powered by machine learning and blockchain innovations, a decentralized ledger system (DLT). Web 3.0 consists of 4 different layers, namely: Layer 1 (blockchain platform), Layer 2 (blockchain interaction layer), Layer 3 (libraries and language layer), and Layer 4 (user interface layer). The blockchain concept associated with web 3.0 and the payment system is a peer-to-peer distributed ledger that records transactions between two parties for traceability purposes, removing the intermediaries from the distribution and verification.

DLT can verify transactions, including associated data, anytime and from anywhere. DLT can either be Public Ledger or a Private Ledger. The public ledger is the permissionless one that is open to the public without a company or user control over this ledger. It is usually decentralized and permits different users to make use of it. On the other hand, the private ledger requires certain permission levels before the participants can use it. It is, therefore, sometimes called the permissioned ledger, which is not open to the public.

On the other hand, Peer to Peer (P2P) networks involves a group of computers or devices connected to form a network without a centralized authority. In the formed network, any peer can simultaneously act as a client or server because each has a copy of the file called the ledger. The network formed through this peer-to-peer pairing could be either structured, unstructured, or hybrid. Structured P2P is an organized architecture in which the node (participants) interacts with each other using the hashtag function. An unstructured network is an unorganized network in which the nodes communicate randomly. The hybrid network is a network that combines the traditional client-server model with some characteristics of peer-to-peer architecture. In financial terms, P2P is autonomously transferring and exchanging digital assets or cryptocurrencies over a distributed ledger. The blockchain architecture of P2P permits the transfer of bitcoin and other cryptocurrencies worldwide.

We must understand that not all P2P networks are decentralized, and this (P2P) formed the core of Bitcoin. On the other hand, Bitcoin is about blockchain, and blockchain brings about the concept of a "distributed ledger," which permits no central authority for processing transactions. One of the essential functionalities of Web 3.0 is that of open payments and settlement features. With this functionality, web 3.0 gives control into the hands of the users (independence) instead of the big tech companies, helping users to transfer and exchange data without third parties. Furthermore, web 3.0 will provide an interactive and dynamic user experience based on its semantic web, blockchain, machine learning, and artificial intelligence technologies. This will impact the ways open payment transactions are carried out.

The Concept of Open Payment Systems and Web 3.0

Web 3.0 is creating an exchange of values on the web by using cryptocurrencies or digital tokens to reward content creators and transfer payments and settlements among users across the globe. One of the fundamental impacts of this

new technology on global payment is immeasurable by eliminating specific blockages usually experienced during transferring of values across the border or from a payer to a receiver. The elimination of delayed payment, long procedural requirements, intermediary interference, and other irrelevant requirements makes the future of open web payments, as provided by web 3.0, a super-reality to experience rather than imagined.

Web monetization allows the creation of a payment stream from the user agent to the website. It is a new way to reward users seamlessly and automatically. The motivation behind web monetization is to create an ability to transfer money via native, open, efficient, and automatic means of compensating content creators for the work, which works on the foundation of the interoperability of blockchain by allowing the exchange of information from one blockchain to another either parallel blockchain, off-chain networks, or oracle. This technology of web monetization is a paradigm shift in the usual way of compensating for the exchange of goods and services or other online payments. Companies like Interledger are at the front end of pioneering this technology to decentralize payment models. In web monetization, a web monetization sender/provider sends micropayments in the form of payments to the web via ILP to a web monetization receiver that accepts payments via Interledger over the web, whereby a unique payment point (URL) is used as an identifier for the transaction.

Overview of Interledger Protocol and Open Web Payments

In 2015, Stefan Thomas and Evan Schwartz crystallized the vision of the Interledger protocol. The basic idea behind this open payment system by Interledger was to promote inclusiveness, diversity, and equity among unlimited users by eliminating boundaries and factors that can prevent the easy accessibility and flow of money. Interledger is a protocol for sending and receiving payments between systems that maintain registered wallets. It could be regarded as a middleware that allows connectivity between two or more different networks on different platforms to communicate, allowing web payment services to take place irrespective of the difference between or among the networks. Interledger wants to ensure that the barriers to banking that makes a certain large number of individuals still unbanked are removed by creating a technology that allows intercommunication with decentralized and centralized ledgers.

Siris et al. (2019). Interledger denotes several approaches to establish interoperability among other distributed ledgers or blockchains. With the Interledger protocol, there is a frictionless movement of payments and micropayments across different ledgers, unlike the centralized technology that enforces barriers and limitations in terms of integration with other networks. The Interledger is a decentralized technology that permits flexibility and adaptability for easy integration with other networks. Interledger protocol is not a ledger but allows the flow of funds and currencies between accounts.

Interledger promotes innovativeness, creativity, and inclusiveness by establishing open payment standards and technologies that connect seamlessly and globally. As an open-source protocol for transferring money globally, Interledger is not bound to any specific business, blockchain, or currency but employs the concept of cryptographic escrow. Escrow describes a financial arrangement in which a third party holds an asset or money on behalf of two others involved in a transaction by conditionally locking the funds.

Unlocking funds processed through the Interledger protocol requires certain conditions to be met before the fund is released. If the needs are met, the payment goes through and is booming, while the receiver receives value(s), and the sender receives a cryptographically signed receipt from the receiver. However, if, on the other hand, the conditions set are not met, the transaction will be aborted, and the host will return the fund to the sender. The execution of payment by the Interledger protocol could be carried out either in Atomic mode or Universal mode.

In the Atomic mode, transfers are coordinated by an ad-hoc group of notaries selected by the participants to ensure all transfers either execute or abort. Siris et al. (2019), atomic cross-chain transactions focus on the fundamental problem of trading assets on two unrelated blockchains. That is, carrying out transactions on two blockchains using both hash-locks and time-locks. It is simply peer-peer trading and a novel cryptographic protocol. The exchange of values in an atomic mode depends on meeting the predetermined conditions by the users.

According to Siris et al. (201), Atomic swaps are based on hashed time-lock, which utilizes the multi-signature (two or more parties can sign a transaction), hash-locks (a cryptographic lock that the account can unlock by revealing a secret s whose hash $H(s)$ is equal to the value h configured in the lock), time-locks (a time-based condition that

prevents a transaction's or smart contract's assets from being redeemed (or refunded) until specific time interval has expired) and basic scripting (this is required to indicate a transaction can be unlocked (or committed) only if multiple conditions are satisfied). In other words, executing transfers atomically across multiple ledgers requires a transaction commit protocol.

The Universal mode instead uses bounded execution windows and incentives to remove the need for any mutually trusted system or institution. All participants rely upon their ledgers to escrow funds and release them only when a predefined condition is met. For example, the sender is assured by their ledger that their funds are transferred only upon delivery of a non-repudiable acknowledgment that the recipient has received their payment.

With web 3.0 democratization of information, it will give a self-independence perspective that allows individuals to have and use a wallet that gives them the freedom to use various decentralized applications on the internet. Based on the W3C (World Wide Web Consortium) recommendation to have a standard protocol for funds transfer, ILP made modifications in conformity with this recommendation, thereby enabling the atomic transfer of funds from one ledger to another using the escrow principle (a principle of delivering to a party only after the fulfillment of the pre-stated terms/conditions) or non-escrow which is based on a bilateral agreement of the connectors (the connectors must have existing accounts on the platform to be used for the settlement). Comparing the escrow and other systems agreed upon by connectors, it is about risk, cost, and serviceability. Using escrow reduces risk but is expensive and slower in terms of the long timeout while using agreed platforms by connectors involves higher risk, shorter timeout, and less cost.

1.5: Benefits Of Open Web Payments and Web 3.0

Facilitating Transfer and Collection of Payment: Web 3.0 is created to eliminate the barriers experienced with online payment by making the transactions smooth.

Enabling Global Market Outreach: With this new technology in place, the world market will become a smaller village than how it is currently experienced between organizations to organization transactions and interaction as well as the individual-to-organization exchange of values.

Payment Security: One of the central notions behind web 3.0 is the better security model surrounding online payments. This means the payment over the web will be secured and opened to the public or third party not involved in this entitlement transfer. It simply enabled more privacy.

Improved Economics: The impacts of the new 3.0 will enormously be impactful in terms of the economic gains that customers will derive from this new technology. Economic progress will not only be associated with the government and organizations but with individuals. Leaders must prepare organizations for the new impacts coming soon from web 3.0. Embracing this technology will not only help economically but also in non-economic ways.

Interoperability: This is the characteristic of web 3.0 to work with other products or systems. It will be a more diverse, inclusive, and equitable space than its predecessors. It is the ability to share information across different blockchain networks without restrictions.

Decentralization: Web 3.0 is based on decentralized technology whereby independent computers communicate with each other across the globe and run on a peer-to-peer protocol. This allows information not to be monopolized and centrally controlled.

Data Ownership: One of the issues with web 2.0 has to do with data being misused, especially by big tech companies, without the permission of the owners of the data and monetized the data. Firms will overcome this with web 3.0, whereby data owners have absolute control over what and which data to be permitted to others to use or view.

Ubiquity: Involves the availability of the systems to be available everywhere and anywhere without or with reduced downtime making the services available 24/7.

Openness: There is no restriction either based on location, region, or financial capability, as it allows everyone to get involved and benefited from it.

Web 3.0 will improve work automation in various organizations. Organizations will be able to manage their vendors, contracts, supply chain, and logistics through decentralizing services involving third parties, thereby reducing certain overhead costs.

1.6: The Challenges of Open Payment Systems And Web 3.0

Adoption and Lack of Trust: In any newly introduced product/service, there are always different levels of adoption by users/consumers at different phases of the product. The level of acceptance among users across the globe is at a slow, gradual level as against the potential of this technology.

Institutional acceptance: Organizations and financial institutions are not totally in acceptance of this technology. They need to be faster in adopting this technology into their financial systems because of the general misconceptions associated with this new technology. For example, many believe it is yet to be secured and might be related to illicit activities.

Regulatory Framework: Countries worldwide have their respective Apex Bank, usually called Central Bank, to regulate financial activities within and outside their countries. However, the need to break away from the limitations and barriers presented by the Apex bank of the individual country gave birth to this technology. Unfortunately, governments are trying to silence the adoption of the technology or using a series of regulations to weaken its importance.

Myth and Misconceptions: Many believe that transaction involvement payment should be local, and if it must be across the border, payments should make it through the banks. There is a saying that 'payments always be local and will continue to be local.'

Security-Related Challenge: Over the period when this technology was launched and adopted, auditors witnessed issues relating to security, especially phishing attacks and counterfeiting.

Limited interoperability: Incompatibility is another challenging issue of an open payment system—a situation whereby different networks are compatible with others except for similar networks.

Data Validation Challenge: Web 3.0 is unable to identify and fix incorrect and misleading data

Scalability and Speed: It was discovered that web 3.0 is slower in processing transactions than web 2.0 because of the numerous nodes involved. Vulnerabilities that were present during the first generation of the web had an impact on the second generation as well. The same notion will apply to the third generation of the web.

Due to the ability of Web 3.0 to autonomously harvest and integrate data and convert it into information, all statements on Web 3.0 need to be considered as claims before they can be trusted. Only when these claims have been established should trust be put in the information provided. In order to be able to trust harvested information, the source of information, as well as the policies available on the source, needs to be obtained and analyzed.

This study aims to do 1) a preliminary analysis of Web 3.0 and its significance in open payment systems. 2) The study identified the opportunities and challenges arising from Web 3.0 technologies and open web payments.

LITERATURE REVIEW

This study employed a systematic mapping review methodology to get literature on the research-related variables. It used the search terms "web payment," "web 3.0," and "Interledger protocol" to locate, retrieve, and evaluate data from peer-reviewed articles that examined the concepts from different databases.

Making payments or taking payments online is becoming critical because of the large volumes of data being handled by the web, the exposure to fraud, risk involvement, timeliness, and urgency surrounding the need for the exchange

and the volume of money involved in the exchange to facilitate online settlement and payment without little or no boundaries. The future is turning to web 3.0 to harness this new technology as payment is becoming significant to customer experience and how organizations connect with their customers. Web 3.0 provides fully integrated solutions to all these challenges and customer needs. This paper used a systematic review of studies on open system payment, web 3.0, and Interledger protocol literature, citing various past literature, databases, and the web of science analytical tool. There have been a series of reviews, research, studies, and publications regarding online payment, web payment, and e-commerce, while only a few examined web monetization and web 3.

Siris et al. (2019), the need to increase overall flexibility and innovation by pushing away from the one-chain rules them-all model is the share motivation of Interledger proposals. That is the need to create and enable interoperability. However, although Interledger Protocol wants to achieve interoperability across heterogeneous, a related study on interoperability between blockchain discovered that there is still limitation across the heterogeneous and not smooth interconnection as stipulated. Furthermore, the Hyperledger Quilt, side by side with Ripple, is just an actual implementation of the Interledger protocol into blockchain technology, so it also shares the same drawbacks as ILP. In other words, ILP might still require a sidechain to perform its interoperability functionality/fully.

Blockchain must improve its ability to store robust data to achieve scalability. However, this robustness will mainly face problems with scalability, Speed of transactions, and privacy challenges. Moreover, according to work by Zamyatin et al. (2019), blockchain interoperability can only be implemented with a trusted third party. In line with the above, Madine et al. (2019) also noted that the Interledger protocol might enable interoperability. However, cross-chain interoperability is a crucial challenge preventing blockchain applications' widespread adoption. Contemporary cross-chain interoperability solutions are centralized and require re-engineering the core blockchain stack to enable inter-communication and data sharing among heterogeneous blockchain networks.

CONCLUSION & RECOMMENDATION

The advent of web 3.0 and Interledger involvement in open payment systems will bring about business advantages for various organizations in terms of productivity, improved customer service and satisfaction, proper data management, and profitability. While on the part of the users, the future of open payment services powered by web 3.0 will create a seamless experience with the transfer of benefits and ownership across borderless networks and nations by connecting all users in interactive managers beyond describable imagination. Web 3.0 is not just a technological advancement but also a web with more risks and opportunities. Specific risks and challenges have been identified with this new technology, as well as the various technological advantages it will bring.

The Interledger Protocol enables certain transfers and exchanges of values across systems. This protocol also provides scalability for transactions across networks with elimination or reduction of risk based on the escrow feature embedded in the open system payment via hash-lock and time-lock mechanisms. The Interledger protocol also matters as it gives users (connectors) confidentiality and trust as there is little or no risk involved. Comparatively, it is relatively cheap in terms of transaction cost compared to other available protocols. Interledger protocol has the potential to enable global market outreach by breaking all cross-border transactions with secured payment. The approach allows interoperability of transactions. ILP follows the end-to-end principle of simplicity, neutrality, interoperability, security, and, most importantly, interoperability meaning it should be usable across any ledger, even those not built for interoperability with no native tokens (Toshendra, 2020).

REFERENCES

- Bonatti, P., Kirrane, S., Polleres, A., & Wenning, R. (2017, September). Transparent personal data processing: The road ahead. In *International Conference on Computer Safety, Reliability, and Security* (pp. 337-349). Springer, Cham.
- Madine, M., Salah, K., Jayaraman, R., Al-Hammadi, Y., Arshad, J., & Yaqoob, I. (2021). appxchain: Application-level interoperability for blockchain networks. *IEEE Access*, 9, 87777-87791.
- Siris, V. A., Nikander, P., Voulgaris, S., Fotiou, N., Lagutin, D., & Polyzos, G. C. (2019). Interledger approaches. *IEEE Access*, 7, 89948-89966.
- Toshendra Kumar Sharma (2020): Blockchain Interoperability Projects-Overledger Vs Ripple Interledger Protocol
- Zamyatin, A., Al-Bassam, M., Zindros, D., Kokoris-Kogias, E., Moreno-Sanchez, P., Kiayias, A., & Knottenbelt, W. J. (2021, March). Sok: Communication across distributed ledgers. In *International Conference on Financial Cryptography and Data Security* (pp. 3-36). Springer, Berlin, Heidelberg.

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EFFECT OF COVID-19 ON THE STANDARDIZED FIELD TEST RESULTS FOR UNDERGRADUATE BUSINESS STUDENTS

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ABSTRACT

Mitigating a global pandemic was certainly not at the forefront of planning for educators prior to March 2020. Educators were forced to move classes out of the classroom in a matter of days, while still offering students the level of education they expected and deserved. Students were expected to navigate online learning while working through various obstacles like poor to no Internet access, time zone differences and the distraction of family members. This challenged students mentally, socially, and psychologically as they were eventually required to return to campus with one foot in the classroom and one foot remaining in remote learning. This empirical study examines the effects of COVID-19 on the Educational Testing Service's Major Field Test taken by undergraduate students studying in the business department of one university in Northern Pennsylvania in the USA, through analytics methods applied on data collected during a four-year period.

INTRODUCTION

The emergence of the Coronavirus (COVID-19) pandemic presented an unprecedented challenge for universities at administrative and pedagogical levels. The highly contagious nature of the virus forced the demand for social distancing while limiting face-to-face contact outside the confines of one's household. To curb infection rates, educational institutions were temporarily shut down around the world and immediately forced to implement emergency online instruction using remote methods of learning, while relying significantly on technology. Instructors were faced with increased workloads as they were tasked with rethinking the modality of content and assessment while also providing support to the students.

The emergency transition to remote learning came at a time when most universities were well into their academic year. Faculty and students were forced into a new learning mode with little time to wrap their heads around what was happening to plan and adjust to the change. Emergency online instruction has been shown to aggravate psychological health issues already inherent in students (Cleofas & Rocha, 2021; Hamaideh et al., 2021; Khawar et al., 2021) while research on past epidemics suggested that lockdowns and quarantine measures could rouse negative psychological impacts like depression, stress, and anxiety (Brooks et al., 2020).

Students have dealt with increased depression, feeling of loneliness, anxiety about the lack of productivity, finances, future job offers, and contracting the virus. Interestingly, students have reported a general trend of decreased prevalence of symptoms as students got closer to their graduation date (Lee et al., 2021). The United Nations noted that 94% of the world's student population was affected by COVID-19. Students who were admitted to international universities were restricted by global travel restrictions and were not able to join the academic programs, causing them emotional stress. As universities switched to emergency remote teaching, students who were deprived of the necessary digital tools faced major setbacks due to spatial, economic, and social reasons. A large proportion were frustrated with online learning to the extent they were losing interest in and dropping out of college.

Researchers have studied the effects of the online learning modality on student's retention. Al-Kumaim et al. (2021) investigated whether the online learning platforms used by university students during the COVID-19 period presented any challenges to their learning by developing a conceptual model to reduce the impact of the challenges. Montenegro-Rueda et al. (2021) found that continuous assessment, not focused on the exams, but rather in a more qualitative way is the best course to assess at a distance. Some studies report that online learning leads to worsened outcomes whereas other studies report comparable outcomes to face-to-face instruction (Knight et al., 2021). Hickey and White (2021) studied the effects of COVID-19 on the scores of ETS Major Field Test at the United States Coast Guard Academy. The study did reveal a decline with an 11-percentage point decrease over the previous 2 years in the ETS scores for the class of 2021, but in areas that were not affected by the COVID disruption. The authors proposed two possible explanations for the decline in the scores; a larger than normal class size and the students took the ETS exam electronically rather than in paper form.

This paper examines the effects of COVID-19 on the ETS's Major Field Test (MFT) taken by undergraduate students studying in the business department of one university in Northern Pennsylvania in the USA, on data collected during a four-year period intervened by the pandemic. Results show that although there was a drop in the performance of the students on the MFT, this decrease was not statistically significant. The student population reacted resiliently to adapting to the new modes of instruction.

LITERATURE REVIEW

There are some works in the literature studying the impact of COVID-19 on student's performance. Montenegro-Rueda et al. (2021) presented a systematic review of literature on the impact of assessment in higher education during the pandemic. Selecting 13 studies out of 51, the authors suggested that faculty and students faced numerous challenges in moving to virtual environments and rampant practices of dishonesty and misconduct in relation to the students. Suggestions provided for assessing students other than through examination would include through academic assignment, assessing student progress through the educational stage and through continuous assessment (Montenegro-Rueda et al., 2021). Jehi et al. (2022) conducted a comprehensive literature review on the prevalence of anxiety among the students of higher education during the pandemic. From the 37 studies that met the authors inclusion criteria, two themes were developed; prevalence of anxiety and the factors associated with the anxiety during the COVID-19 confinement period. The challenges that were experienced from this emergency transition to remote teaching also contributed to students increased anxiety (Jehi et al., 2022).

Lee et al.(2021) surveyed 200 domestic U.S. college students ages 18 – 24 attending a 4-year university before the pandemic. The authors presented 11 multiple choice questions to the respondents that honed in on the physical, emotional, and social impacts of COVID-19. The authors also included a final open-ended question to capture the student's verbatim feelings.

How has COVID-19 impacted your mental health?

60.8% reported increased anxiety; 54.1% reported depression and 59.8% reported feeling of loneliness. Interestingly, the authors found a general trend of decreased prevalence of symptoms as students got closer to their graduation date (Lee et al., 2021). Knight et al. (2021) performed a qualitative study using an inductive thematic approach to explore the impact of COVID-19 by studying the perspectives of both students and staff members. International and first year studies were particularly impacted as COVID-19 made it harder to develop friendships and social networks. As per this study, evidence on the impact of the shift to online instruction on learning outcomes has been mixed. Students in this study reported a motivational decline to engage with their academic work and responsibilities (Knight et al., 2021). Zhou and Zhang (2021) found that students' learning experience during COVID-19 was positive. The students surveyed reported fair mental health, a good belonging to their learning community, and satisfaction with remote learning. There were reports of inadequate interactions between student, but the hybrid learning model was still shown to be a positive learning option even a year after the outbreak of the pandemic (Zhou& Zhang, 2021).

Marklein (2020) suggested that this opened a whole new area of inequity as the digital gap is more than just a lack of equipment. The digital gap also includes the capacity to handle the devices and the ability to effectively use them for learning. The authors suggested that face-to-face learning creates a motivation for students to engage and take their studies more seriously, and that remote learning limits opportunities for peer learning and social interaction between teachers and students and student to student. Baglione and Tucci (2022) concur as the student participants in their study had a more favorable response to Zoom as a learning tool when they were allowed to remain on campus with limited face-to-face interaction. Al-Kumaim et al., (2021) collected data from 486 students in different universities in Malaysia wherein the students disclosed various obstacles they encountered using IT platform applications for online learning. The obstacles included working with information overload received from instructors, inadaptability and unfamiliarity of the new online learning environment, and personal health challenges related to stress and anxiety. Browning et al. (2021) collected 2,500 survey responses from seven US universities using web-based questionnaires to identify the psychological impacts of COVID-19 on students and evaluate potential risk factors that could make students more likely to experience these impacts. They reported effects like lack of motivation, anxiety, stress, isolation, social distancing, education changes and going out less. This study showed that students who were women, non-Hispanic Asian, in fair/poor health, of below-average relative

family income, or someone who knew a family/community member infected with COVID-19 appeared to be more strongly impacted by the pandemic (Browning et al., 2021).

Bailey (2021) surveyed 165 declared business majors to capture information on their experiences as they transitioned to online learning to finish the semester. In response to how the Coronavirus impacted them, at 69.1%, emotional stress was the most mentioned, followed by travel plans, financially, family, and other. Despite the negative factors associated with the transition, most students indicated that they were glad they had the ability to move to the online format so they could complete the semester. Green et al. (2022) studied the Major Field Test and the role it plays in Assurance of Learning (AOL) assessment at business schools. Use of the AOL assessment is accepted by all three major business school accrediting agencies – AACSB, ACBSP, and IACBE. The authors suggested that the MFTB test results are scored and reported in a manner that makes it impossible to determine how well business students have learned the common body knowledge expected of business graduates. The comparisons of MFTB performances either across time or across institutions are invalid because the test results are significantly driven by individual student characteristics of an unknown group of students enrolled at diverse non-random business schools (Green et al., 2022).

METHOD AND RESULTS

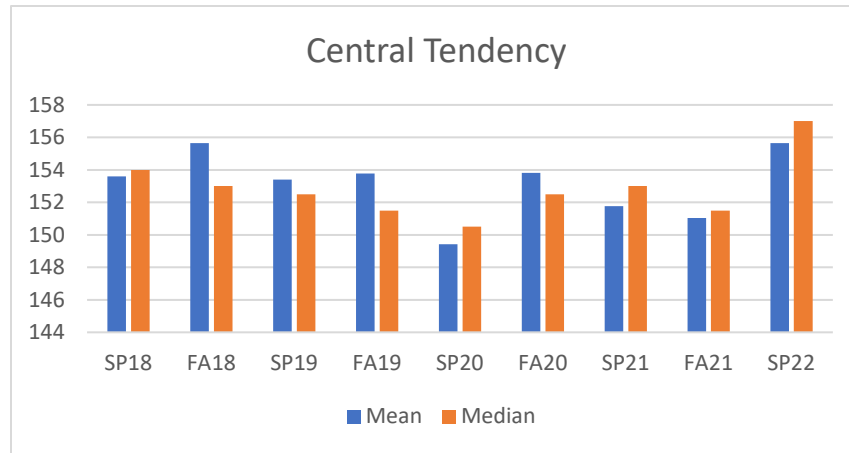
The impact of COVID on the learning medium of students was mostly felt during the year of 2020 when learning was abruptly shifted to the online mode and students and educators had to adopt to the new normal. For this study, data was collected from the ETS website for the past performance of students in the university for four semesters preceding the semesters of Spring 2020 and Fall 2020, followed by three semesters after 2020. In all 354 students took the test during the nine semesters and the summary statistics of each group are stated below.

Table 1
Summary Statistics of the Sample of Data

Year	SP18	FA18	SP19	FA19	SP20	FA20	SP21	FA21	SP22
Count	28	48	38	52	44	48	21	44	31
Mean	153.6	155.6	153.4	153.8	149.4	153.8	151.8	151.0	155.6
Median	154.0	153.0	152.5	151.5	150.5	152.5	153.0	151.5	157.0
Std dev	11.1	13.3	11.6	11.1	9.5	9.0	15.1	10.9	16.9
Coeff of Variation	7.25%	8.54%	7.56%	7.23%	6.37%	5.87%	9.96%	7.21%	10.84%

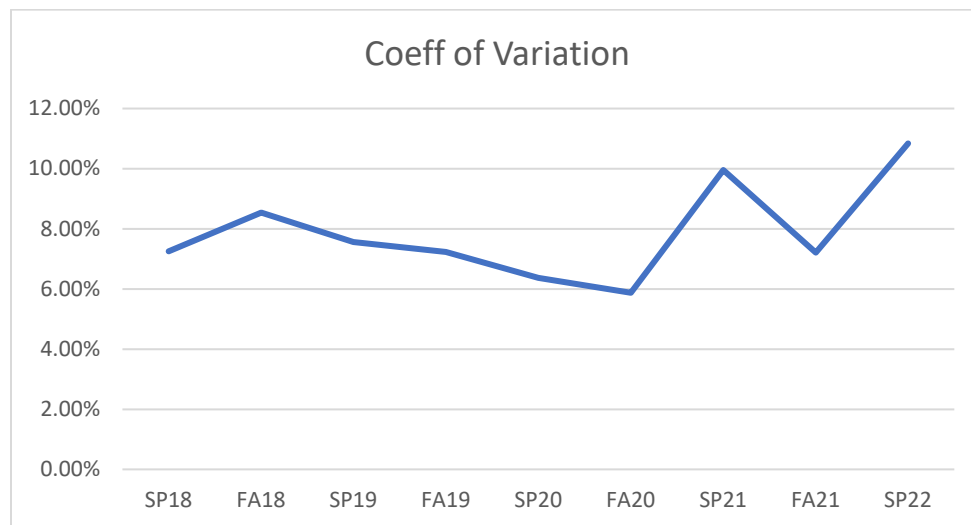
As can be seen from Figure 1, trend in the Mean and Median was the least for the semester of Spring 2020 and is roughly showing return to previous trend from the semester of Fall 2020 onwards. This indicates that students' learning and application of the quantitative skills were affected by the shift in the teaching mode.

Figure 1
Central Tendency of the sample of students over nine semesters



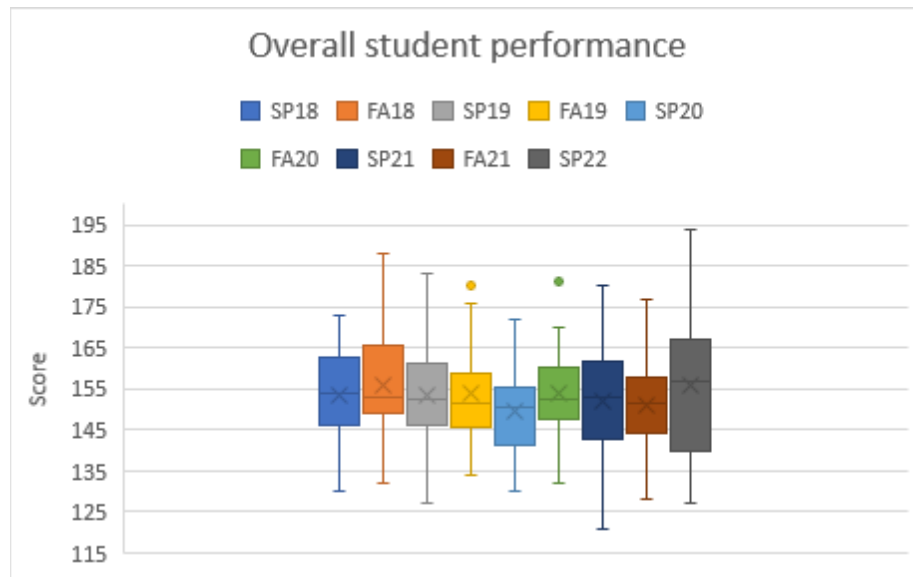
If you consider the combined effect of the mean and the standard deviation as captured in the coefficient of variation shown in Figure 2, we can see that the coefficient of variation was the least for the Spring 2020 and Fall 2020 semesters, further proving that COVID had a marked effect on student's quantitative abilities.

Figure 2
Coefficient of Variation of the sample of students over nine semesters



To compare the overall performance of all the students from each semester during the period of the analysis, we constructed box-and-whiskers plot for the data. We can observe that the Spring 2020 semester was the semester of the lowest performance of all the students on the SFT.

Figure 3
Box and Whiskers plots of the sample of students over nine semesters



To check the statistical significance of the difference in the students' performance for the COVID affected 2020 semesters, we created two groups of data. We grouped the data for the performance of the four semesters preceding 2020 and the three semesters after 2020 into one group. The second group consisted of the data for the two semesters of 2020. We conducted an F test for equality of variances and found that we can conclude that the variances of the two groups are unequal. The results are shown in Table 2.

H0: The variance of score on the SFT is the same for COVID semesters as compared to non-COVID semesters

H1: The variance of score on the SFT is different for COVID semesters as compared to non-COVID semesters

Table 2
F-Test Two-Sample for Variances

	<i>X1</i>	<i>X2</i>
Mean	153.645	151.7174
Variance	160.2988	89.74343
Observations	262	92
Df	261	91
F	1.78619	
P(F<=f) one-tail	0.000759	
F Critical one-tail	1.344028	

As $F > F$ Critical, we can reject the null.
We can conclude the variances are different.

Since the variances can be concluded to be different, we conducted a two-sample hypothesis test assuming unequal variances to check if we can conclude that the population averages of the two samples are the same. In other words, we tested if we could conclude that COVID had no impact on the SFT scores of business students. We conducted the two-sample t-test assuming unequal variances with alpha values of 0.05 and 0.1. As shown in table 3 and table 4, we cannot statistically conclude that COVID had a significant impact on the SFT scores of business students.

H0: The average of score on the SFT for COVID semesters is at least the same as the average compared to non-COVID semesters.

H1: The average of score on the SFT is less for COVID semesters as compared to non-COVID semesters.

Table 3
Two-Sample t-Test Assuming Unequal Variances, **alpha = .05**

	<i>X1</i>	<i>X2</i>
Mean	153.645	151.7174
Variance	160.2988	89.74343
Observations	262	92
Hypothesized Mean Difference	0	
Df	212	
t Stat	1.530023	
P(T<=t) one-tail	0.063751	
t Critical one-tail	1.652073	
P(T<=t) two-tail	0.127502	
t Critical two-tail	1.971217	

As $t \text{ Stat} < t \text{ Critical one-tail right side}$, we cannot reject the null.

We cannot conclude that COVID has influenced the SFT score.

To further investigate where the effect of COVID is significant at a .10 level of significance, we conducted another t test assuming unequal variances.

Table 4
Two-Sample t-Test Assuming Unequal Variances, $\alpha = .10$

	<i>X1</i>	<i>X2</i>
Mean	153.645	151.7174
Variance	160.2988	89.74343
Observations	262	92
Hypothesized Mean Difference	0	
Df	212	
t Stat	1.530023	
P(T<=t) one-tail	0.063751	
t Critical one-tail	1.285558	
P(T<=t) two-tail	0.127502	
t Critical two-tail	1.652073	

As t Stat > t Critical one-tail right side, we can reject the null.
We can conclude that COVID has influenced the SFT score.

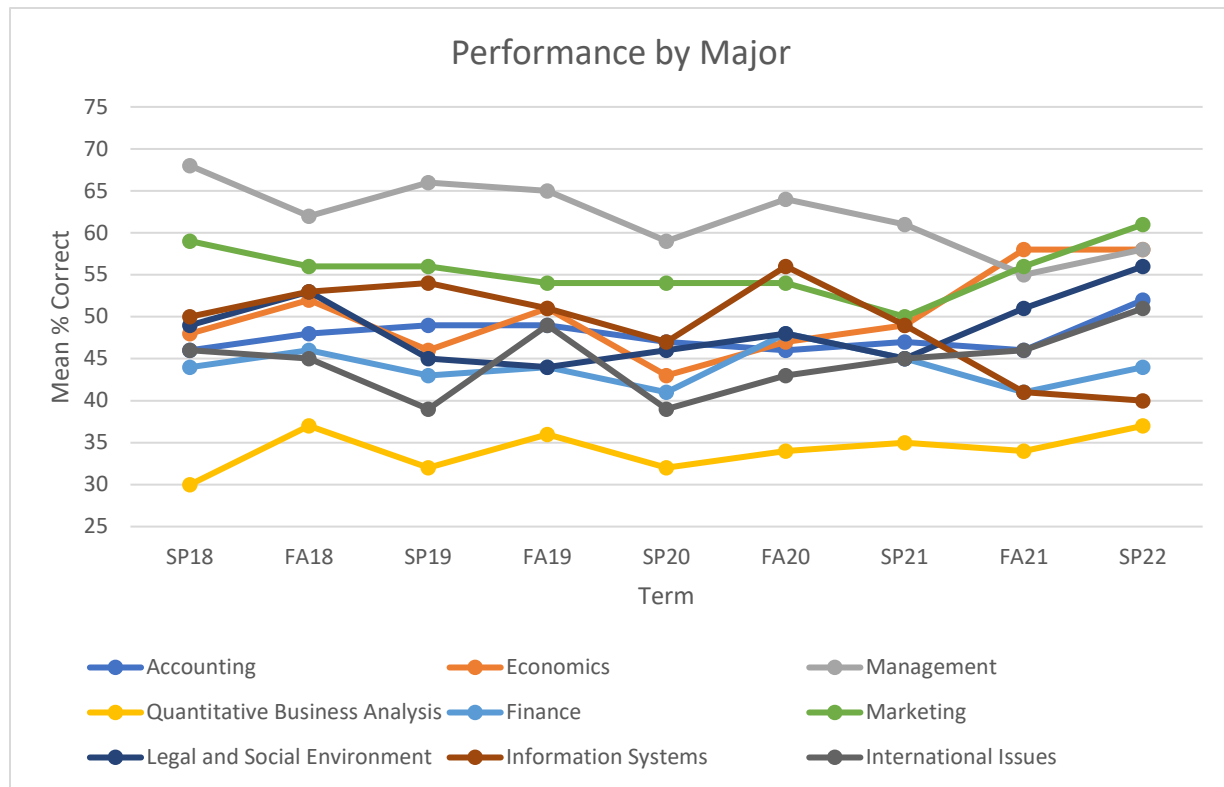
To investigate if the major pursued by the different students had any effect on their performance in the SFT, we made a breakup of all the data as per the majors as seen in Table 5.

Table 5
Mean% Correct answers by Majors

	Mean%Correct								
Year	SP18	FA18	SP19	FA19	SP20	FA20	SP21	FA21	SP22
Accounting	46	48	49	49	47	46	47	46	52
Economics	48	52	46	51	43	47	49	58	58
Management	68	62	66	65	59	64	61	55	58
Quantitative Business Analysis	30	37	32	36	32	34	35	34	37
Finance	44	46	43	44	41	48	45	41	44
Marketing	59	56	56	54	54	54	50	56	61
Legal and Social Environment	49	53	45	44	46	48	45	51	56
Information Systems	50	53	54	51	47	56	49	41	40
International Issues	46	45	39	49	39	43	45	46	51

As you can see graphically in Figure 4, there appears to be no apparent major that has been affected by COVID.

Figure 4
SFT scores by majors over nine semesters



To statistically evaluate the effect of the major on the SFT scores, we conducted a one-way ANOVA on all the data in Table 5.

H0: The major has no effect on the performance on the SFT.

H1: The major has an effect.

Table 6
Single Factor ANOVA, $\alpha = .05$

ANOVA						
Source of Variation	SS	Df	MS	F	P-value	F crit
Between Groups	4292	8	536.5	36.5104	2.2E-22	2.069832
Within Groups	1058	72	14.69444			
Total	5350	80				

As $F > F_{crit}$, we can reject the null.

We can conclude that major influences the Standardized Field Test results.

CONCLUSION

Even though graphically there appears to be an effect of COVID on the results of the SFT, this effect is statistically significant only at a level of significance of .10 or higher as illustrated by the t-test. The Major pursued by the students does not seem to influence the results of the SFT as illustrated by both the graphical results, but the effect is statistically significant as illustrated by the ANOVA. The results have some limitations. For example, there could be differences

that are visible in slicing and dicing the data in different ways, but they are not visible at present. Did we administer the exam in a different format? Did we have the students take it online vs in class during this year? This study also does not differentiate the results as per the level of the students: Bright, average, struggling. For future research, this work could be extended to more universities. As we consider the next few years, do the results change given the class status of students during COVID – for example the students taking the exam in 2020 were Jr's and Sr's prior to COVID, those who took it in 2021 only had to experience the change during their senior year etc.

REFERENCES

- Al-Kumaim, N. H., Alhazmi, A. K., Mohammed, F., Gazem, N. A., Shabbir, M. S., & Fazea, Y. (2021). Exploring the impact of the COVID-19 pandemic on university students' learning life: An integrated conceptual motivational model for sustainable and healthy online learning. *Sustainability*, 13(5), 2546.
- Baglione, S., & Tucci, L. (2022). Students' appraisal of Zoom classes during a pandemic. *Journal of Business, Economics and Technology*, 25(1), 85-94.
- Bailey, A. E. (2021). Transition to online learning: Business student perspectives during the coronavirus pandemic. *Journal of Business, Economics and Technology*, 24(1), 114-121.
- Brooks, S. K., Webster, R. K., Smith L. E., Woodland, L., Wessely, S., Greenberg, N., & Rubin, G. J. (2020). The psychological impact of quarantine and how to reduce it: Rapid review of the evidence. *The Lancet*, 395(10227), 912-920.
- Browning, M. H., Larson, L. R., Sharaievska, I., Rigolon, A., McAnirlin, O., Mullenbach, L., & Alvarez, H. O. (2021). Psychological impacts from COVID-19 among university students: Risk factors across seven states in the United States. *PloS one*, 16(1), e0245327.
- Cleofas, J. V., & Rocha, I. C. N. (2021). Demographic, gadget, and internet profiles as determinants of disease and consequence related COVID-19 anxiety among Filipino college students. *Education and Information of Technologies*, 1-16.
- Green, J. J., Stone, C. C., Zegeye, A., & Charles, T. A. (2012). The Major Field Test in Business: A pretend solution to the real problem of assurance of learning assessment (No. 201201).
- Hamaideh, S. H., Al-Modallal, H., Tanash, M. A., & Hamdan-Mansour, A. (2021). Depression, anxiety, and stress among undergraduate students during COVID-19 outbreak and "home-quarantine". *Nursing Open*.
- Hickey, A. W., & White, J. B. (2021). The impact of the COVID-Induced shutdown on learning: The measurable experience of one business program. *Business Education Innovation Journal*, 13(2).
- Jehi, T., Khan, R., Dos Santos, H., & Majzoub, N. (2022). Effect of COVID-19 outbreak on anxiety among students of higher education: A review of literature. *Current Psychology*, 1-15.
- Knight, H., Carlisle, S., O'connor, M., Briggs, L., Fothergill, L., Al-Oraibi, A., ... & Blake, H. (2021). Impacts of the COVID-19 pandemic and self-isolation on students and staff in higher education: A qualitative study. *International journal of environmental research and public health*, 18(20), 10675.
- Lee, J., Solomon, M., Stead, T., Kwon, B., & Ganti, L. (2021). Impact of COVID-19 on the mental health of US college students. *BMC psychology*, 9(1), 1-10.
- Marklein, M. B. (2020, November 16). New international student enrollments drop by 43% in US'. *University World News*. <https://www.universityworldnews.com/post.php?story=20201116050900954>.
- Montenegro-Rueda, M., Luque-de la Rosa, A., Sarasola Sánchez-Serrano, J. L., & Fernández-Cerero, J. (2021). Assessment in higher education during the COVID-19 pandemic: A systematic review. *Sustainability*, 13(19), 10509.
- Tilak, J. B., & Kumar, A. G. (2022). Policy changes in global higher education: What lessons do we learn from the COVID-19 pandemic?. *Higher Education Policy*, 1-19.
- United Nations. (2020). *Policy Brief: Education during COVID-19 and Beyond*. New York. UN <https://unsdg.un.org/resources/policy-brief-impact-covid-19-children>

Zhou, J., & Zhang, Q. (2021). 'A survey study on US college students' learning experience in COVID-19. *Education sciences*, 11(5), 248.

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THE BLOCKCHAIN TECHNOLOGY AND DIGITAL MARKETING

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ABSTRACT

This paper reviews the literature on blockchain technology in light of digital marketing. Along with a glance of the current state of the disruptive technology, it highlights specific characteristics of that technology that is revolutionizing business practices. To demonstrate the wide-ranging effect, this paper presents applications of blockchains in different areas of business, such as financial services, supply chains, health care, tourism, location of shipments, disintermediation of third parties for investment growth, and smart contracts to execute secure transactions on exchanges. Specifically, digital marketing is emphasized within the environment of social networks, such as Facebook, Twitter, YouTube, LinkedIn and Instagram, by examining its potential benefits in many commercial contexts. Based on the behavioral data of customers within social networks, this paper also describes the current state of digital marketing and its future trends. A conclusion derived herein is that blockchain technology will consistently influence future operations of digital marketing, social media marketing (including influencer marketing), e-commerce, and analysis of networks.

INTRODUCTION

As a new paradigm of economic development, the digital economy represents a turnaround in business relationships based upon information use. In this sense, information technologies and networks represent fundamental factors for economic globalization which contribute to the rapid transition of theoretical studies from autonomous economic agents to those agents of social networks; they ensure the digital economy to be solidly supported by innovative business processes (Vovchenko et al., 2017).

Specifically, blockchain technology originates from bitcoin, a cryptocurrency with a peer-to-peer payment system (McKinney et al., 2015). Cryptocurrencies using blockchain technologies bring competitive advantages to financial contracts from lower costs associated with interactions amongst economic agents, acquisition of information, transparency of and capital control over operational risks. Moreover, blockchain technology provides a means for high-quality contract execution between the economic agents of the digital economy by its contributions to the financial security of operations (Negroponte, 1996). In fact, sectors of the economy and society associated with the digital economy have undergone fundamental changes from the emergence of blockchain technology. Hence, experts (cf. Osipov&Zotova, 2015) consider the technology to be a platform for businesses, especially in areas of high-growth, technology, investment and finance.

The 2008 financial crisis motivated an anonymous group of computer enthusiasts to develop a stable, decentralized, autonomous and sustainable financial system to ideally eliminate the influence of financial institutions (cf. Chuen, 2015; McKinney et al., 2015). Satoshi Nakamoto (2008), a pseudonym who was the main promoter of cryptocurrency, designed the first blockchain database. These events linked with the phenomena of privatized profits and socialized losses have made financial intermediaries lose their public confidence which prompted connoisseurs of information technology to utilize computers and the Internet as a tool of defense. In this defensive environment, Bitcoin as the first cryptocurrency was launched in 2009. This fully digital currency consists of a system of electronic payments between peers. Since 2009, there have been ~2,677 cryptocurrencies by the middle of 2020.

Bitcoin is not authorized by a country (Chuen, 2015). When used in transactions, banks do not have to be involved within the Bitcoin transaction process as it is decentralized. Thus, international payments are easy to complete. That is, commercial actors who are connected by a blockchain will no longer require third parties to complete transaction completion. Despite these conveniences and advantages, this technology is just beginning to be known even though it was launched almost a decade ago. Whilst some suggest that cryptocurrencies are not subject to regulations, there has been significant movements towards increased regulations; however, these regulations are somewhat inconsistent (McKinney et al., 2021).

Although the future of Bitcoin remains unclear, it is assured that blockchain technology has enormous potential to bring about large-scale improvements in finance, economics, and business operations (Chuen, 2015). Such technology could reduce the influence of many large global corporations and institutions, particularly those that are greatly interested in preserving existing hierarchies, by altering the power structures. That is, the potential of this technology still remains untapped.

Because of its suitability to handle business transactions, currencies, contracts and assets, Tapscott and Tapscott (2016) note that blockchain technology represents an opportunity for a more prosperous, safer, inclusive, and open world. The rapid development of the Internet, Social Media, and Mobile Media offer marketers a variety of options that did not previously exist. Hence, marketers must reevaluate their media strategies and rethink the processes through which customers make decisions (Belch & Belch, 2014). Specifically, marketers must investigate within the current digital era how various media vehicles influences individuals and how persuasive messages may be effectively communicated.

Simultaneously, the proliferation of sophisticated e-commerce platforms with mobile device applications has fueled the rapid growth of business-to-customer commerce, reshaped organizational structures, and renewed the processes of value-creation and capture (Rejeb et al., 2020). These new technologies have altered the foundation of brand marketing by allowing a far broader market reach with a more personalized market segmentation that increases brand trust and improves customer loyalty. Marketers can create new online sales venues and generate new demands. That is, blockchain technology is the disruptive technology that brings forward various innovations in commerce that empowers the paradigm of consumer-centric marketing. Additionally, blockchains encourage disintermediation, helps combat fraud, reinforces trust and transparency, improves privacy protection, enhances security, and enables creative loyalty programs.

The potential of blockchain technology is seen as the forefront of revolutionizing industries and economic sectors; it is expected to lead the digital world (Filimonau & Naumova, 2020). Digital supply chains have been integrating towards blockchain technology with improved security and profitability of transactions (Korpela et al., 2017). This will drastically transform how companies organize, manage, and conduct their operations (Coita et al., 2019). Such technology represents competitive advantages in financial contracts due to cost reduction in the interaction of economic agents (Vovchenko et al., 2017). It also contributes to the disintermediation and decentralization of business endeavors within business (Ertemel, 2018). Blockchains can represent practical solutions to the challenges of online advertisement that involves thousands of intermediaries who distort and make the diffusion of goods and services more expensive (Pärssinen et al., 2018). The growth of the Internet, along with emerging technologies, has had a substantial impact on the traditional marketing mix (i.e., product, price, place and promotion); technologies, known as big data analytics, have allowed companies to aggregate large and complex data sets, and use sophisticated methods to mine additional information about customers (Stone & Woodcock, 2014). Another very important contribution of blockchain technology is that it can reduce the asymmetry of information amongst buyers and sellers so that negotiations between various parties can take place on level fields (Zavolokina et al., 2019). Similarly, with blockchain technology, smart contracts can be developed to facilitate, verify, and automatically enforce the implementation of digital contracts without the involvement of a central authority (Wang et al., 2019).

Considering the potentials and advantages of blockchain technology delineated above, this paper presents the characteristics, potentialities and applications of blockchain technology in the field of digital marketing. To this end, the rest of this paper is organized as follows: a description of the research methodology used, the main characteristics of blockchain technology, different applications of the technology, and applications of the technology in marketing. In conclusion, this paper details its contributions and future applications of blockchain technology.

METHODOLOGY

This paper employs the method of sorting through published research works on blockchain, relevant technology, and digital marketing to identify patterns and associations between blockchain technology and digital marketing. This provides general theoretical knowledge about the possible origins of this disruptive technology and its consequent competitive advantage.

The methodology of documentary research facilitates a broad view of the bibliography and systemic review of the literature. It allows for a creative, organized access to and evaluation of a body of available but unorganized

knowledge. The eventually organized knowledge is achieved through a series of systematic steps that describe facts and phenomena by using logical procedures, consisting of analysis, synthesis, deduction and induction. The compilation of data from documented sources allows for the discovery of hidden patterns and facts, suggestion of problems, and orientation towards other seemingly unrelated sources. It naturally points to appropriate techniques useful for locating and selecting data, analyzing documents and contents.

MAIN CHARACTERISTICS AND OPERATIONS OF BLOCKCHAINS

Each blockchain is very similar to an Excel spreadsheet: it consists of many linked blocks of data that can be shared by users. Each blockchain can be simply viewed as a chain of connected blocks. Each block stores data for specific transaction at particular times. For example, a block in a payment blockchain contains payment data. Each transaction will be recorded in the involved blocks and broadcasted to all the blocks. All blocks are chained together to form a distributed database.

Storing data in blockchains follow a consensus algorithm among users in terms of what information to store in a decentralized ledger (Cheun, 2015). Each block is valid for the previous block which collectively become a strong network without the danger of failure from a central point. Underlying the working of a blockchain, there is an encoded algorithmic property that protects the chain from malicious attacks. Blockchain technology is embedded in cryptography, mathematics, algorithms and economic models. Each blockchain combines peer-to-peer networks and uses a distributed consensus algorithm to solve traditional synchronization problems of distributed databases. It stands for an integrated multi-field infrastructure.

Once a piece of information is saved under mutual agreement and encrypted, no user, including administrators, is allowed to add, edit or delete the information stored in any of the blocks (Cheun, 2015). That is the main reason why blockchains are highly secure and manifests the authenticity of information.

Blockchains are developed based on the studies of a well-known problem of distributed consensus in computing; each blockchain appears when independently running computers can reliably agree on a common data set in the presence of flaws.

This problem arises in large distributed networks like the internet; and many software companies, including Google, Facebook, and Yahoo, employ algorithms to protect access to critical data (Casey et al, 2018). Figure 1 depicts how a representative blockchain works when a person A wants to send money to person B. In a blockchain, i.e., a decentralized system, a successful transaction is known to all peers in the system. But in a centralized system, it is only known to administrator (bank authority) and sender and receiver themselves.

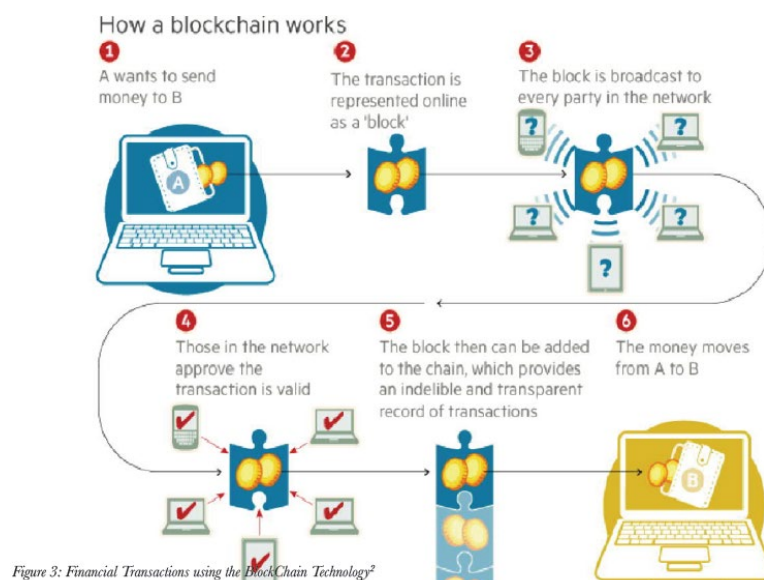


Figure 1 How a blockchain works. reprinted from Crosby et al. (2016)

These properties have made blockchains a symbol of trust and security. It is predicted that blockchain technology will “...grow by 58.7 percent between 2016-2024” (Kuno Creative, 2018). Due to these characteristics of blockchains, marketers should take advantage of this technology to make their strategies more efficient and accurate.

Blockchain technology has six key features: decentralization, transparency, open source, autonomy, immutability, and anonymity (Lin & Liao, 2017). In particular, decentralization means that each blockchain does not have to depend on a centralized node to record and store data and update distribution dates. The feature of transparency means that data records within a blockchain system is transparent; and for each node, the available data are also transparent in terms of relevant dates. That is why information stored in a blockchain can be trusted. As for the feature of open source, most blockchain systems are open to everyone in the world; each record can be publicly verified; and people can also apply blockchain technology as desired. By autonomy, it means that because of the consensus implemented, each node in a blockchain system can safely transfer or update data so that people can individually trust the entire system, in which no one can intervene. The feature of immutability represents that records will be reserved forever and cannot be changed unless someone can take control of more than 51% nodes simultaneously. Finally, with anonymity, blockchain technology has successfully solved the trust problem between nodes so that the transfer of data and transaction data can be ‘anonymous’ with only the addresses of individuals within a blockchain being communicated.

Because of these key features, blockchains’ promise of great potentials emerge due to the following reasons:

- Because a large number of participants from different geographical locations share one blockchain, each blockchain can readily resist outages and attacks (Sato et al., 2020).
- Each blockchain system does not need to worry about a single-node failure potentially causing a wide-ranging system failure (Kakavand et al., 2017).
- If a node of a participant blockchain network fails, other nodes will continue to function, making stored information in the network continuously and constantly available and reliable (Azaria et al., 2016).
- Transactions on a blockchain are transparent to participants, which increases a chain’s auditability and trust (Kamble et al., 2020).
- It is almost impossible for someone to make changes to a blockchain without detection, which reduces opportunities for fraud and thereby increases confidence in the information it carries (Guerar et al., 2020).
- It is almost possible to make transactions irrevocable, which increases the accuracy of records and data whilst simplifying administrative processes (Myeong& Jung, 2019). Note: In some cases, it has been theorized and discussed that ‘cancelling, and reissuing’ bitcoins might be done under circumstances where a majority of Senior Administrations and nodes agree on this.
- Digitally, almost any document or asset can be expressed in codes and encapsulated or referenced by a ledger entry. This means that blockchain technology has very broad range of applications, most of which have not been imagined, much less implemented (Schatsky&Muraskin, 2015, p. 11).

DIVERSE BLOCKCHAIN APPLICATIONS

The concept of blockchains holds many promises for both the financial sector and financial market infrastructure. In fact, key drivers behind the wave of blockchain innovations is to facilitate transitions from centralized and proprietary ecosystems to their decentralized and mutualized equivalents. For financial actors and those actors particularly within the banking industry, this could mean greater risks of disintermediation and potential threats to relevant activities, especially activities for which banks act as the central coordinator (Collomb&Sok, 2016).

Blockchain has a potential to make the whole insurance ecosystem to move to streamline operations and lower expense ratios from ‘back-office’ operations to do efficient asset tracking, risk pricing, and quick claim settlement (Gatteschi et al., 2018). For example, several blockchain startups and insurance companies have launched flight delay insurance. Smart contract is applied to guarantee the claim. Travelers simply enter the personal information and details of the flight and customize the suitable insurance, such as coverage amount, delay conditions. The platform automatically calculates the price. After the purchase, the insurance information will be written onto the blockchain, meanwhile a smart contract will be generated. When the delay condition is satisfied, the smart contract will be triggered. Travelers will receive the compensation immediately without complex manual checks (Figure 2).

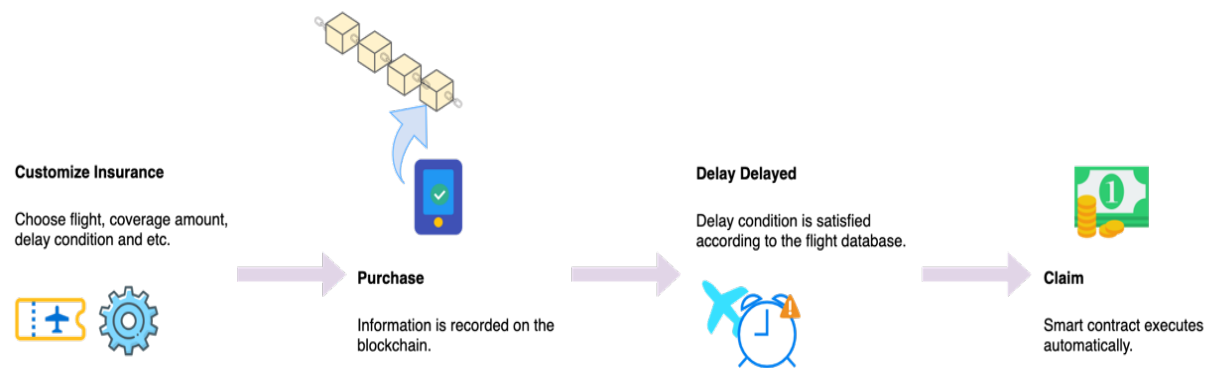


Figure 2.Flight delay insurance on blockchain

P2P lending takes place by borrowing the advantages of blockchain. Lendoit is one of the lending platforms facing global participants (Arvanitis, 2019). On that platform, borrowers, lenders, credit agencies and debt-collectors perform lending activities. In the traditional P2P lending mode, information asymmetry and default events significantly obstacle the development of P2P lending market. While the characteristics of blockchain offset these situations. Only after a borrower is assessed and verified by a professional credit agency, he/she can make a request of lending. Although collateral is unnecessary, part of the loan is transferred into Smart Compensation Fund, used to compensate for the lender if default occurs. The lender also can sell the default to debt-collectors, who will collect the debt according to the framework in each country. Meanwhile, lenders are allowed to resell the debt to other lenders to solve their own finance problem(s) just in case. Through blockchain technology, all related information is public in the leading market, the secondary market, and the collector market. All lending participants appreciate the transparent environment and actively promote the market liquidity.

The application of blockchain technology has also been introduced in areas related to health services: Public health management, pharmaceuticals, medical research, and user-oriented healthcare, based on personal data of patients, and preventing counterfeiting of medicines. The technology can eliminate intermediaries by allowing direct transactions between buyers and sellers; thereby the influence of a central actor, who controls data and collect high levels of commissions, can be limited. For example, blockchain technology has been used to securely request genomic data from individuals without compromising an individual's identity. All patients' DNA data and health records can be securely stored through blockchain without the risk of a crash or data leak (Gursoy et al., 2020). Furthermore, Blockchain allows for pharma companies to request genomic data straight from individual patients rather than using a third-party company by giving these individuals more control of their genomic data. Hence, future applications of blockchains can create new possibilities for market operations in the health care area by avoiding intermediaries (Mettler, 2016).

Also, blockchain technology is expected to transform current modes of financial transactions and radically alter how tourism activities are transacted, creating opportunities for travel companies to track the preferences of their travelers so that customer services can be more meaningful and personalized. That is, the technology will be able to extract more value out of loyalty programs. Specific to the tourism industry, blockchain represents the latest development in a long line of technological innovations that have the potential to significantly stimulate tourism (Treiblmaier&Önder, 2019). The reduced transaction costs, resulting from the blockchain technology will also transform the organizational structure of the tourism industry. That will in turn help innovative companies improve their market shares. However, considering the contribution of the tourism industry to the world GDP, a greater diffusion of blockchain technology is required.

The characteristics of blockchain technology open doors to the disintermediation of third parties in innumerable types of transactions so that relevant transaction costs are lowered; that reduces the growth of vital investments (Coase, 1937, 1960; Williamson, 1975; 1985), and increases the potential for innovation in major industries. The main sources of risks that originate in transaction costs are: Limited rationality, the general uncertainty of the economic system and specificities of transactions. In this sense, among others, transaction costs have been those associated with products, negotiations, formalization and induction compliance with various agreements. Hence the importance of contracts that

provide protection against various contingencies. Although the employment of contracts is not new, their inclusion as part of a blockchain implementation certainly is. The term “*smart contract*” has been coined (Gal & McCarthy, 2018) to indicate the creation of a contract that is encoded and included as part of a blockchain. Each smart contract consists of a group of conditions that are coded in a computer language and is added as a transaction to a blockchain.

Another important application of blockchain technology is tracking the location of shipments that require delivery at precise times (Klein, 2020). Examples include some same-day services from Amazon, Wal-Mart, Federal Express, and DHL. However, even though such services are generally reliable and offer tracking services, errors occasionally occur during shipments. For example: whilst there is a small chance of error, a package may miss a flight or a truck may be delayed due to weather, traffic conditions or accidents. For extremely urgent shipments such as medication, there is a need for extremely accurate tracking systems and methods that are superior to those methods of the latest generation that may include blockchain(s).

According to Waters (2003), each supply chain consists of an ordered series of activities where materials are mobilized from initial suppliers to final customers. When organizations within a supply chain actively and collaboratively manage activities and relationships to maximize customer values and to achieve sustainable competitive advantages, this is effective supply-chain management. Such management consists of the development of new products, supplies, productions, logistics, the management, coordination and integration of demands. In this regard, blockchain technology promises potentially reliable, secure and authenticated logistics and an information exchange system on the supply chain of supply networks (Dujak&Sajter, 2019). Effective supply chain management creates a superior competitive advantage.

Furthermore, AI technologies are implemented on blockchains. For example, Cotex is a decentralized AI autonomous system running on blockchains (Chen et al., 2018). It adds AI algorithms to support smart contracts so that anyone can add AI to their smart contracts. The model providers are paid by a certain amount of Endorphin, which is the price unit that is required for payments that deals with transactions or executes AI smart contracts on the Cortex chain. The Cortex blockchain stores the hash values of the model and the data. Users could post task on the machine learning platform, submit models, make inferences by calling intelligent contracts, and create their own AI DApps (Artificial Intelligence Decentralized Applications).

APPLICATIONS OF BLOCKCHAIN TECHNOLOGY IN MARKETING

In this section, we will address the question of how will blockchain technology affect digital marketing? In many aspects, the technology will influence marketing activities. Harvey et al. (2018) argue that it will impact marketing by eliminating intermediaries, allowing to significantly reduce transaction costs, putting an end to the payments that companies usually make to banks through credit cards, and passing those costs to consumers. In this wave of transitions, digital marketers will have access to a new type of model. While limiting the Google-Facebook duopoly, companies will experience an increasing level of competition in the field of electronic commerce; and concentrations of traffic will appear at a few particular sites and advertising networks.

According to the 2019 Digital Economy Report (<https://unctad.org/webflyer/digital-economy-report-2019>), digital advertisement will increase to 60% of the total marketing promotional outlay in 2023. Also, advertising in the traditional media will suffer losses of about \$4 billion. The combined share of Google and Facebook has grown 20% since 2010 mainly due to spending on social networks. For these companies, their digital advertisement in 2017 brought in \$200 billion of revenues worldwide; and 65% of their profits were created through digital advertisements. These two internet platforms brought in the most incomes from electronic advertising.

Additionally, Szabo’s (1996) original idea of smart contracts with blockchain technology was revived. A smart contract is essentially a self-executing computer program that represents a contract on a blockchain. The computer program takes actions at specified times and/or based on the satisfaction of preconditions (e.g., delivery of money or asset). The transaction records, assets and other entities of the organization are maintained on a blockchain. Such contracts are designed to facilitate, verify and automatically enforce the negotiation and implementation of digital contracts without any need for central authorities. Currently, smart contracts are in the process of adaptation in order to address security and privacy concerns (Wang et al., 2019).

Similarly, adopting blockchain technology will improve consumer trust in brands in three ways: enhancement of brand transparency, reduction of the circulation of counterfeit bills, and increase of brand confidence in online markets (Boukis, 2020). Consumer trust is very important and must be generated for those consumers who make purchases through electronic commerce. In this regard, it is both theoretically and practically important to understand the key aspects of developing relationships with consumers on the Internet (Corbitt et al., 2003), where trust is a fundamental attribute driving purchase decisions (Beatty et al., 2011).

Furthermore, although cybersecurity has been improving, fraud prevention is still high on the agenda of companies around the world. Altering or eliminating information in the accounting systems, changing electronic documents, such as the creation of fraudulent electronic files, have been the main methods employed to hide frauds. According to Cybersecurity Ventures (2020) (<https://cybersecurityventures.com/hackerpocalypse-cybercrime-report-2016/>, accessed on January 31, 2021), the global costs of cybercrime will grow 15% per year over the next five years, reaching \$10.5 trillion annually by 2025, compared to \$3 trillion in 2015. That represents respectively a larger amount than the losses caused by natural disasters in one year and the profit of global trade of major illegal drugs. To this end, financial institutions are using blockchain-based technology to reduce risk and prevent cyber frauds (Singh & Singh, 2016). The characteristics of blockchain technology prevent accounting records or electronic documents from being altered or deleted. The capability to share information with many business partners, stakeholders, managers, auditors allows everyone to participate by conducting independent reviews of transactions and deliveries in real time (Dai et al., 2017).

When consumers make purchases or other business transactions by using online platforms and social networks, companies collect an enormous amount of data from consumers. So, the danger of violating consumer privacies often exists. Regarding this issue, scholars propose various models based on the concept of blockchain to protect user data in order to avoid any security breach. Most social networking databases are distributed systems that are accessible by system administrators. Therefore, data transfers to third parties represent a latent threat. An example is the consumer information that Facebook leaked to Cambridge Analytica (Chen et al., 2019) for electoral purposes. This event ignited an intense debate among companies, experts and government officials regarding the protection of consumer privacies. It is within this environment that the concept of surveillance capitalism gained prominence. It is a term coined by Shoshana Zuboff (2019) to represent the exacerbated monetization of the information that users share in the digital environment. The concept presumes the existence of manipulation and surveillance derived from the analysis and data-sharing techniques utilized by many companies.

For researchers, trust is a key factor in electronic commerce, online banking and social networks that can be enhanced by employing blockchain technology (Fleischmann & Ivens, 2019). In this regard, studies find that blockchain technology promotes higher levels of consumer trust in that such technology can be considered an innovation in the area of business models, as consequences of digital marketing (Seppälä, 2016). Additionally, trust is a key factor for successful transactions in risky exchanges; and digital technologies have consistently shown that trust is strongly related to consumer acceptance. The greater the trust users have in online services, the less effort they will need to validate the details and legitimacies of these services (Shin, 2019).

Blockchain technology has also a built-in bitcoin wallet that helps customers pay and earn in crypto. Disruption of influencer marketing, taking advantage of the transparency and immutability of blockchains, helps marketers authenticate the identity of an influencer, validate their followers, obtaining a guarantee with the help of smart contracts, in which a payment can be kept in custody until a desired transaction is completed (Kuno Creative, 2018). Also, interactive marketing represents a recent, highly innovative development. That includes an online affiliate, and platforms (e.g., Amazon, e-bay and Apple and specialized start-ups). These platforms support the automated auction of advertising spaces for individual consumers who can navigate via mobile phone or other devices (Stone & Woodcock, 2014).

The ecosystem of digital marketing is composed of social networks (Balathandayutham & Anandanatarajan, 2020). Each of these networks consists of different types of applications, such as collaborative projects (e.g., Wikipedia), blogs / microblogs (e.g., Twitter), community content (e.g., YouTube), social networking sites (e.g., Facebook), virtual game worlds (e.g., World of Warcraft) and virtual social worlds (e.g., Second Life). These networks have a very important role in promoting digital marketing and charting its evolution, as they are also popular digital advertising platforms. During the last decade, the use of Social Media in marketing has increased. Many (e.g., Salo et al., 2013; Moschini, 2012) have commented that Social Media can enhance the power of viral marketing. Others (e.g., Hajli, 2014; Kang & Schuett, 2013) suggest that Social Media increases the speed at which consumers share experiences and

opinions with an increasing audience. Social Media can provide a better understanding of consumer needs and collaborative responses for solutions. In addition, social relations take an active role in the internationalization of companies as they serve as an effective means to generate knowledge about the markets that a company is interested in entering (Crosby et al., 2016).

Entrepreneurs can digitally advertise their brands in social networks, the most suitable virtual space. Within this space, their power of influence is very broad, since in a matter of seconds an advertisement reaches a large audience, which greatly reduces per capita advertisement cost. Because of the large number of users online, marketers can conveniently employ this channel to complement their marketing efforts. In summary, marketers can easily reach to a large number of potential and actual buyers at a lower CPM (cost per thousand) than in print or television media advertising (Henderson, 2020).

To understand the current state of digital marketing and future trends, it is very important to review various reports, digital marketing statistics, surveys, research data and results in order for businesses to stay updated and competitive. Doing so helps marketers observe the latest trends and tactics of digital marketing. This paper presents the following information on digital marketing gleaned from social networks.

Social media platforms have registered an unprecedented growth of users in the last decade, from 970 million users in 2010 to that exceeding 3.96 billion in 2020. That represents almost half of the world's population. Among all such platforms, Facebook ranks first with 2.7 billion monthly active users, followed by YouTube (2 billion), WhatsApp (2 billion), FB Messenger (1.3 billion) and WeChat (1.2 billion). By gender, the current global average of social media users is 54% male versus 46% female. However, in the US, women constitute the main base of users: 76% of all female Internet users have social media accounts compared to 72% of all men. In 2020, the average time spent on social media per day is 2 hours 24 minutes globally for users aged 16 to 64 on any device. The total of 144 minutes is a 1.4% increase from the 142 minutes of the previous year and a 38% increase in the last 5 years. Regarding the use of social networks by device, 99% of people in the world access networks exclusively on a mobile device (tablet or phone). Around 78% access platforms only from their mobile phone, compared to only 1.32% who visit their social networks only through the desktop. For details, see Dean (2021).

CONCLUSIONS AND RECOMMENDATIONS

Blockchain technology is highly valued and holds immense potential for businesses due to the technology's decentralized infrastructure and peer-to-peer nature. It has practical applications in a great variety of endeavors far beyond Bitcoin. The technology has demonstrated its potential and capability to transform a traditional industry with its key features: decentralization, persistence, anonymity, and auditability (Antoniadis et al., 2019). However, the actual adoption of this technology has been relatively slow due to associated risks. Because of this reason, understanding the disruptive effect of this technology's potential on industries and people's lives as a consequence of adopting the technology can prepare the world to eventually embrace the technology in the years to come (Casino et al., 2019).

In the virtual environment, digital and social media have created important changes. That effect of the media and relevant social and digital networks has motivated marketers to recognize how they can more effectively serve customers with their offerings than ever before. Hence, many companies adopt digital and social media as an important part of their marketing communications mix. Promotional activities in marketing have three main objectives: Increasing the awareness of a product, persuading people to buy the product, and reminding people that the product exists (Kotler & Keller, 2007). To achieve these purposes, the choice of promotional tools, such as advertising or direct marketing, depends on the desired marketing objective, consumer preference and the resources available for accomplishing this objective. Among promotional tools, organizations are beginning to recognize the power of the Web, mobile technology, digital television, email, and databases. This is confirmed by the trends registered in the behavior statistics of the main social networks (Appel et al., 2020).

It is clear that blockchain technology increasingly influences digital marketing and will continue to do so in the future. This technology allows companies to acquire more relevant knowledge and more reliable data from

customers, while it also allows customers to retain the ownership over their data. Therefore, blockchain technology helps provide relevant information and customer preferences so that companies have access to their customer data.

Furthermore, the discussions above suggest that blockchain technology can minimize the involvement of intermediaries and the number of or even eliminate fraudulent activities, such as deep forgeries and illegitimate reviews, within digital marketing. Accompanying the great many potentials, blockchain technology also faces many challenges and obstacles. For example, large companies like Google may feel threatened by the technology; and therefore, these companies may very well introduce countermeasures to interrupt or simply slow down the implementation of blockchain technology. In addition, along with the growth of electronic commerce the number of cyberattacks has increased, involving compromises of large amounts of highly sensitive data, including private customer information, financial information, and breaking into well protected computer-network systems to steal confidential data (Teo, et al., 2020).

Based on information presented in this paper, it can be concluded that blockchain technology will consistently influence major digital marketing efforts, such as Social Media marketing (including influencer marketing), e-commerce, and network analysis. The media will contribute to the veracity, speed, value and volume of big data because of blockchain's abilities. Additionally, blockchain technology will drive changes in data ownership and customer empowerment. Consequently, these changes will mitigate fraudulent activities. They will influence how customers acquire, store and retrieve information and how such information is communicated (Yogesh et al., 2020).

Specifically, this paper makes both managerial and social contributions. In terms of the former, this work develops the relevant management knowledge and necessary awareness of blockchain technology. It demonstrates this technology's influence on digital marketing so that marketing managers will be prepared for the forthcoming disruptive changes. In terms of the social contribution, this paper shows how blockchain technology can mitigate the activities of scammers in digital marketing and how the digital industry can benefit society by making itself more transparent and effective than before. In other words, blockchain technology has the potential to either minimize the number of or even eliminate fraudulent activities, such as the dissemination of fake news and propaganda that adversely affect society.

REFERENCES

- Antoniadis I., Kontsas S., & Spinthiropoulos K. (2019). *Blockchain applications in marketing*. University of Western Macedonia, REECE.
- Arvanitis, S. (2019). P2P lending review, analysis and overview of Lendoit blockchain platform. *International Journal of Open Information Technologies*, 7(2), 94-98.
- Appel, G., Grewal, L., Hadi, R., & Stephen, A. (2020). The future of social media in marketing. *Journal of the Academy of Marketing Science*, 48, 79-95. <https://doi.org/10.1007/s11747-019-00695-1>.
- Azaria, A., Ekblaw, A., Vieira, T., & Lippman, A. (2016) MedRec: Using blockchain for medical data access and permission management. *The 2nd International Conference on Open and Big Data (OBD)*, Vienna, 25-30.
- Beatty, P., Reay, I., Dick, S., & Miller, J. (2011). Consumer trust in e-commerce web sites: A meta-study. *ACM Computing Surveys*, 1-46.
- Balathandayutham, P., & Anandanatarajan, K. (2020). Digital marketing through social networking sites (Sns): A field of digital empowerment. *International Journal of Scientific & Technology Research*, 9(2), 734-736.
- Belch, G. & Belch, M. (2014). The role of new and traditional media in the rapidly changing marketing communications environment. *International Journal of Strategic Innovative Marketing*, doi:10.15556/IJSIM.01.03.001.
- Boukis, A. (2020). Exploring the implications of blockchain technology for brand–consumer relationships: a future research agenda. *Journal of Product & Brand Management*, 29(3), 307-320.
- Casey, M., Crane, J., Gensler, G., Johnson, S., & Narula, N. (2018). The impact of blockchain technology on finance: A catalyst for change. *ICMB, International Center for Monetary and Banking Studies*.
- Casino, F., Dasaklis, T., & Patsakis, C. (2019). A systematic literature review of blockchain-based applications: Current status, classification and open issues. *Telematics and Informatics*, 36, 55-81.
- Chen, Y., Xie, H., Lv, H., Wei, S., & Hu, C. (2019). DEPLEST: A blockchain-based privacy-preserving distributed database toward user behaviors in social networks. *Information Sciences*, 501, 100-117.
- Chen, Z., Wang, W., Yan, X., & Tian, J. (2018). Cortex - AI on blockchain: The decentralized AI autonomous system. Tech. rep. <https://whitepaperdatabase.com/cortex-ctxc-whitepaper/>, accessed on February 19, 2021.
- Dai, J., Yunsen, W., & Miklos, V. (2017). Blockchain: An emerging solution for fraud prevention. *The CPA Journal*, 87(6), 12-14.
- Chuen, D.L.K. (2015). *Handbook of digital currency: Bitcoin, innovation, financial instruments, and big data*. New York, NY: Elsevier.
- Coase, R.H. (1937). The nature of the firm. *Economica*, núm, 4, 102.
- Coase, R.H. (1960). The problem of social cost. *The Journal of Law and Economics*, 3, 1-44.
- Collomb, A., & Sok, K. (2016). Blockchain/distributed ledger technology (DLT): What impact on the financial sector? *Digiworld Economic Journal*, (103), 3rd Q. 2016, 93-111.
- Coita, C., Abrudan, M., & Matei, M. (2019) *Effects of blockchain technology on human resources and marketing: An exploratory study*. In: Kavoura, A., Kefallonitis, E., Giovanis, A. (eds), *Strategic Innovative Marketing and Tourism. Springer Proceedings in Business and Economics*. Springer, Cham.

- Corbitt, B., Thanasankit, T., & Yi, H. (2003). Trust and e-commerce: a study of consumer perceptions. *Electronic Commerce Research and Applications*, 2(3), 203-215.
- Crosby, M., Pattanayak, P., Verma, S., & Kalyanaraman, V. (2016). Blockchain technology: Beyond bitcoin. *Applied Innovation*, 2, 6-9.
- Dean, B. (2021). Social network usage & growth statistics: How many people use social media in 2021? <https://backlinko.com/social-media-users/#%20social-media-usage-stats>, accessed on February 2, 2021.
- Dujak, D., & Sajter, D. (2019). Blockchain applications in supply chain. In: Kawa, A., & Maryniak, A. (eds), *Smart Supply Network*. Springer, 21-46.
- Ertemel, A. (2019). Implications of blockchain technology on marketing. *Journal of International Trade, Logistics and Law*, 4(2), 35-44.
- Fleischmann, M., & Ivens, B.S. (2019). Exploring the role of trust in blockchain adoption: An inductive approach. Proceedings of the 52nd Hawaii International Conference on System Sciences, 6845-6854.
- Filimonau, V., & Naumova, E. (2020). The blockchain technology and the scope of its application in hospitality operations. *International Journal of Hospitality Management*, 87, 102383.
- Gal, G., & McCarthy, W. (2018). Implementation of REA Contracts as Blockchain Smart Contracts: An Exploratory Example. *12th International Workshop on Value Modeling and Business Ontologies*, Amsterdam, 1-5.
- Gatteschi, V, Lamberti, Demartini, C, Pranteda, & Santamaría, V. (2018). Blockchain and smart contracts for insurance: Is the technology mature enough? *Future Internet* 10, 20; doi:10.3390/fi10020020.
- Guevarra, M., Merlo, A., Migliardi, M., Palmieri, F., & Verderame, L. (2020). A fraud-resilient blockchain-based solution for invoice financing. *IEEE Transactions on Engineering Management*, 67(4), 1086-1098.
- Gursoy, G., Braannon, C., Wagner, S., & Gerstein, M. (2020). Storing and analyzing a genome on a blockchain. *bioRxiv*, <https://doi.org/10.1101/2020.03.03.975334>, accessed on February 19, 2021.
- Hajli, N. (2014) A study of the impact of social media on consumers. *International Journal of Market Research*, 56(3), 387-404.
- Harvey, C.R., Moorman, C., & Toledo, M. (2018). How blockchain can help marketers build better relationships with their customers. *Harvard Business Review*, <https://hbr.org/2018/10/how-blockchain-can-help-marketers-build-better-relationships-with-their-customers>, accessed on February 2, 2021.
- Henderson, G. (2020). The importance of social media marketing. <https://www.digitalmarketing.org/blog/the-importance-of-social-media-marketing>, accessed on February 2, 2021.
- Kakavand, H., De Sevres, K., & Chilton, B. (2017). The blockchain revolution: An analysis of regulation and technology related to distributed ledger technologies. <http://dx.doi.org/10.2139/ssrn.2849251>.
- Kamble, S., Gunasekaran, A., & Sharma, R. (2020). Modeling the blockchain enabled traceability in agriculture supply chain. *International Journal of Information Management*, 52, 101967.
- Kang, M., & Schuett, M. (2013). Determinants of sharing travel experiences in social media. *Journal of Travel & Tourism Marketing*, 30, 1-15.
- Klein, E. (2020). Blockchain system and method for calculating location of time - crucial shipments according to expectation and smart contracts. Washington DC.: U.S. Patent Application publication (no. 17010460).

- Korpela, K., Hallikas, J., & Dahlberg, T. (2017) Digital supply chain transformation toward blockchain integration. *Proceedings of the 50th Hawaii International Conference on System Sciences*. DOI: 10.24251/HICSS.2017.506.
- Kotler, P., & Keller, K. (2007). *A framework for marketing management* (3rd ed.). Upper Saddle River, NJ: Pearson/Prentice Hall.
- Kuno Creative. (2018). 6 ways to benefit from blockchain marketing technology. Available at: <https://www.kunocreative.com/blog/blockchain-marketing>
- Lin, I., & Liao, T. (2017). A survey of blockchain security issues and challenges. *International Journal of Network Security*, 19(5), 653-659.
- McKinney, R.E., Jr., Shao, L.P., Shao, D.H., & Rosenlieb, D.C., Jr. (2015). The evolution of financial instruments and the legal protection against counterfeiting: A look at coin, paper, and virtual currencies. *Journal of Law, Technology & Policy*, 2015(2), 273-313.
- McKinney, R.E., Jr. Baker, C.W., Shao, L.P., & Forrest, J.YL. (2021). Cryptocurrency: Utility determines conceptual classification despite regulatory uncertainty. *San Francisco Intellectual Property and Technology Journal*, 25(1).
- Mettler, M. (2016). Blockchain technology in healthcare: The revolution starts here. *2016 IEEE 18th International Conference on e-Health Networking, Applications and Services (Healthcom)*, Munich, 2016, pp. 1-3.
- Moschini, S. (2012) *Claves del Marketing Digital*. La Vanguardia Ediciones, Barcelona, España. Primera edición.
- Myeong, S., & Jung, Y. (2019). Administrative reforms in the fourth industrial revolution: The case of blockchain use. *Sustainability*, 11(14), 3971.
- Nakamoto, S. (2008). Bitcoin: A peer-to-peer electronic cash system. https://www.usssc.gov/sites/default/files/pdf/training/annual-national-training-seminar/2018/Emerging_Tech_Bitcoin_Crypto.pdf, accessed on January 24, 2022.
- Negroponte, N. (1996). *Being Digital*. New York, NY.: Vintage.
- Osipov, M., & Zotova, S. (2015). New economy: Reality, virtuality and myth making. MSU, Center for Social Sciences. Faculty of Economics, TEIS, p. 112
- Pärssinen, M., Kotila, M., Cuevas R., Phansalkar, A., & Manner, J. (2018). Is blockchain ready to revolutionize online advertising? *IEEE Access*, 6, 54884-54899.
- Rejeb, A., Keogh, J., & Treiblmaier, H. (2020) How blockchain technology can benefit marketing: Six pending research areas. *Front. Blockchain* 3:3.
- Salo, J., Lehtimäki, T., Simula, H., & Mäntymäki, M. (2013). Social media marketing in the scandinavian industrial markets. *International Journal of E-Business Research*, 9(4), 16-32.
- Sato, T., Imamura, M., Omote, K. (2020). Threat analysis of poisoning attack against ethereum blockchain. In: Laurent, M., & Giannetsos, T. (eds). *Information Security Theory and Practice*. WISTP 2019. Lecture Notes in Computer Science, 12024. Springer, pp 139-154.
- Schatsky, D., & Muraskin, C. (2015). Beyond bitcoin: Blockchain is coming to disrupt your industry. Deloitte University Press. <https://www2.deloitte.com/mt/en/pages/financial-services/articles/mt-banking-alert-019-blockchain-is-coming-to-disrupt-your-industry.html>

- Seppälä, J. (2016). The role of trust in understanding the effects of blockchain on business models. Aalto University <https://aaltodoc.aalto.fi/handle/123456789/23302>, accessed on February 04, 2022.
- Shin, D. (2019)Blockchain: The emerging technology of digital trust. *Telematics and Informatics*, 45, 101278. <https://doi.org/10.1016/j.tele.2019.101278>.
- Singh, S., & Singh, N. (2016). Blockchain: future of financial and cyber security. *2nd International Conference on Contemporary Computing and Informatics (IC3I)*.
- Stone, M., & Woodcock, N. (2014). Interactive, direct and digital marketing. *Journal of Research in Interactive Marketing*, 8(1), 4-17.
- Szabo, N. (1996). Smart contracts: Building blocks for digital markets. *EX-TROPY: The Journal of Transhumanist Thought*, no. 16. https://www.fon.hum.uva.nl/rob/Courses/InformationInSpeech/CDROM/Literature/LOTwinterschool2006/szabo.best.vwh.net/smart_contracts_2.html, accessed on February 02, 2021.
- Tapscott, D., & Tapscott, A. (2016) *Blockchain Revolution: How the Technology behind Bitcoin is Changing Money, Business, and the World*. Penguin: New York.
- Teo, M.X., Alrashdan, M.T., Al-Maatouk, Q., Alrashdan, M.T. (2020). Blockchain technology in e-commerce platform. *International Journal of Management*, 11(10), 1688-1697; doi: 10.34218/IJM.11.10.2020.154.
- Treiblmaier, H., & Önder, I. (2019). The impact of blockchain on the tourism industry: A theory-based research framework. In: Treiblmaier, H., & Beck, R. (eds). *Business Transformation through Blockchain* (pp. 3-21). Palgrave Macmillan, Cham.
- Vovchenko, N., Andreeva, A., Orobinskiy, A., & Filippov, Y. (2017) Competitive advantages of financial transactions on the basis of the blockchain technology in digital economy. *European Research Studies*, XX(3B), 193-212.
- Wang, S., Ouyang, L., Yuan, Y., Ni, X., Han, X., & Wang, F. (2019). Blockchain-enabled smart contracts: *Architecture, Applications, and Future Trends*. [*IEEE Transactions on Systems, Man, and Cybernetics: Systems*](#), 49, [Edición: 11](#)
- Waters, D. (2003). *Logistics: An introduction to supply chain management*. Palgrave Macmillan.
- Williamson, O.E. (1975). *Markets and hierarchies: Analysis and antitrust implications*. New York: Free Press.
- Williamson, O.E. (1985). *The economic institutions of capitalism*. New York: Free Press.
- Yogesh, K., Dwivedi, et al. (2020). Setting the future of digital and social media marketing research: Perspectives and research propositions. *International Journal of Information Management*, <https://doi.org/10.1016/j.ijinfomgt.2020.102168>
- Zavolokina, L., Miscione, G., & Schwabe, G. (2019). Buyers of lemons: Addressing buyers' needs in the market for lemons with blockchain technology. *Proceedings of the 52nd Hawaii International Conference on System Sciences*; DOI: [10.24251/HICSS.2019.223](#).
- Zuboff, S.(2019). *The age of surveillance capitalism*. New York: PublicAffairs.

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EXPLORING THE POTENTIALITY OF RECURRENT NEURAL NETWORKS FOR EMOTION CLASSIFICATION

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ABSTRACT

Textual data in the form of tweets, status updates, blogs, articles are being generated in a vast amount through social media sites and blogs. These textual data are emotionally rich and are a good representative of emotions expressed by an individual or a group. Analyzing the emotions within these textual data can provide us with an idea about how an individual or a community communicate their thoughts and insights on any given topic. Various predictive analytic techniques are available to analyze the emotions within these texts. Widely used supervised classification techniques suffer from the imbalance in the training dataset thus failing to classify the emotional classes. Here, we have explored the potentiality of the deep learning classifier especially the different Recurrent Neural Network (RNN) architectures to address a six-class emotion (Anger, Sadness, Happy, Surprise, Love, and Fear) classification problem. By appropriately tuning the hyper parameters of the RNN classifier our study reveals that both the Long Short-Term Memory (LSTM) and the Bidirectional LSTM performs significantly better than a simple RNN classifier for a six-class emotion classification problem.

INTRODUCTION

Emotions can be widely expressed through speech and written texts. The emergence of social media and blogging sites have facilitated individuals and communities to express their opinions, feelings, and thoughts on a variety of topics. Texts within these channels, irrespective of the number of characters, hold a wealth of information on how an individual or a community communicates their thoughts, emotions, and feelings. Analyzing these texts can help us in understanding the emotions expressed by both an individual and the entire community. Commonly expressed emotions include the state of anger, disgust, fear, happiness, surprise, sadness, tensed etc. Not only one, but many emotions can be expressed within a single text. Secondly, text's lack both the structure and size. Therefore, *emotion classification*, can be very challenging.

Even though, advances have been made in the area of machine learning, data mining and artificial intelligence in recent years still it is very hard to account for all the emotions associated by human behavior. The field of sentiment analysis has become very mature now. However, it has become very important to determine the exact emotions behind a topic rather than a generic sentiment. It has become necessary to determine sentence-wise emotions in order to determine the overall emotions expressed within a document. Ghazi et al. (2015) have worked in text summarization and have indicated that emotion expressions are very informative in an expressive sentence. Mining emotions within texts that are shorter in length poses a severe challenge to emotion classification. Coviello et al. (2014) have indicated that online social networks have the tendency to intensify the global emotional synchrony.

There are several more challenges to emotion classifications. The short messages unlike the conventional texts are peculiar in structure and size. The language used by people within these short messages to express their emotions are quite different from the contents that are in digitized documents (Ling and Naomi, 2007). Availability of a very large number of features within these short messages is also a major challenge. The inherent nature of the different emotions also makes it very difficult to differentiate between them. The circumplex model highlights the fact that the 28 affect words or emotions are clustered so close to each other that it becomes very hard to differentiate between them (Russell, A., 1980). Thus, it becomes very hard to manually classify the texts to different emotion types. Manually annotating the texts could be ambiguous at times and would not guarantee a complete accuracy (Hasan, , Elke, and Emmanuel, 2014). Therefore, supervised classifiers are severely inhibited from learning the critical features that can enable it to identify emotions within the text. Keeping these challenges in mind, here we have tried to address the classification of the six-class emotion classification problem using the state-of-the-art deep learning classifier. In particular, the popular architectures of the RNN classifiers have been explored in this study together with the emphasis on Natural Language Processing (NLP) tasks and feature engineering.

Studies in past have explored the potentiality of the different analytical techniques using the bag-of-words (BOW) and/or the n-grams as features (Aman and Stan, 2007, Badshah, Jamil, Mi, and Sung, 2016, Chaffar, and Diana, 2011, Ghazi, Diana and Stan, 2010, Hasan, Elke, and Emmanuel, 2014). None of the above-mentioned studies have explored

the potentiality of deep learning techniques. Here, we have demonstrated the potentiality of the RNN classifiers for the six-class emotion classification problem and have achieved an average of 88% accuracy. According to the observational results, LSTM and Bidirectional LSTM both outperformed the simple RNN classifier in classifying the six emotion types. The rest of the paper is organized as follows. In section 2, we report the survey of the literature. In section 3, we detail the materials and methods employed in this study. In section 4, we detail the experimental design strategies. In section 5, we present the results from this study and discuss our findings. Finally, in section 6 we conclude the paper and outline the future direction of our research.

RELATED STUDIES

Classifying emotions is a relatively new research area and has also attracted much attention recently. Bhowmick et al. (2010) have observed relatively similar performance exhibited by both humans and machines for the emotion classification task. Recently there has been a lot of interest in using Deep Neural Networks (DNN) for classifying emotions within texts. Recent advances in technology have resulted in significantly improved performance for the DNNs when compared to other off-the-shelf models (Chatterjee et al., 2019).

Literature survey revealed the popularity of both the Convolutional Neural Networks (CNNs) and RNNs for analyzing sentiments and emotions in textual data. For sentiment analysis CNNs have been a popular choice in several different works. A simple CNN with hyperparameter tuning demonstrated excellent results on the fine-grained Stanford Sentiment Treebank (Kim, 2014). For predicting sentiments in twitter data Kalchbrenner et al. (2014) have proposed using a Dynamic Convolutional Neural Network (DCNN). According to them, the DCNN is capable of handling varying lengths of input sentences and is easily applicable to any language. For detecting emotions in ECG signals Acharya et al. (2018) have proposed a complex 13-layer CNN architecture. A CNN-LSTM model has also been proposed by Wang et al. (2016) to predict the VA ratings of texts in the Stanford Sentiment Treebank corpus (SST). In addition to that Zhang *et al.*, (2019) have proposed a Coordinated CNN- LSTM-Attention (CCLA) model using the SoftMax regression classifier on multiple datasets including Movie review data (MR), Large movie review (IMDB), TREC question dataset (TREC) and Subjectivity dataset (SUBJ).

RNNs on the other hand are designed to handle sequence problems. Lai *et al.* (2015) have introduced a RNN that automatically judges and captures the key components in texts to boost the accuracies in the experiments. Abdul-Mageed and Ungar (2017) have discussed about using a core model of Gated Recurrent Neural Networks (GRNNs) and a modern variation of RNN for classifying emotions in several dimensions. They have also demonstrated high accuracies in classifying different type of emotions. Across 6 benchmark datasets Kratzwald et al. (2018) have shown that both the RNN and the sent2affect (transfer learning) have consistently outperformed the traditional machine learning algorithms.

A deep recursive neural network constructed by stacking multiple recursive layers has been proposed by Irsoy and Cardie (2014) for the task of fine-grained sentiment classification (5-classes of Stanford Sentiment Treebank dataset). They have reported an accuracy of 50% for 5-class classification. Several other studies have been reported relating to textual-based emotion classification. A novel method termed as the Binary Neural Network (BNet) has been proposed by Jabreel and Moreno (2019) for a multi-label emotion classification on Twitter data. They have reported an accuracy score of 59%. Zhou *et al.* (2016) have proposed a BLSTM architecture that helped them capture long-term sentence dependencies. They have reported a 52.4% accuracy on Stanford Sentiment Treebank binary classification and fine-grained classification tasks.

MATERIALS AND METHODS

Dataset

Here we use an *emotion in text* dataset obtained from Kaggle. This dataset can be downloaded from the link (<https://www.kaggle.com/datasets/ishantjuyal/emotions-in-text/metadata>). This dataset contains instances each represented as {text, emotion-class}. We ensured that all the instances in this dataset have a single annotation of an emotion class. In this dataset each instance belongs to any one of the classes including *sadness*, *anger*, *love*, *surprise*, *fear* and *happy*. The figure 1 shows the class-wise distribution of the number of instances in each of the six emotion classes. From figure 1 it is evident that the dataset is highly imbalanced.

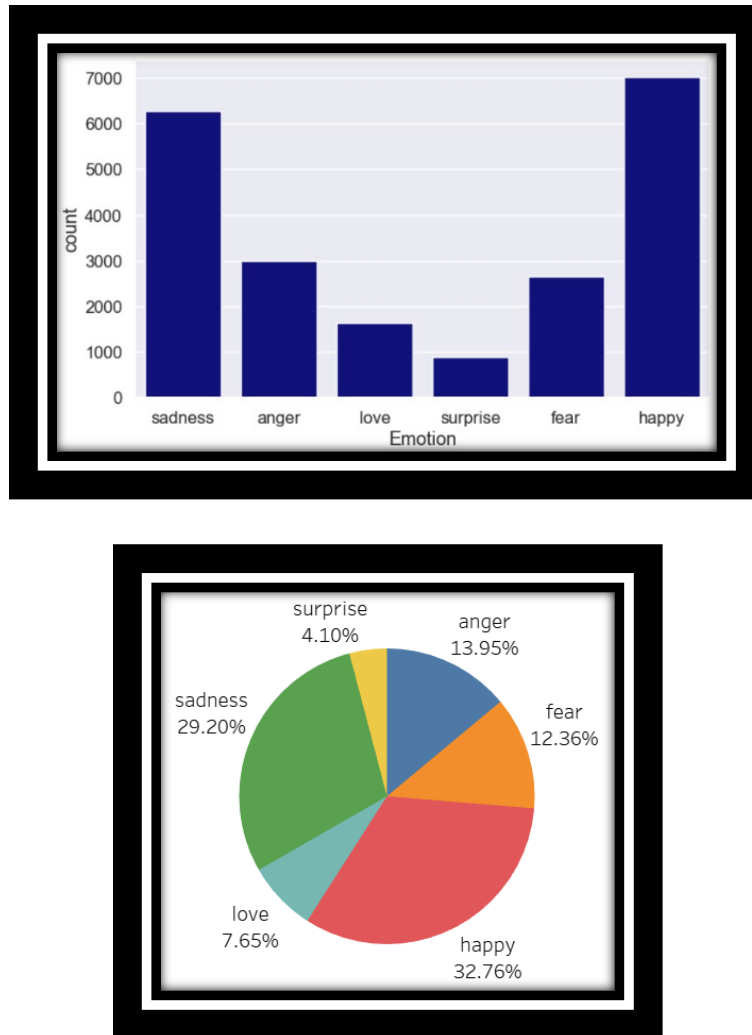


Figure 1: Class-wise distribution of the number of instances in the dataset

Before analyzing the data using the deep learning model, data pre-processing was performed. Instances within the dataset were split into words, and irrelevant words and symbols within the instances were removed during the stop words removal step. In the resulting texts both the lemmatization and stemming were performed to reduce the words to its root form. From the *NLTK* package, 2 common lemmatization approaches namely the *WordNetLemmatizer* and *pos_tag* were used for performing lemmatization. The *WordNetLemmatizer* was used to group the words together under a common root. The *Pos_tag* analyzer on the other hand was used to format the words and their speech tags. For stemming the Porter and the Snowball Stemmer were used in the test and validation dataset respectively. The dataset was also normalized to improve the speed of the training models as well as to improve the model performance. Here, we performed *min-max* normalization to transform the data into the scale of 0 to 1.

Recurrent neural networks (RNNs) and its architectural variants

DNN are well-known for modelling non-linear and complex relationship between the inputs and the outputs. Therefore, DNN's are preferred for emotion classification tasks (Abdul-Mageed and Lyle, 2017, Chatterjee et al., 2019, Hamdi et al., 2020, Jabreel and Antonio, 2019, Kalchbrenner et al., 2014, Zhang et al., 2019).

The RNNs are derived from feedforward neural networks, and they are different from a typical Artificial Neural Network. RNN have a temporal feedback or loops to the nodes themselves or to the nodes in different layers. Therefore, it acts like a memory and remembers all the information that were computed in the past. RNN is called as "Recurrent" because it gets recirculated for every element of a sequence through this network. Because of this property, RNN is very useful for sequential data analysis such as audio, text, and other temporal signals. Its applications include speech recognition, voice recognition, time series prediction, machine translation etc.

RNNs have a chain-like structure which means that connections between the nodes form a directed graph along a temporal sequence. They also have the capability to scale to much longer sequences. RNN is widely used to address the emotion classification problems due to its temporal dynamic property. It's internal memory is used to process the sequence of inputs of variable length.

Long Short-Term Memory (LSTM) networks, a kind of RNNs and an improvement of simple RNN, is used specifically to overcome the vanishing gradient problem and short-term dependencies of RNN. In LSTM, a memory cell is introduced to process data with memory gaps, which allows the network to take long-term memory into consideration. Therefore, LSTMs have feedback connections which make them different from the traditional feedforward neural networks. This property enables LSTMs to process entire sequences of data without treating each point in the sequence independently, but rather, retaining useful information about previous data in the sequence to help with the processing of the new data points. On the other hand, the Bi-directional LSTM split the neurons of a regular RNN into two directions, one for positive time direction (forward states), and another for negative time direction (backward states).

The architecture of the Simple RNN, LSTM and Bi-directional LSTM model is described in table 1, 2 and 3 respectively.

Table 1: The details of the Simple RNN structure used in this study

Layers	Type	Number of neurons (Output Shape)
1	Embedding	(None, 100)
2	Simple RNN	64
3	Dense (Fully Connected)	64
4	Dropout	100, 64, 64
5	Dense (Fully Connected)	6

Table 2: The details of the LSTM structure used in this study

Layers	Type	Number of neurons (Output Shape)
1	Embedding	(None, 100)
2	LSTM	64
3	Dense (Fully Connected)	64
4	Dropout	100, 64, 64
5	Dense (Fully Connected)	6

Table 3: The details of the Bi-directional LSTM structure used in this study.

Layers	Type	Number of neurons (Output Shape)
1	Embedding	(None, 100)
2	Bidirectional	128
3	Dense (Fully Connected)	64
4	Dropout	100, 128, 64
5	Dense (Fully Connected)	6

A 6-layer Simple RNN, LSTM and Bidirectional LSTM has been employed in this study. The dimension of word embedding used here is 100, the number of hidden units in the LSTM layer is 64. Within the LSTM layer, we set the dropout and the recurrent dropout parameter to 0.2. We have used ReLU as the activation function in the first dense layer which has 64 hidden units. For regularization, we employ Dropout operation with a dropout rate of 0.5. The final output layer (dense layer) consists of 6 outputs since we are addressing a six-class classification problem. We also use SoftMax as the output layer. The loss function used here is the cross entropy and Adam optimizer, which is set to minimize the loss.

Therefore, in this study we have explored the RNN architectures. In order to optimize the hyperparameters we have employed the grid search technique. Upon performing the grid search as discussed in (Al *et al.*, 2019, Ghosal, *et al.*, 2019, Khorrami *et al.*, 2016, Lakomkin *et al.*, 2018) we have determined the optimal numbers for the layers in the RNN models. The grid search functionality was implemented in Python using the *GridSearchCV* class in the Scikit-learn library. An exhaustive list of values was provided for tuning the hyperparameters. The performance of the models across different RNN architectures were compared at different stages.

EXPERIMENTAL DESIGN STRATEGIES

Data pre-processing

The pre-processing begins with converted all textual instances to lower case letters. The instances were then padded to a length of 600 characters. Instances that were longer than 600 characters were trimmed. Next, we performed tokenization and retained the top 1500 words for our analysis. We used the Global Vectors for Word Representation (GloVe) to initialize the weights for these words and then created the embedding matrix (Pennington *et al.*, 2014).

Ten-fold cross-validation

A 10-fold cross-validation approach was followed in this study. First, the pre-processed dataset was split into the train and test set in the ratio 80:20 respectively. When training the model, we performed 10-fold cross-validation using the training dataset. For performing the 10-fold cross validation technique we initially partitioned the training dataset into 10-folds. Across the 10 different experiments performed, in each experiment, nine-folds of the dataset were used for training the model and the remaining one-fold was used for validating the model. Finally, the model was tested on the test dataset. In the testing phase, we performed 10 different experiments with different subset of the dataset but with the same model and then averaged the accuracies as the resulting metric. Here we report the validation and test accuracy all averaged across 10 different experiments.

Performance measure

In this study, we have tried to address a six-class emotion classification problem. Here, we report the values for Accuracy. Accuracy is the ratio of the number of truly predicted samples to the total number of samples in the test dataset. The accuracy was computed from the obtained confusion matrix across each experiment.

All the RNN architectures were created using the *Keras* package in Python. To summarize, this study conducts a series of experiments based on the steps outlined below:

1. All the textual instances were cleaned/preprocessed as outlined in section 3 and 4. Using the shuffle functionality, we randomized the instances within the dataset. The resultant dataset was then split into the ratio of 80:20. 10-fold cross validation was performed on the 80% (training) dataset.
2. The instances from the training dataset were transformed into a feature vector and the embedding matrix was constructed.
3. All the RNN architectures was trained using the training dataset and their performance across 10-fold cross validation were recorded as outlined above (see section 4).
4. Finally, we test our models using the test dataset and report the overall accuracy for the six-classes (See section 4) across the test dataset averaged over 10 different experiments as discussed in this section.

RESULT AND DISCUSSION

A six-class emotion classification was performed using the different RNN architectures. we noticed that both the validation and the test accuracy of the different RNN models stabilized after 50 iterations. Therefore, we choose to set 50 epochs for all the RNN models. The overall average prediction accuracy on the validation and test dataset for the RNN architectures explored in this study are reported in table 4. LSTM reported an average of 88.12% validation accuracy which is slightly better than the Bidirectional LSTM classifier See Table 4. However, on the test dataset Bidirectional LSTM performed slightly better than the LSTM classifier. On both the validation and test dataset both the LSTM and Bidirectional LSTM outperformed the simple RNN by a good margin. Based on the validation and test accuracy for both the RNN architectures namely LSTM and Bidirectional LSTM we can conclude that there is no evidence of overfitting (See Table 4). The use of the Snowball Stemmer boosted the performance of the Bidirectional LSTM (from 0.8756 to 0.8886). However, it did reduce the LSTM accuracy from 0.8812 to 0.8674 which has the highest accuracy among all the RNNs when using the Porter Stemmer.

Table 4: Averaged Performance measure (Accuracy) for the different RNN architectures for the six-class emotion classification

Results	Simple RNN	Bidirectional LSTM	LSTM
Validation Accuracy	0.7281	0.8756	0.8812
Test Accuracy	0.7128	0.8886	0.8674

The use of the embedding layer is very useful for sequential text data as it works similar to one-hot encoding. The embedding method uses less memory space and records more information than the one-hot encoding. In order to compare the performances of the different RNN architectures, the basic architectures of these models were kept the same, but the RNN layer was changed to Simple RNN layer, LSTM layer, and Bidirectional LSTM layer when training the different neural net models. Though gradient-based optimization approaches are popular for neural network models, grid search was performed here to tune the number of layers, the number of neurons, learning rate and the dropout rate. Since the RNNs usually take more time to train because of its memories the focus has been on reducing the run time. To reduce the run time, the number of epoch and the batch size have been tuned through grid search. For all the RNN architectures in this study the epochs and the batch size were set to 50 and 64, respectively. The dropout rate was set to 0.3 and the learning rate with the Adam optimizer was set to 0.001. LSTM resulted in the best accuracy of 88.12% in the validation dataset when the learning rate, number of neurons and the dropout rate was set to 0.002, 128 and 0.3 respectively. These parameters were determined through performing the grid search. In the test dataset most of the records were classified into correct classes. However, there was a significantly high number of misclassifications among the *love* and the *happy* classes.

CONCLUSION

In this study, we have demonstrated the potentiality of the DNNs for the six-class emotion classification problem. Different architectures of the RNN classifiers were explored in this study. On the *emotions in text* dataset, we achieved

an average of 88% accuracy while trying to classify the instances belonging to six different emotion types. LSTM and Bidirectional LSTM significantly outperformed the simple RNN in classifying all the six emotion types. However, both the classifiers misclassified a significant number of instances from the *love* class to the *happy* class. This observation can be attributed to the fact that both the emotion types *i.e.*, *love* and *happy*, are very similar to each other which is also evident from the circumflex model and the instances belonging to the *love* type clearly lacks distinctive features that can help the models to discriminate this emotion against the *happy* emotion. In this study, we have limited our investigations to only six classes of emotions. In future, we plan to consider additional emotion types and investigate the potentiality of the DNNs for emotion classification.

REFERENCES

- Ghazi, D., Inkpen, D., & Szpakowicz, S. (2015). Detecting emotion stimuli in emotion-bearing sentences. *In the International Conference on Intelligent Text Processing and Computational Linguistics*, 152-165.
- Coviello, L., Sohn, Y., Kramer, A. D., Marlow, C., Franceschetti, M., Christakis, N. A., & Fowler, J. H. (2014). Detecting emotional contagion in massive social networks. *PloS ONE*, 9(3), 1-6.
- Ling, R., & Baron, N. S. (2007). Text messaging and IM: Linguistic comparison of American college data. *Journal of Language and Social Psychology*, 26(3), 291-298.
- Hasan, M., Rundensteiner, E., & Agu, E. (2014). Emotex: Detecting emotions in twitter messages. *Academy of Science and Engineering BigData/Socialcom/Cybersecurity*, 1-10.
- Russell, J. A. (1980). A circumplex model of affect. *Journal of Personality and Social Psychology*, 39(6), 1161–1178.
- Aman, S., & Szpakowicz, S. (2007). Identifying expressions of emotion in text. *In Matoušek V., Mautner P. (eds) TSD 2007. Lecture Notes in Computer Science, Springer, Berlin, Heidelberg 4629*, 196-205.
- Badshah, A. M., Ahmad, J., Lee, M. Y., & Sung, W. B. (2016). Divide-and-conquer based ensemble to spot emotions in speech using MFCC and random forest. <https://doi.org/10.48550/arXiv.1610.01382>.
- Chaffar, S., & Inkpen, D. (2011). Using a heterogeneous dataset for emotion analysis in text. *Proceedings of the 24th Canadian Conference on Artificial Intelligence*, 62-67.
- Ghazi, D., Inkpen, D., & Szpakowicz, S. (2010). Hierarchical versus flat classification of emotions in text. *In Proceedings of the NAACL HLT 2010 Workshop on Computational Approaches to Analysis and Generation of Emotion in Text*, 140-146.
- Bhowmick, P. K., Basu, A., & Mitra, P. (2010). Classifying emotion in news sentences: When machine classification meets human classification. *International Journal on Computer Science and Engineering*, 2(1), 98-108.
- Chatterjee, A., Gupta, U., Chinnakotla, M. K., Radhakrishnan S., Galley, M., & Agrawal, P. (2019). Understanding emotions in text using deep learning and big data. *Computers in Human Behavior*, 93, 309-317.
- Kim, Y. (2014). Convolutional neural networks for sentence classification. *In Proceedings of the 2014 Conference on Empirical Methods in Natural Language Processing (EMNLP)*, 1746–1751.
- Kalchbrenner, N., Grefenstette, E., & Blunsom, P. (2014). A convolutional neural network for modelling sentences. *In Proceedings of the 52nd Annual Meeting of the Association for Computational Linguistics*, 1, 655–665.
- Acharya, U. R., Oh, S. L., Hagiwara, Y., Tan, J. H., & Adeli, H. (2018). Deep convolutional neural network for the automated detection and diagnosis of seizure using EEG signals. *Computers in Biology and Medicine*, 100, 270-278.
- Siwei, L., Xu, L., Kang, L., & Zhao, J. (2015). Recurrent convolutional neural networks for text classification. *In Twenty-ninth AAAI Conference on Artificial Intelligence*, 29(1), 2267-2273, <https://doi.org/10.1609/aaai.v29i1.9513>
- Abdul-Mageed, M., & Ungar, L. (2017). Emonet: Fine-grained emotion detection with gated recurrent neural networks. *In Proceedings of the 55th Annual Meeting of the Association for Computational Linguistics*, 1, 718-728.

- Kratzwald, B., Ilić, S., Kraus, M., Feuerriegel, S., & Prendinger, H. (2018). Deep learning for affective computing: Text-based emotion recognition in decision support. *Decision Support Systems*, 115, 24-35.
- Wang, J., Yu, L-C., Lai, K. R., & Zhang, X. (2016). Dimensional sentiment analysis using a regional CNN-LSTM model. *In Proceedings of the 54th Annual Meeting of the Association for Computational Linguistics*, 2, 225-230.
- Zhang, Y., Zheng, J., Jiang, Y., Huang, G., & Chen, R. (2019). A text sentiment classification modeling method based on coordinated CNN-LSTM-attention model. *Chinese Journal of Electronics*, 28(1), 120-126.
- Irsoy, O., & Cardie, C. (2014). Deep recursive neural networks for compositionality in language. *In the proceedings of the 27th International Conference on Neural Information Processing Systems*, 2, 2096-2104.
- Jabreel, M., & Moreno, A. (2019). A Deep Learning-Based Approach for Multi-Label Emotion Classification in Tweets. *Applied Sciences*, 9(6), 1123. MDPI AG, Retrieved from <http://dx.doi.org/10.3390/app9061123>
- Zhou, P., Qi, Z., Zheng, S., Xu, J., Bao, H., & Xu, B. (2016). Text classification improved by integrating bidirectional LSTM with two-dimensional max pooling. Retrieved from <https://doi.org/10.48550/arXiv.1611.06639>.
- Hamdi, E., Rady, S., & Aref, M. (2020). A deep learning architecture with word embeddings to classify sentiment in Twitter. *In International Conference on Advanced Intelligent Systems and Informatics*, 115-125.
- Al Machot, F., Elmachot, A., Ali, M., Al Machot, E., & Kyamakya, K. (2019). A deep-learning model for subject-independent human emotion recognition using electrodermal activity sensors. *Sensors*, 19(7), 1659. MDPI AG, Retrieved from <http://dx.doi.org/10.3390/s19071659>
- Ghosal, D., Majumder, N., Poria, S., Chhaya, N., & Gelbukh, A. (2019). DialogueGCN: A graph convolutional neural network for emotion recognition in conversation. *arXiv:1908.11540*, Retrieved from <https://doi.org/10.48550/arXiv.1908.11540>
- Khorrami, P., Paine, T. L., Brady, K., Dagli, C., & Huang, T. S. (2016). How deep neural networks can improve emotion recognition on video data. *In 2016 IEEE international conference on image processing (ICIP)*, 619-623.
- Lakomkin, E., Bothe, C., & Wermter, S. (2018). GradAscent at EmoInt-2017: character-and word-level recurrentneural network models for tweet emotion intensity detection. *In the Proceedings of the 8th Workshop on Computational Approaches to Subjectivity, Sentiment and Social Media Analysis*, 169-174, arXiv:1803.11509.
- Pennington, J., Socher, R. & Manning, C. D. (2014). Glove: Global vectors for word representation. *In Proceedings of the 2014 conference on empirical methods in natural language processing (EMNLP)*, 1532-1543.

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REIMAGINING THE INTRODUCTION TO BUSINESS COURSE

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ABSTRACT

According to a recent survey, 54% of 18–24-year-olds perceive capitalism negatively (Manchester 2021), implying that many young adults lack an accurate understanding of capitalism and socialism and the societal and economic implications of each (Bitzan and Routledge 2021). The impact of these results is that a growing number of young adults have a critical view of our free market system. This gap in understanding and knowledge really presents an opportunity for institutions of higher education to explain and promote the positive benefits of a free market system by educating students in the nature of a capitalist economy (when guided by a set of ethically sound principles) and the relationship to this economy to long-term prosperity for all. One mechanism to begin this education is through an Introduction to Business (I2B) course.

Borden (2016) provides that the first experience a student has with a course is critical in establishing expectations for a successful collegiate career. These courses provide a broad survey of business concepts to ready students for further business study and to also excite students in terms of the content (Borden, 2016). In these times of decreasing enrollment and increased cost pressures (Nadworthy, 2021), recruitment and retention of students is critical, and I2B courses provide a great way for even non business students to gain business skills, as virtually all individuals need to have some sense of business and organizations (Reynolds, 2016). These non-business students may then even determine to minor or even major in business going forward.

This research provides insight into historical developments of such courses, tracking on-going improvements, including the use of gamification and simulation (Greenlaw and Wyman, 1973) (Despeisse, 2018) (Elliott et al, 2021), coupled with the use of reflection (Kember et al, 2000) (Teach and Szot, 2019). It will deeply explore the use of simulation as it impacts business understanding along with a text accompaniment (Wagner, 2019), specifically focusing on a next generation simulation (NextGenSIM) Scrimmage© (Wagner, n.d.) (Nightingale, 2019) (Haines et al, 2019). Two course designs using this simulation will be presented.

The first course design will describe the use of the simulation in a large public university where the NextGenSIM was designed and programmed by a faculty member. The second course design will describe the use of the simulation in a small, rural public university, where the course is delivered as a core course meeting the requirements of mathematical and quantitative reasoning. Here, the course is newly implemented. As with the larger university, this course is open to all students, not only business majors.

Outcomes of the course designs will be discussed, comparing the two designs. These results will center on student feedback. Recommendations for further development of the course will also be offered as well as opportunities for further study related to the curriculum pedagogy. This research is important with regard to the enhancement of education that promotes economic stability and growth.

INTRODUCTION

According to a recent survey, 54% of 18–24-year-olds perceive capitalism negatively (Manchester 2021), implying that many young adults lack an accurate understanding of the economic frameworks of capitalism versus socialism and the societal and economic implications of each (Bitzan and Routledge 2021). The impact of these results is that a growing number of young adults have a critical view of our free market system. This gap in understanding and knowledge really presents an opportunity for institutions of higher education to explain and promote the positive benefits of a free market system by educating students in the nature of a capitalist economy (when guided by a set of ethically sound principles) and the relationship to this economy to long-term prosperity for all. One mechanism to begin this education is through an Introduction to Business (I2B) course. An additional benefit to the I2B course is the role it may play in recruitment and retention.

College enrollment has been on the decline since 2012 (Nadworthy, 2021). Add to that trend the COVID-19 pandemic, and colleges face a real disaster. Indeed, the National Student Clearinghouse Research Center (NSCRC) in its final

report including spring 2021 indicated that enrollment is down 3.5% from the previous year. This drop represents 600,000 students from one year ago (Nietzel, 2021). This drop is attributed to almost entirely undergraduate students, while graduate enrollment actually increased (Nietzel, 2021). It is unclear if these undergraduate students are lost to collegiate education or simply taking a break until COVID-19 and its impacts subside. Nevertheless, the declining trend will probably continue, as it had prior to the pandemic.

Borden (2016) provides that the first experience a student has with a course is critical in establishing expectations for a successful collegiate career. These courses provide a broad survey of business concepts to ready students for further business study and to also excite students in terms of the content (Borden, 2016). Thus, in these times of decreasing enrollment and increased cost pressures, recruitment and retention of students is critical, and I2B courses provide a great way for even nonbusiness students to gain business skills, as virtually all individuals need to have some sense of business and organizations (Reynolds, 2016). These non-business students may then even determine to minor or even major in business going forward.

This study is important as it seeks to understand the value of the I2B courses and how such courses are designed and implemented to provide insight into the dynamics of capitalism while also providing an engaging learning experience to enhance recruitment and retention priorities of institutes of high learning (IHL). By enhancing introductory business courses, students will more readily understand how a business operating within a free enterprise system in a democratic society with appropriate social safety nets provides the most effective system yet devised to harness the energy of the individual to best meet the needs of the society.

The study will explore the historical context and improvements in introductory courses, such as I2B courses, including the use of a Next Generation Simulation (NextGenSIM). A comparison and contrast of two implementations of I2B course which use Next Generation Simulation (NextGenSIM) in two different IHLs. One implementation in a large IHL offering a mature design, and the other implementation in a small IHL representing a new and recently designed course. A hypothesis is provided with regard to student perception of I2B courses which provide realistic engagement via simulation. This hypothesis is challenged by research questions regarding two implementations of an I2B course using the NextGenSIM. The methodology is then presented. The results of the study are then provided as measured by student feedback. The study concludes with a subsequent discussion of the results and suggestions for further I2B course evolutions.

LITERATURE REVIEW

Borden (2016) provides that the first experience a student has with a course is critical in establishing expectations for a successful collegiate career. These courses provide a broad survey of business concepts to ready students for further business study and to also excite students in terms of the content (Borden, 2016). However, selecting 17 IHLs from the top 25 undergraduate programs identified in Bloomberg BusinessWeek (Levy in Borden, 2016). Borden found wide variation among courses promoted as I2B courses, in contrast to Introduction to Accounting courses, which were much more standard in content. All 17 IHLs required this type of course of their business students, with the vast majority requiring it within the freshman year, with credits granted from zero to three credits. Variation further existed in terms of professional communication and professional development assignments required. Most courses required some level of teamwork. All had unique but diverse goals, such as problem solving, career choice, leadership, etc. Thus, although this course is considered important, approaches to its design vary widely.

Reynolds (2019) provides that business knowledge and resultant skills are necessary for all students, indicating the business students all take liberal arts courses, but liberal arts students are not required to take business courses. However, liberal arts students will clearly need to exercise skills necessary for organizational success, such as critical thinking, problem-solving, decision-making, and time management (Reynolds, 2019). To this end, designing the I2B course to be palatable to not only business students but to the larger campus study body makes good sense.

As far back as 1973, researchers have been interested in evaluating the benefits of simulation and gamification in course design (Greenlaw and Wyman). At that time, Greenlaw and Wyman provided a rather pessimistic view of such design (1973); however, Wolfe (1997) reports positive outcomes with regard to simulation and gamification in teaching strategic management. Wolfe (1997) further advanced, in a prescient manner, that computer simulations and gamification are indispensable tools for instructors.

Technical education also benefits from gamification and simulation. Despeisse (2018) provides an overview of uses of computer simulations and other digital games commonly used to teach technical skills in supply chain management and production planning, indicating such approaches not only promote deeper learning, but also enhance the development of professional skills, such as leadership, teamwork, and communication. Importantly, games must work to enhance a student's learning experience, that is the affective level of learning, and then provide for a practical understanding of challenges, that is, the cognitive level (Despeisse, 2018).

In terms of the cognitive level of learning, Despeisse (2018) further indicates that although generalizations are difficult with regard to game design, a modified Bloom's Taxonomy should be considered, encompassing these dimensions: 1) remembering; 2) understanding; 3) applying; 4) analyzing; 5) evaluating; and 6) creating. Thus, by understanding the learning objectives to be achieved, an appropriately designed game or simulation can be selected with respect to the taxonomy level sought.

The affective level of learning should further encompass these following dimensions in terms of game design (Despeisse, 2018): 1) receiving—learning the game and expressed willingness to participate; 2) responding—conforming to the game rules; 3) valuing—internalizing the rules and hence apply them more easily; 4) organizing—combining information and acting accordingly to achieve objectives; and 5) characterizing—being able to apply learning to a real world application. Hence, it is imperative to deliver the game or simulation in a way that moves the learner through each phase, as the typical point of simulation is to mimic practical application.

Elliott et al (2021) offer a menu of games in their publication, covering a variety of business disciplines, including, but not limited to, marketing, accounting, and strategy. They further offer insights into strengthening the simulation/gamification experience, consistent with Despeisse (2018).

In an effort to fortify learning and achieve the components detailed by Despeisse (2018) and Elliott et al (2021), a structured approach to the simulation is warranted, including the opportunity for reflection and debriefing. Drawing on a variety of extant literature on learning reflection, Kember et al (2000) provides a questionnaire providing four ratings of four constructs that are necessary for reflective learning: Habitual action; understanding; reflection; and critical reflection. These researchers developed such a tool to encourage instructors to better understand how pedagogical efforts achieved desired learning outcomes. Teach and Szot (2019) describe the usefulness of debriefings and to structure such debriefings to maximize the effectiveness of simulation use. Thus, to achieve adequate curriculum design when using simulation, the literature suggests the need to understand if critically reflective thinking is achieved or enhanced as a result of the simulation pedagogy; the literature further encourages the use of debriefings. Both of these mechanisms are consistent with facilitating both the affective and cognitive levels of learning. Additionally, the choice of the simulation itself should facilitate affective and cognitive learning levels through the use of critical reflection and debriefing.

Obviously, the simulation should be targeted to the learning objectives of the course. In an I2B course, it makes sense that the simulation should provide a broad foundation across the key disciplines of business. However, it should allow for experimentation, which in turn, fosters critical reflection and debriefing. For example, a next generation simulation, such as Scrimmage© which mimics SAP, provides students with a series of scenarios that increase in complexity as students develop their skills, including those associated with quantitative literacy. Importantly, this simulation allows for students to “re-play” a simulation over and over, according to the professor's direction, facilitating the students' use of reflective critical thinking as well as the opportunity to share successes and opportunities for improvement as part of debriefings (Nightingale, 2019). Further enhancing the use of Scrimmage© to meet the objectives of business skill development, including quantitative literacy, are planning sessions for each simulation, requiring the use of Excel© spreadsheets and team reflection on that plan prior to play (Haines et al, 2019).

I2B WITH NEXTGENSIM COURSE DESIGN: MATURE AND NEWLY IMPLEMENTED

The NextGenSIM Scrimmage© is used in two distinct I2B courses, among others; these specific courses are the focus on this study. The first I2B course represents a mature design and implementation; the second I2B course represents a newly implemented design. Additionally, both courses use the Kindle© book *Fundamentals of Business* (Wagner, 2019). Both courses are also targeted to all students and are not exclusively offered to business students.

Scrimmage© is designed as a web-based Enterprise Resource Planning (ERP) which allows students to interact with the simulations in an environment that will be similar to what they will experience in the workplace (Wagner, n.d.) Faculty members teaching the I2B course select from a menu of simulations representing the broad body of business knowledge that build in complexity. Students work in teams to determine strategies to maximize profit throughout the scenarios. Like other simulations, Scrimmage© allows for student engagement with the material and allows for students to compete and learn from each other to achieve optimal results. Unlike other simulations, Scrimmage© has flexibility that allows faculty to select scenarios tailored to the course objectives; it also allows for on-going repetition of the scenarios so students can improve their outcomes (Wagner, n.d.). Lastly, Scrimmage© offers the option to have a business scenario built to a faculty member's needs. Currently, Scrimmage© offers a variety of teaching supports, including Power Points©, videos, and exam support.

The textbook supporting Scrimmage© is the Fundamentals of Business (Wagner, 2019). The first five chapters of the text are: 1) Introduction; 2) Generating Profits (Income Statements); 3) Assets of the Firm (Balance Sheets); 4) Managing Cash (Statement of Cash Flows); and 5) Economics (Supply and Demand, Price Controls, Elasticity).

In both courses, students are shown how to understand a company by looking at the financial statements, calculating key ratios and comparing these ratios to industry averages. Spreadsheets are introduced as a tool for performing these analyses. These topics are covered first in the course to provide a foundation for the other topics covered in the course—marketing, finance, supply chain management, personal financial planning, economic systems, money, and leadership.

Now that the similarities of the course designs have been described, attention will turn to the specific differences of the courses. The discussion begins with the mature design, implemented in a IHL.

I2B: Mature Design: Large IHL

The course description for the I2B is:

This course introduces students to key business functions and how they work together to provide customer value and generate profits for a company. Students will gain an understanding of the history and development of business in a free market economy. Students will be introduced to conceptual and quantitative models that help businesses solve problems and evaluate opportunities. Students will develop proficiency in oral and digital communication and information literacy through a number of classroom experiences and assignments. Students will examine the dynamics of business decision-making and demonstrate the ability to identify, define, and interpret essential business concepts through the use of an integrative business simulation. The simulation will also allow students to understand how information systems are used to manage a business and gain a first-hand understanding of leadership in a small group setting.

The course objectives are:

1. Develop an appreciation of the history and structure of business and economics.
2. Analyze key financial statements through increased fluency with the fundamental concepts of accounting.
3. Develop a fundamental understanding of economics and how economic concepts can be used to better understand the business environment.
4. Describe the strategic management process and its role in managing a company.
5. Describe the role of marketing in helping a company deliver value to the customer.
6. Describe the new product development process and explain its critical role in a company's long-term success.
7. Describe the function of supply chain management and how the different participants in the supply chain coordinate their activities to provide value efficiently.
8. Analyze business problems involving the discounting of cash flows.
9. Apply key concepts of personal financial planning to maintain an individual's financial health.
10. Describe how the business disciplines of management, marketing, accounting, supply chain management, and finance work together within an organization to deliver customer value at a profit.
11. Apply key concepts in leadership and management in a team environment.

12. Apply conceptual and mathematical models to business problems.
13. Build and use Excel© spreadsheets to analyze business problems.

This course is a required course for business students at this IHL. However, any other students can take the course, as it meets the requirements for Oral and Digital Communications. Options are limited for this requirement, and as such, this course is a popular choice. The IHL is rather large, with over 1,000 students enrolling in the course each academic year. Students work in teams of three and earn points that represent individual work as well as teamwork. The pedagogy consists of lecture, readings, video, presentation, research, and writing.

Descriptions of the assignments are found as Appendix A: Assignment Descriptions, Mature I2B.

The approach taken in this design is unique, in that it allows for students the opportunity to redo as much of the course work as possible if they have not performed to an acceptable level. The midterm and final exams in the course are online and available from the beginning of the semester. The students can take the exams as many times as possible and their best score counts. Each time the exam is taken, the students get a random set of questions from a test bank for true/false and multiple-choice questions from the textbook chapter. For quantitative problems, there are at least two versions of each question, and the question has random values in the question itself. Papers and presentations are graded by communications professionals (through the ScrimmageSIM simulation) and students are given constructive feedback and encouraged to resubmit their work for a better score.

The spreadsheet assignments include an academic integrity macro that prevents the students from submitting other students' work. Again, students can resubmit this work and earn a better score if they make a mistake. The intent here is that students strategize for an upcoming simulation using an Excel© spreadsheet, they meet to discuss and adjust strategy, and then run the simulation. They separately submit their spreadsheet, although the team runs the simulation as a unit. Their strategy meeting is recorded for grading purposes.

I2B: Newly Implemented Design: Small IHL

The course description for the I2B is:

This class is designed to provide you with a foundation for a lifelong career of learning and applying business concepts. An overriding theme of this course is the development of your quantitative literacy in the context of applied business concepts. Quantitative literacy is defined in this class as:

An aggregation of skills, knowledge, beliefs, dispositions, habits of mind, communication capabilities, and problem solving skills that people need to autonomously engage in and effectively manage situations in life and at work that involve numbers, quantitative or quantifiable information, or textual information that is based on or has embedded in it some mathematical elements.

Successful businesspeople are comfortable with understanding quantitative tools and models, applying them to business problems, and clearly explaining the implications of these tools and models clearly and succinctly to other business professionals.

The course objectives are:

1. Interpret and draw inferences from mathematical models, such as formulas, graphs, tables and schematics.
2. Represent mathematical information symbolically, visually, numerically and verbally.
3. Employ quantitative methods such as arithmetic, algebra, geometry, or statistics to solve problems.
4. Estimate and check mathematical results for reasonableness.
5. Recognize the limits of mathematical and statistical methods.
6. Determine the nature and extent of the information needed.
7. Use information effectively to accomplish a specific purpose, either individually or as a member of a group.
8. Use technology effectively to accomplish a specific purpose, either individually or as a member of a group.

The I2B course is not a required course for business students. It is, however, available to all students. It has been approved as a foundational course meeting the mathematical and quantitative reasoning requirement. For its first

offering, 11 students are registered. Students here work in teams of two and receive grades as both individuals and teams. The pedagogy consists of lecture, readings, video, presentation, and writing.

A description of the assignments are found as Appendix B: Assignment Descriptions, Newly Designed I2B.

The approach in this design utilizes an approach more focused on the text and simulations themselves. For example, no outside readings are required, such as the Wall Street Journal. Substantial teamwork is required for not only the simulations, but also with regard to the postmortems and One Big Idea presentations. This course does not allow for retakes of knowledge checks to improve to best grade. It does, however, allow for reworks of simulations for best grades. Overall, this approach is more remedial than the more mature model, perhaps attesting to the learning curve anticipated by the faculty member teaching the course.

PURPOSE AND RESEARCH QUESTIONS

The purpose of this study is to provide an initial exploration students' perceptions of I2B courses which provide realistic engagement via NextGenSIM; it is hypothesized that students will perceive themselves as better critical thinkers, more engaged in the coursework, more motivated to learn, and have a better understanding of business disciplines that are fundamental to future career paths as a result of the I2B course with NextGenSIM (H1). It is further hypothesized that the maturity of the course roll-out will not be appreciably different with regard to students' perceptions of business preparation, in terms of the dimensions of interest (H2).

To challenge these hypotheses, the following research questions will be explored:

Hypothesis 1; Research Question 1 (H1; RQ1):

Generally, what are the student perceptions of the I2B course at the more mature I2B NextGenSIM course with regard to critical thinking, engagement, motivation to learn, and business understanding?

Hypothesis 1: Research Question 2 (H1:RQ2):

Generally, what are the student perceptions of the I2B course at the less mature I2B NextGenSIM course with regard to critical thinking, engagement, motivation to learn, and business understanding?

Hypothesis 2: Research Question (H2:RQ1):

What are the qualitative similarities and differences between H1:RQ1 and H1:RQ2?

Hypothesis 2: Research Question (H2:RQ2):

Do the qualitative differences between H1:RQ1 and H1:RQ2 appear significant?

METHODOLOGY

This study is an exploratory study and as such, it utilizes qualitative data. The methodology will be to evaluate student perceptions in two separate I2B courses at two different universities. The first university is a large public university where the I2B course has been implemented for several years; as such, it represents a more mature iteration of the course. The second university is a small public university and represents a newly designed I2B course using the Scrimmage© simulation, and as such, this implementation represents an immature model of the course using the simulation.

Ordinal student feedback was collected as part of the end of semester evaluations from the mature I2B course, while the data presented for the immature I2B course represents were collected at mid-term as its implementation is in its early infancy. The ordinal data included several questions, with feedback responses ranging on five-point scale of strongly agree to strongly agree. For the mature course, the questions were framed as past reflection, while in the newly implemented course, the questions were framed as present tense.

Several questions were selected that frame the effectiveness of the course to prepare students to have a better understanding of business disciplines that are fundamental to future career paths as a result of the I2B course with NextGenSIM. These questions are as follows:

- 1) In this course, my critical thinking increased (mature course);
In this course, my critical thinking is increasing (newly implemented course).
- 2) The simulation exercises helped me be more engaged in the course (mature course);
The simulation exercises help me be more engaged in the course (newly implemented course).
- 3) My motivation to learn and to continue to learn about course topics increased because of this course (mature course);
My motivation to learn and to continue to learn about the course topics is increasing because of this course (newly implemented course).
- 4) This course helped me better understand how business disciplines come together within an organization to deliver customer value at a profit (mature course);
This course is helping me to better understand how business disciplines come together within an organization to deliver customer value at a profit (newly implemented course).

Each question's responses on the ordinal scale in terms of each dimension of interest (critical thinking, engagement, motivation, and business understanding) were analyzed via Pareto Analysis. The H1 is considered met if the Pareto demonstrates student agreement (either agreement or strong agreement) to equal or exceed at least 70% in terms of the cumulative responses.

With regard to H2, the data were compared between the two course designs. The H2 is considered met if the percentage of respondents for each dimension provides a $\geq 70\%$ cumulative response in categories of agree – strongly agree for each implementation.

RESULTS

A Pareto Analysis was performed of the ordinal data for each I2B course implementation with regard to each dimension of interest: critical thinking; engagement; motivation; and business understanding. Textual sentiment analysis is further provided. With regard to the mature I2B, $n = 240$, representing a 79% participation rate for semester end Spring 2022. With regard to the newly implemented I2B, $n = 11$, representing a 100% participation rate.

Each dimension is considered and presented in contrast in terms the two reviewed implementations. A brief summary is provided after each Pareto Analyses comparison.

Critical Thinking

The question posed to the mature course I2B students was: *In this course, my critical thinking increased*. The question posed to the newly implemented I2B students was: *In this course, my critical thinking is increasing*. The Pareto Analyses for this dimension are found in Figure 1a: Critical Thinking: Mature I2B and Figure 1b: Critical Thinking: Newly Implemented I2B.

Figure 1a Critical Thinking: Mature I2B

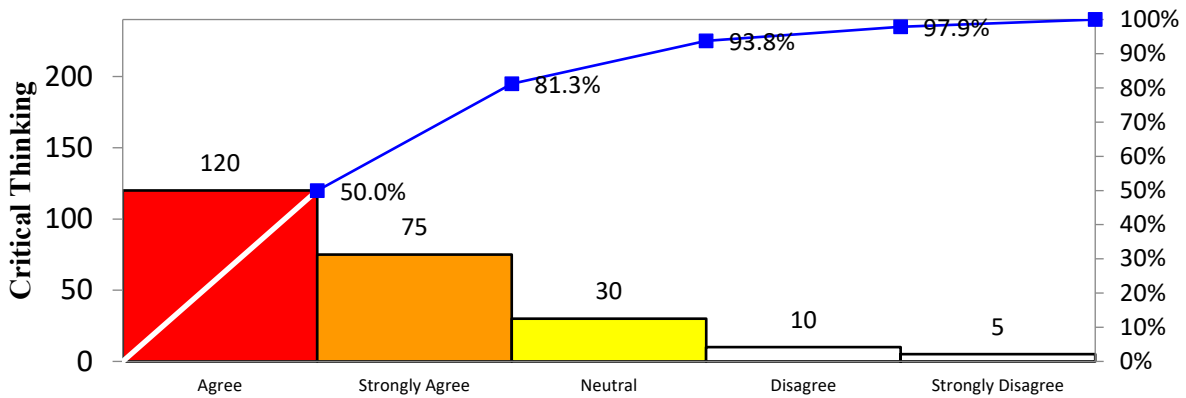
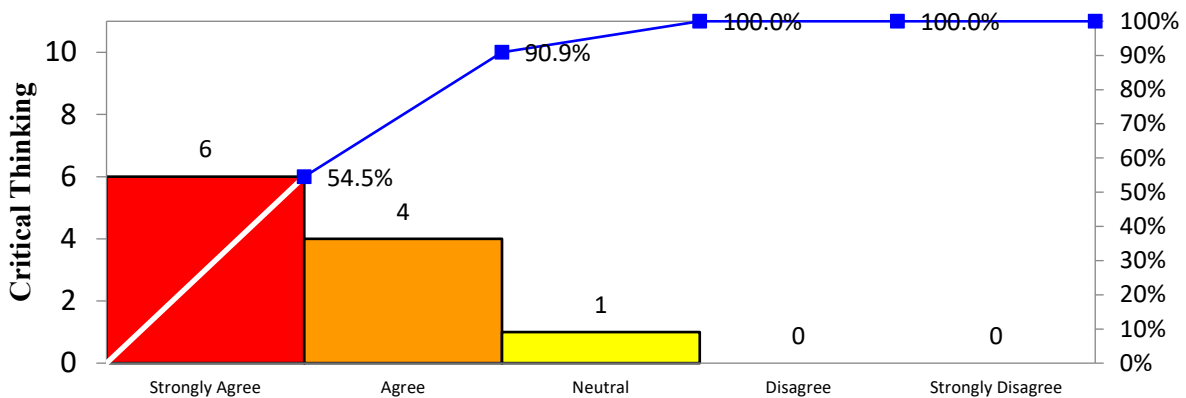


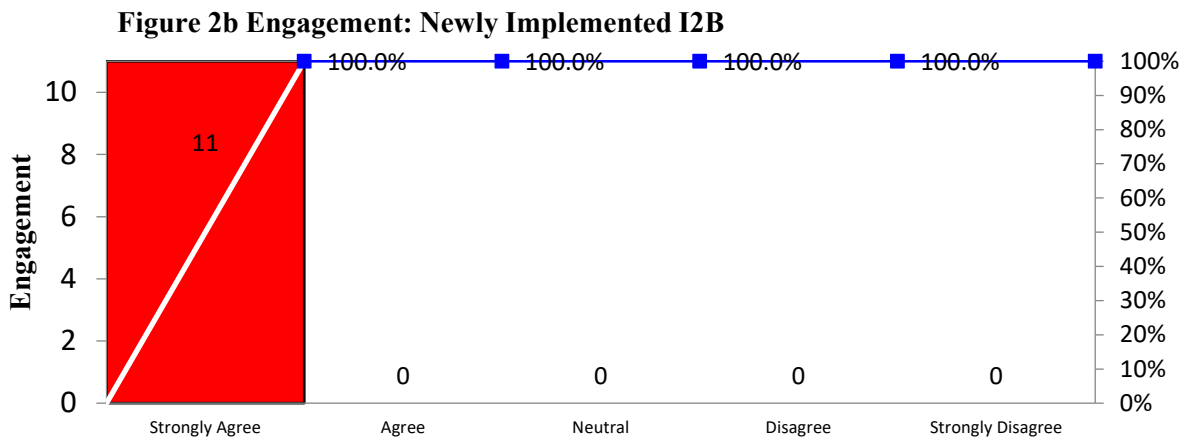
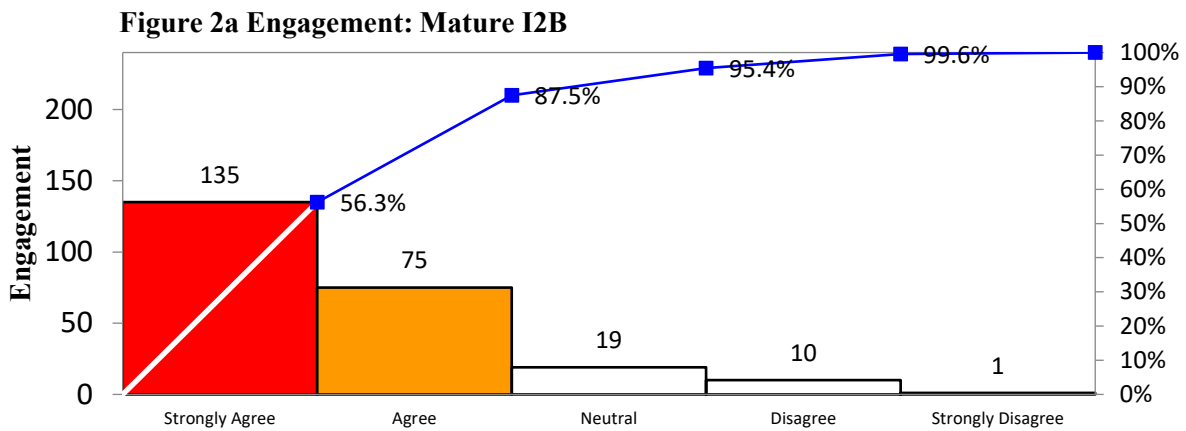
Figure 1b Critical Thinking: Newly Implemented I2B



In both implementations, courses exhibit agreement (either agree or strongly agree) at a percentage $\geq 70\%$ of the cumulative participation. Specifically, the mature I2B demonstrated 81.3% of agreement or strong agreement that the course enhanced critical thinking skills, while the newly implemented I2B course demonstrated a percentage of 90.9%.

Engagement

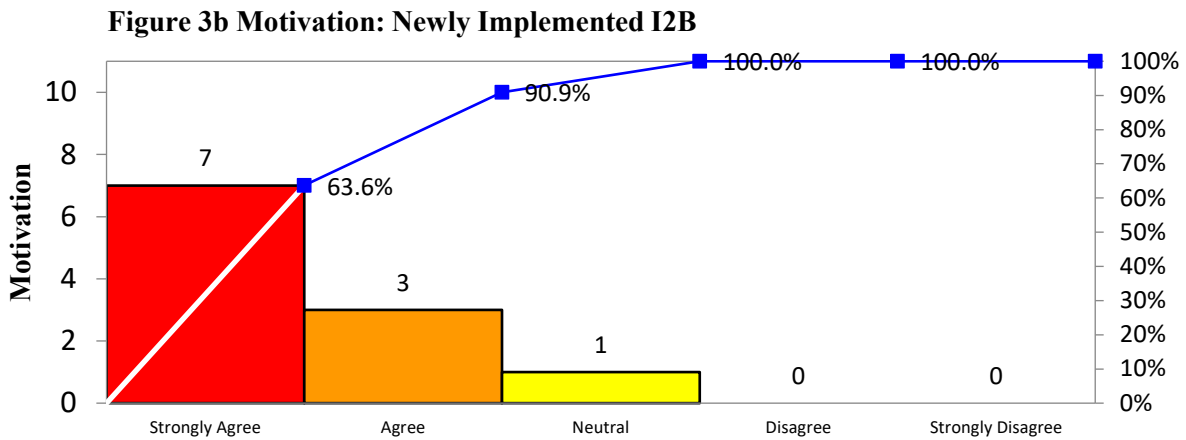
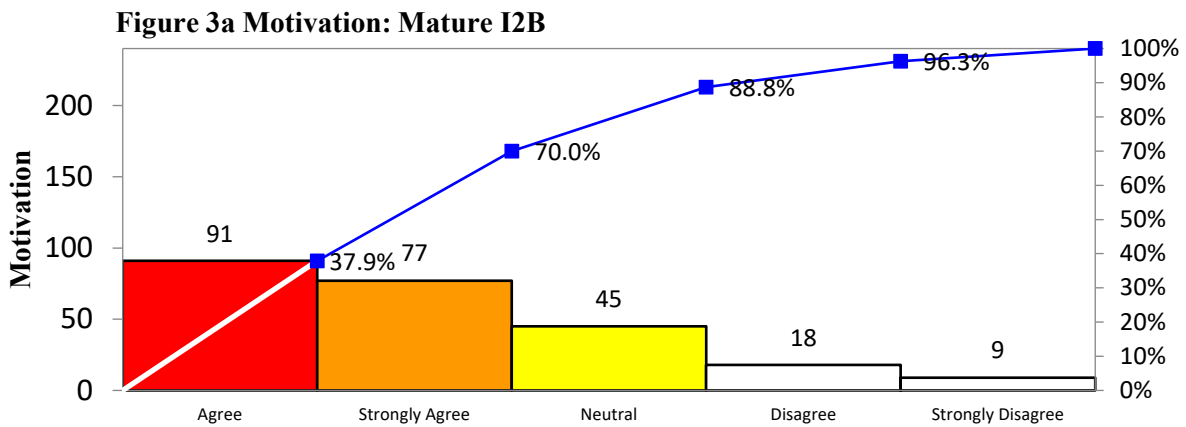
The question posed to the mature course I2B students was: *The simulation exercises helped me be more engaged in the course.* The question posed to the newly implemented I2B students was: *The simulation exercises help me be more engaged in the course.* The Pareto Analyses for this dimension are found in Figure 2a: Engagement: Mature I2B and Figure 2b: Engagement: Newly Implemented I2B.



In both implementations, courses exhibit agreement (either agree or strongly agree) at a percentage $\geq 70\%$ of the cumulative participation. Specifically, the mature I2B demonstrated 87.5% of agreement or strong agreement that the simulations better engaged the learners, while the newly implemented I2B course demonstrated a percentage of 100.0%.

Motivation

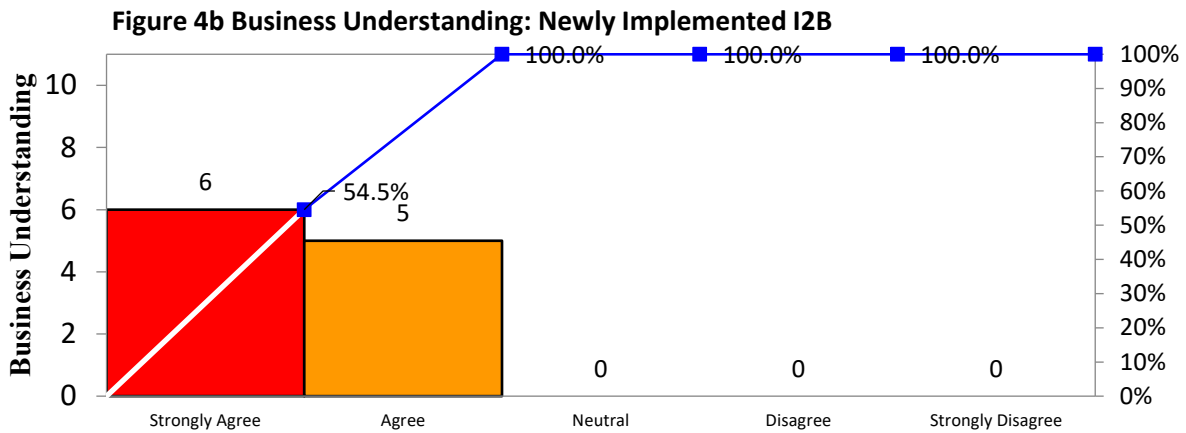
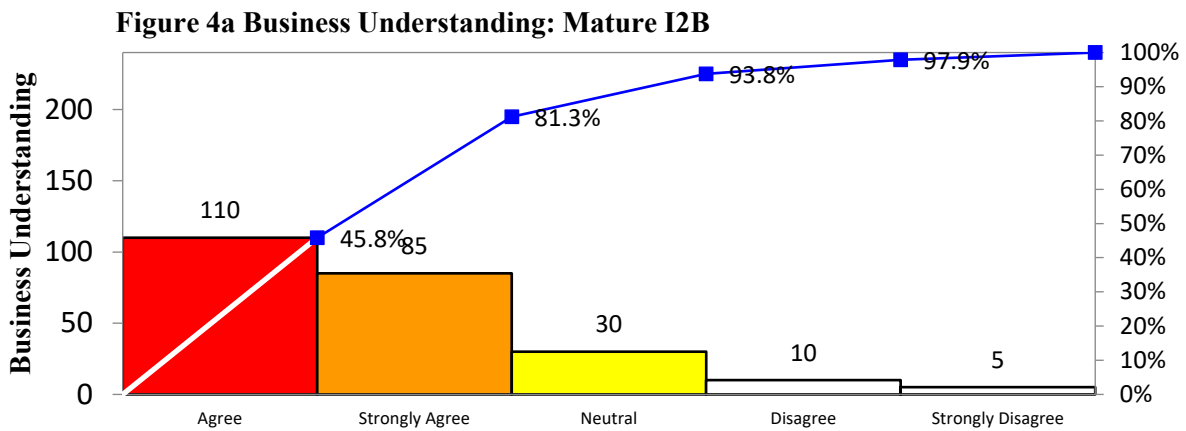
The question posed to the mature course I2B students was: *My motivation to learn and to continue to learn about course topics increased because of this course.* The question posed to the newly implemented I2B students was: *My motivation to learn and to continue to learn about the course topics is increasing because of this course.* The Pareto Analyses for this dimension are found in Figure 3a: Engagement: Mature I2B and Figure 3b: Engagement: Newly Implemented I2B.



In both implementations, courses exhibit agreement (either agree or strongly agree) at a percentage $\geq 70\%$ of the cumulative participation. Specifically, the mature I2B demonstrated 70.0% of agreement or strong agreement that the simulations better engaged the learners, while the newly implemented I2B course demonstrated a percentage of 90.9%.

Business Understanding

The question posed to the mature course I2B students was: *This course helped me better understand how business disciplines come together within an organization to deliver customer value at a profit.* The question posed to the newly implemented I2B students was *This course is helping me to better understand how business disciplines come together within an organization to deliver customer value at a profit.* The Pareto Analyses for this dimension are found in Figure 4a: Business Understanding: Mature I2B and Figure 4b: Business Understanding: Newly Implemented I2B.



In both implementations, courses exhibit agreement (either agree or strongly agree) at a percentage $\geq 70\%$ of the cumulative participation. Specifically, the mature I2B demonstrated 81.3% of agreement or strong agreement that the course enhanced their business knowledge, while the newly implemented I2B course demonstrated a percentage of 100.0%.

With regard to the differences between the two implementations, a graphical representation is found as Figure 5: Mature I2B Course v Newly Implemented I2B Course by Dimension: Percentage of Participants Indicating Combined Agree - Strongly Agree.

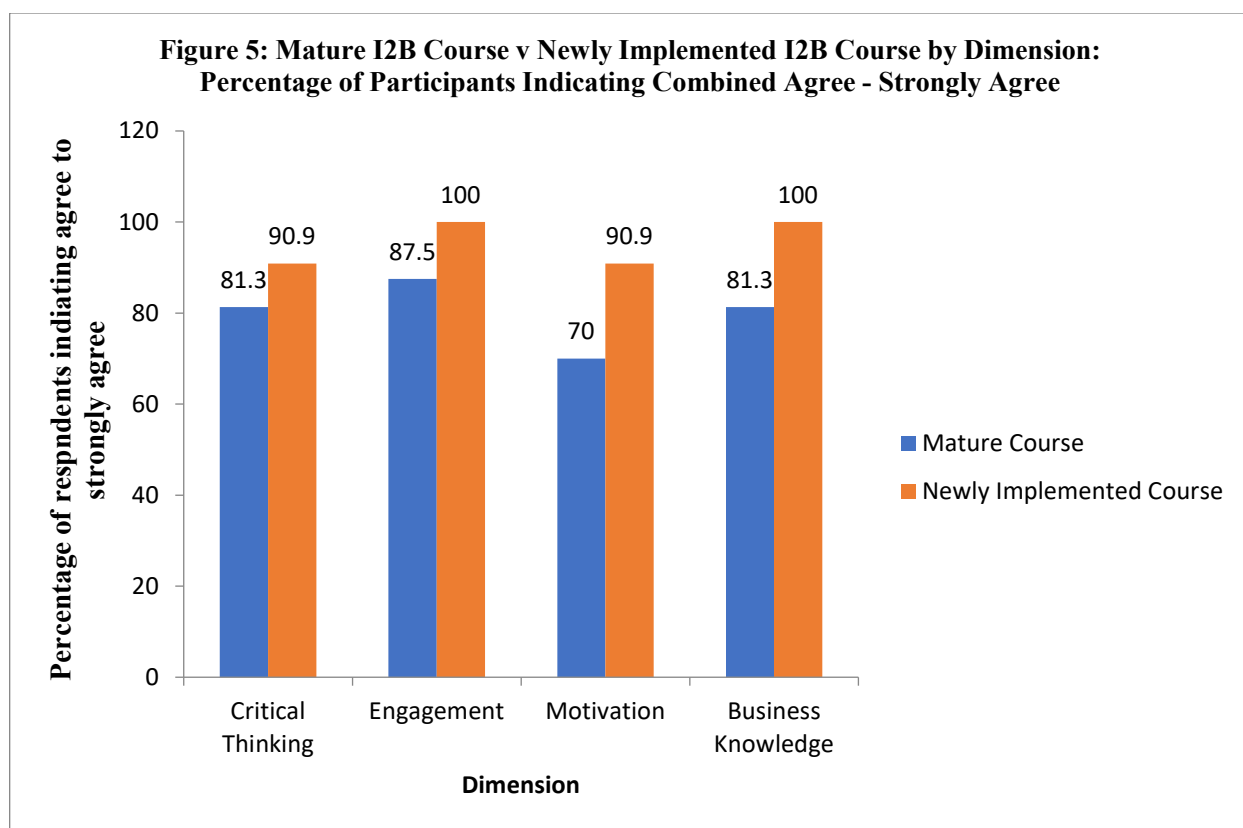


Figure 5 illustrates that both implementations resulted in $\geq 70\%$ of respondents indicating agree to strongly agree with regard to each dimension considered. It is noted that the newly implemented course tended to have higher percentages. That result may be indicative of the small sample size when compared to the more mature course implementation participants.

As a result of these analyses, both hypotheses appear to be acceptable. That is, students appear to perceive themselves as better critical thinkers, more engaged in the coursework, more motivated to learn, and have a better understanding of business disciplines that are fundamental to future career paths as a result of the I2B course with NextGenSIM (H1). Further, the maturity of the course roll-out does not appear to be appreciably different with regard to students' perceptions of business preparation, in terms of the dimensions of interest.

USEFUL ANECDOTAL DATA OUTSIDE SCOPE OF RESEARCH

An additional question was offered to the participants of the mature course implementation at the conclusion of the semester. Specifically, the participants had the option to provide input to: *What was the best thing about this course?* Notably, the question is phrased to provide positive feedback; however, this question does allow for students to indicate “nothing” or provide similar negative feedback.

The data are valuable to identify particular strengths of the course and if the comments are linked to course content or course administration. By understanding these data, an opportunity to better identify areas for further I2B course improvement exists.

A small number of respondents offered insights to the question prompt ($n = 15$). These data were evaluated to identify positive and negative sentiment using Excel© sentiment analysis using the Azure add-in. Each statement was then manually categorized as content-related or course-administration related.

The results of this analysis are shown as Table 1: Anecdotal Feedback: What Did You Like Best About This Course?

Table 1: Anecdotal Feedback: What Did You Like Best About This Course?		
Mature course feedback	Sentiment	Theme
I liked the simulations the most.	positive	Content
The simulations were confusing at first but became my favorite activity.	positive	Content
I had the opportunity to learn new things about business.	positive	Content
This is the first course where I have been able to submit an assignment, fail and try again until I learned and understood it	positive	Administration
It is rewarding to be able to learn that way.	positive	Content
The assignment due dates are flexible	positive	Administration
The exam can be taken throughout the semester, so it is more of a learning experience rather than rushing to memorize facts for a one-time exam during finals week.	positive	Administration
The simulations were enjoyable, especially when I was in a team that cared about doing well and wanted to strategize.	positive	Content
Engaging with teammates while doing the simulations, I learned a lot from them	positive	Content
Expanding my spreadsheet skills	positive	Content
Being able to work with other students in the class and bounce ideas off one another	positive	Administration
I appreciated the flexibility with assignments and being able to re-do them.	positive	Administration
The best thing about this course is having a tutoring center upstairs	positive	Administration
Getting accustomed to working in a team which taught me how to manage with a team	positive	Administration
Learning how to use spreadsheets.	positive	Content

The sentiment analysis indicates all comments as positive. With regard to categorization of statements as content or administration indicates an almost even split, with seven positive comments indicating administration and eight positive comments attributed to content.

This feedback, although limited, supports that not only content is important, but also the way the course is administered. Within the administration category, most positive feedback centers on the ability to retake graded assessments and improve upon those assessments as well as teamwork. Thus, these two components should be considered in course design.

DISCUSSION

These results are consistent with that found in the literature, specifically Despeisse (2018) who indicated that approaches using gamification and simulation not only promote deeper learning, but also enhance the development of professional skills, such as leadership, teamwork, and communication. As indicated in the results of this research, Despeisse (2018) provides that such an approach must work to enhance a student's learning experience.

The approaches described in this research are consistent with the structured approach that allows for an opportunity for reflection and debriefing, as promoted by Kember et al (2000). Additionally, the I2B designs described in this research are aligned with the research of Teach and Szot (2019), who describe the usefulness of structured debriefings to maximize the effectiveness of simulation use as well as an evaluation of critical thinking. Importantly, both designs presented allow for to "re-play" a simulation over and over, according to the professor's direction, which further facilitates the students' use of reflective critical thinking as well as the opportunity to share successes and opportunities for improvement as part of debriefings, notable from the research of Nightingale (2019) and Haines et al (2019), which are both concerned learning associated with ERP systems. In the more mature model, this same ability to repeat assessments beyond the simulation for better understanding of the material and higher grade is also consistent with this notion.

One area denoted in the literature is the specific method by which Kember et al (2000) evaluate self-reflected thinking. As noted, Kember et al (2000) developed a questionnaire to assist in understanding the students' perception of self-reflected thinking in terms of habit, understanding, reflection, and critical self-evaluation. Neither course design described in this research utilized that questionnaire, offering an opportunity for its future use. The questionnaire authors indicate the usage requirements as part of their paper.

CONCLUSION, LIMITATIONS, AND OPPORTUNITIES FOR FURTHER RESEARCH

In conclusion, the NextGenSIM simulations, such as Scrimmage©, offer a sound mechanism to meet learning objectives of I2B courses, with particular student perceived enhancements to critical thinking, course engagement, motivation to learn, and development of business knowledge and skills. Consistent with the extant literature on simulation and gamification, it appears critical to content learning to have students be able to “re-play” the simulation for better outcomes and engage in active reflection and re-direction of actions within course assessments. The maturity of the course design does not appear to play a role in the simulation’s effectiveness to achieve goals.

One significant limitation is that the newly implemented course design was evaluated by students at the mid-term point. Additionally, the sample size to compare against the mature implementation is quite small. Thus, it would be beneficial to evaluate the newly designed course at the end of the semester and compare those results with the mid-term results as well as with the mature design.

A second limitation is that the analyses for both designs were representative of one semester. Thus, in both circumstances, the attributes of interest should be monitored over time to evaluate and detect changes in perceptions within the dimensions of interest: critical thinking, engagement, motivation, and business understanding. Although 70% was selected as the desired outcome “floor,” an effort can be made to improve that value once the normal movement of the data are known.

With regard to further research, an analysis of competence could be undertaken with regard to the performance of students of these I2B courses as they advance into core business courses. Because not all students in the newly developed course are required to take the simulation I2B course, contemporary comparisons are readily available. For the mature design, historical data would need to be sought for comparison.

Further research could be undertaken with regard to the impact of these designed I2B courses on retention. This retention study could take place for the immediate following year, as well as with regard to graduation rates.

Lastly, an avenue of research to pursue may be related to the preferred economical model viewpoints of students who have taken the course. Using secondary research as a baseline, an evaluation can be made to understand the students’ perception of capitalism as a viable and sustainable economic system.

REFERENCES

- Bitzan, John and Clay Routledge (2021). College kids don't understand socialism – or capitalism. Our research proves it. Newsweek, July 12., <https://www.newsweek.com/college-kids-dont-understand-socialism-capitalism-our-research-proves-it-opinion-1608876>
- Borden, J. P. (2016). A Comparison of Introduction to Business Courses at Top-Ranked Schools. *Business Education Innovation Journal VOLUME 8 NUMBER 2 December 2016*, 153.
- Caruso, J. V. (2019, March). Using Business Simulations to Prepare Students to Think Critically, Make Better Decisions, and Solve Business Problems. In *Developments in Business Simulation and Experiential Learning: Proceedings of the Annual ABSEL Conference*, 46.
- Despeisse, M. (2018, December). Games and simulations in industrial engineering education: a review of the cognitive and affective learning outcomes. In *2018 Winter Simulation Conference (WSC)* (pp. 4046-4057). IEEE.
- Elliott, C., Guest, J., & Vettraino, E. (Eds.). (2021). *Games, simulations and playful learning in business education*. Edward Elgar Publishing: United Kingdom.
- Greenlaw, P. S., & Wyman, F. P. (1973). The teaching effectiveness of games in collegiate business courses. *Simulation & Games*, 4(3), 259-294.
- Hains, D., Intindola, M., Lepisto, D., & Wagner, B. (2019). Scrimmage! Teaching quantitative literacy through a multidimensional simulation. *The International Journal of Management Education*, 17(1), 119-129.
- Hartman, K. B., Moberg, C. R., & Lambert, J. M. (2013). Effectiveness of Problem-Based Learning in Introductory Business Courses. *Journal of Instructional Pedagogies*, 12.
- Kember, D., Leung, D. Y., Jones, A., Loke, A. Y., McKay, J., Sinclair, K., ... & Yeung, E. (2000). Development of a questionnaire to measure the level of reflective thinking. *Assessment & evaluation in higher education*, 25(4), 381-395.
- Manchester, Julia (2021). Majority of young adults in U.S. hold negative view of capitalism: poll, The Hill.com, June 28. <https://thehill.com/homenews/campaign/560493-majority-of-young-adults-in-us-hold-negative-view-of-capitalism-poll>.
- Nadworny, E. (2021, June 10). *Spring numbers show 'dramatic' drop in college enrollment*. NPR. Retrieved September 14, 2021, from <https://www.npr.org/2021/06/10/1005177324/spring-numbers-show-dramatic-drop-in-college-enrollment#:~:text=Overall%20enrollment%20in%20undergraduate%20and,spring%202019%20to%20spring%202020>.
- Nietzel, M. T. (2021, June 10). *Latest numbers show largest college enrollment decline in a decade*. Forbes. Retrieved September 14, 2021, from <https://www.forbes.com/sites/michaelt Nietzel/2021/06/10/updated-numbers-show-largest-college-enrollment-decline-in-a-decade/?sh=4956f6571a70>.
- Nightingale, J. (2019). Using a Simulation Game to Teach the Concept of ERP. In *Smart technologies and innovation for a sustainable future* (pp. 457-463). Springer, Cham.
- Reynolds, M. (2019, April 16). *The importance of business skills: HBS Online*. Business Insights Blog. Retrieved June 8, 2022, from <https://online.hbs.edu/blog/post/importance-of-business-skills#:~:text=Business%20skills%20are%20essential%20to,in%20carrying%20out%20business%20goals>.
- Teach, R., & Szot, J. (2019). What business simulations teach: The effect of debriefing. In *Neo-Simulation and Gaming Toward Active Learning* (pp. 525-536). Springer, Singapore.

Wagner, Bret (2019) Fundamentals of Business. <https://www.amazon.com/Fundamentals-Business-Applied-Approach-Engage-ebook/dp/B07GX8P91P>.

Wagner, B. (n.d.). *Business simulations*. ScrimmageSIM. Retrieved July 14, 2022, from <https://scrimmagesim.com/>

Wolfe, J. (1997). The effectiveness of business games in strategic management course work. *Simulation & Gaming*, 28(4), 360+. <https://link.gale.com/apps/doc/A20438117/AONE?u=sunyfredonia&sid=bookmark-AONE&xid=cc010ff2>

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Appendix A: Assignment Descriptions, Mature I2B

Midterm Learning Exam

A midterm exam will be administered through e-learning. Students can take this exam as many times as they want, and the best score will be used for the student's grade. This exam is designed to help students learn the material and develop their quantitative literacy. Students are allowed to get help understanding how to do problems in the exam—especially from the tutoring center—but they are not allowed to have someone take the exam for them.

This exam is available at the beginning of the semester and the course schedule gives the final date and time available to complete this exam. No late exams will be allowed unless the student can provide documentation of a serious medical, family, or similar problem that prevented them from taking the exam in the time available.

Final Learning Exam

A comprehensive final exam will be administered through e-learning. Students can take this exam as many times as they want, and the best score will be used for the student's grade. This exam is designed to help students learn the material and develop their quantitative literacy. Students are allowed to get help understanding how to do problems in the exam—especially from the Rauker tutoring center—but they are not allowed to have someone take the exam for them.

This exam is available once the midterm learning exam is closed. The course schedule gives the final date and time available to complete this exam. No late exams will be allowed unless the student can provide documentation of a serious medical, family, or similar problem that prevented them from taking the exam in the time available.

Excel© Assignments

There are two Excel© assignments at the beginning of the course where the student will be guided in building a spreadsheet. The spreadsheets that students will build are:

- Grade Calculation Spreadsheet
- Gross Margin Calculation Spreadsheet

Scrimmage SIM Simulations (4 different simulations assigned)

The simulation is designed to be run in teams, and the experience is much better when experienced with a team where all members contribute and learn from each other. Working in a team enhances the learning experience and reduces the workload.

Being part of a team is a privilege. An effective team requires all team members to participate and contribute. The saying “many hands make for light work” applies here. Student performance on the team will be monitored by the following mechanisms:

- Submission of planning spreadsheets that show effort in developing a production plan
- Active participation in the recorded team meetings.
- Active participation in the simulation, measured by activity in the simulation and observed engagement in the classroom.

Company Financial Statement Analysis and Company Analysis Report

Students will be assigned a publicly-traded company to research. There will be two submissions for this

assignment—the company financial analysis and company analysis report.

The financial analysis will be submitted first, and will be a key component of the company analysis report. For this assignment, students will get financial statements for the company from the Securities and Exchange Commission web site sec.gov/edgar. Students will calculate financial ratios for at least the most current two years according to the detailed instructions. This assignment will be submitted through the e-learning dropbox.

The company analysis report will incorporate the financial ratios from the financial analysis assignment and add this to additional information pulled from the company's website, annual reports and news items on this company. This report analyzes the company's history, strategy, current products and future plans. Using this information, the student will make a prediction of the company's future performance. This paper must be original research using appropriate resources.

The paper must have the following sections:

- Executive Summary
- Background and Company History
- Current Products and/or Services and Markets
- Company Strategy
- Financial Performance
- Prediction of Future Company Performance

Appendix B: Assignment Descriptions, Newly Designed I2B

Simulations (5 simulations will be run):

Simulations are scenarios provided through the Scrimmage Business Simulation application. These simulations require preparation of data to appropriately forecast using Excel© spreadsheets and result in a variety of reports which are interpreted to maximize profit. Excel© spreadsheets must be submitted by each student for strategy assessment prior to the first SIM run—thus, the SIM is graded as a team, while spreadsheets are graded as individuals.

Knowledge Checks:

Knowledge checks are digitally administered quizzes that are used to enhance your knowledge of the subject matter covered. These are individual assignments.

Presentations:

Postmortems are brief 5 - 7 minute team presentations that provide insight into what went well and what went not so well with the SIM. These presentations are expected to provide you with more insight to try to run the SIM again for an even better result and are done weekly as a team.

One Big Idea presentations are 3 – 4 minute presentations providing insight into the key action that allowed for maximization of profit from any one of the SIM runs and are done weekly as a team.

The Flip Grid assignment uses the Flip Grid application to record a final review of the course. You may then respond to classmates' presentations using the same. This assignment is as an individual.

Written Assignments:

The After Action Report is a technical writing report on one of the final SIMs. It is expected this report will use graphs and visuals to convey an overview of the chosen SIM. This is an individual assignment.

The Flip Grid© assignment uses the Flip Grid© application to record a final review of the course. You may then respond to classmates' presentations using the same. This is an individual assignment.

STEPPING INTO AN OPPONENT'S SHOES: A "HORNSWOGGLE" TO OVERCOME CONFIRMATION BIAS

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ABSTRACT

Cognitive biases are systemic lapses in rationality that lead to poor or incorrect decisions. These are usually attributed to intuitive or heuristic-based decision models versus more considered reasoning. One approach to helping people remedy this problem is through debiasing interventions or specific efforts to resolve a particular bias by forcing people out of reliance on heuristics and into deliberate reasoning. The debiasing technique described here addresses confirmation bias, or the tendency to seek out supporting evidence and not consider the alternative. Students are asked to develop a paper topic on issues in discrimination. Once they have chosen, the assignment is released which requires them to write their paper from the opposite perspective. It also requires critique of the argument they build and then to reflect on what could prompt them to make a similar cognitive effort in other topics. Supplemental material for the students includes discussions on identifying good sources and assumptions underlying issues like career choice or merit.

INTRODUCTION

Cognitive biases are systemic lapses in rationality that lead to poor or incorrect decisions. In the context of dual processing theory (DPT), cognitive biases are argued to arise from System I/intuitive/heuristic thinking (Kahneman 2011, Crokerry, Singhat et al., 2013). System I thinking is the default mode and operates automatically, without voluntary control and relies on rules of thumb, gut feelings, or intuition. It is fast and requires little cognitive effort (Robbins and Judge, 2014). Crokerry, et al (2013) observe that as much as 95% of our cognitive effort is in System I. This has been extended to include implicit bias or the heuristics that are formed from personal history, experience, and culture influences (Byyny, 2017). While these biases are not hardwired in the way cognitive biases are, they still lead to heuristic-based judgment. Overall, they are extremely common (at minimum, dozens have been identified (Berthet, 2021)).

In contrast, System II thinking is aroused when we detect potential errors or problems in reasoning (Kahneman, 2011). System II is characterized by slower, more deliberative, reasoned thinking and is often – but not always - a corrective for errors from System I. Insofar as System II can be equated to critical thinking or reaching a reasoned judgment (Battersby and Bailin, 2011), evaluating the link between evidence and potential conclusions (Paris, 2016), or structured thinking (Haber, 2020) then failures to use System II and circumvent cognitive errors is the foundation of solid thinking. In this paper, I demonstrate an intervention to combat confirmation bias in graduate business students.

If biases mislead or misdirect cognition, debiasing is intended get people back to proper reasoning. Debiasing is a deliberate intervention to reduce or eliminate the bias. Generally, this involves getting people to stop responding in a System I/intuitive way and moving toward a more deliberative, System 2 approach (Graf-Vlachy, 2019). This can be imposed externally (a person is informed of biased reasoning) or internally (a recognition of prior poor decisions and what might have caused them). Debiasing typically requires a number of stages: from “lack of awareness of bias, to awareness, to the ability to detect bias, to considering a change, to deciding to change, then instituting strategies to accomplish change, and finally, maintaining the change” (Crokerry, Singhat et al., 2013).

Some tested techniques for debiasing include making decision makers accountable to others for decisions (Williams, 2018, Graf-Vlachy, 2019) or at least explain the reasoning to others (Christensen and Moynihan, 2020), writing out the argument and its reasoning (Sieck and Yates, 1997, Bhatti, 2018), and intentionally considering the opposite perspective (Lord, Lepper et al., 1984, Graf-Vlachy, 2019, Sellier, Scopelliti et al., 2019, Strachanova and Valus, 2019).

As another example, I teach an MBA course in organizational behavior. Over the past decade, I have asked students to analyze issues around potentially controversial topics and have evolved my approach to get more thoughtful responses. In this mostly online course, extended written discussion posts and conversations play a large part in creating a collective community of inquiry (Garrison and Arbaugh, 2007, Swan, Garrison et al., 2009, Warner, 2016). I ask students to not merely respond to a post but to actively research in the topics and bring sources to the discussion. This has the benefit of moving the students beyond mere opinion and toward reasoned judgment. I assign a paper on a choice of topics (such as discrimination in gender pay equity or ethnic discrimination in hiring and promotion) and let the students choose their topic and position. However, in the first few years, I observed that students usually just

reiterated their discussion arguments and the sources they used, while often collectively sourced, were one-sided. That is, despite seeing alternative viewpoints and sources in discussions, these were ignored in what I attribute to confirmation bias or the search for and use of information that is consistent with prior beliefs (Christensen and Moynihan, 2020). As Battersby and Bailin (2011) argue, “Whoever presents an argument has a dialogical duty to acknowledge counter arguments and to indicate why the supported argument is stronger than these.” Yet students often fail in this because they see their opinion as common sensical and thus do not push the rigor of the assessment.

Debiasing intervention

The de-biasing approach I developed is to begin the discrimination assignment in the same way – with discussions and sources to buttress the arguments – and again, I let them choose a topic and position. The intervention is to ask them to write the argument from the *opposition* point of view and defend it as best they can. While a student once described this as a “hornswoggle”, it is consistent with accepted debiasing techniques (see Graf-Vlachy, 2019; Sellier, Scopelliti et al., 2019; Strachnova and Valus, 2019).

In the week of the paper development, I also guide discussions on issues such as determining quality sources, defining the best argument for their new position, or combatting a persistent dependence on the idea of merit as a cure-all.

Learning objectives

LO1: Develop an argument opposite to your own views and critique it

LO2: Identify assumptions underlying the arguments

LO3: Describe how to vet and use sources for a strong argument

LO4: Describe the cues that should slow down response for deeper thinking

Introducing and developing the assignment

I begin the process several weeks before the paper is due by first advising students of how the assignment will be generated and then setting up discussions along two or more topics (see Appendix A). The purpose here is to solicit true opinions or conclusions from students about their current state of beliefs on a topic. They can respond to one or both topical areas. This may be more practical in an online or hybrid class as the development of the argument is important. Students develop a line of argument which is probably easier in the written environment of a discussion. It certainly allows them the time and space to generate the position. Further, I want them to introduce sources or data to support their positions and this is, again, easier to do in an online format. However, this could also be done as a staged, preparatory assignment of all students in a traditional class setting. Ultimately, I ask each student for a specific commitment to a topic and position.

Once I have that commitment from all students, I post the assignment noted in Appendix B. The assignment is not only to write out the opposition argument (itself a valuable approach to overcoming confirmation bias) but also that they critique the argument they just made and then reflect on the process. I am prompting them to think about what conditions or circumstances or states should prompt this sort of slower, deliberative construction. I have noted that the initial discussions on the topics can become emotion-laden: cognitive biases have been linked to affect or emotional response to an issue. Those disposed to think intuitively were more likely to believe in conspiracy theories (Swami, Voracek et al., 2014) or fake news (Martel, Pennycook et al., 2020), and that anger about an issue led to a tendency to confirmation bias in assessing arguments in line with the respondents’ positions (Suhay and Erisen, 2018). Recognizing this can be a clue for students to slow down.

Helping students support their arguments

Since the paper topics were not what the students originally planned to write about, I guide discussions on topics that are designed to strengthen their analysis (Appendix C). For instance, one typical problem area is in finding good sources. Too often, there is a tendency to search for something online and use what comes up at the top of the results without really assessing the quality of the piece. This can range from the orientation of the publication itself to issues with the qualifications of author, especially of opinion pieces. Another example is a discussion about what “merit” really means or how it is achieved. The purpose of these exercises is to help students begin to address their own assumptions about the issues. Both topics will be further developed in class in the week the papers are due.

Assessment and outcomes

Assessment of this exercise has several parts. First, students are assessed on their engagement with and contributions to the discussions. This is a critical part of the effort because in the earliest discussions, students do not know how the

assignment will be structured and the genuine points of view emerge. I use these to vet the proposed topic from each. Further, in the discussions that support the actual paper development, students engage with issues that address LO's 2 (identifying assumptions) and 3 (quality of sources). The second major part of the assessment is the paper itself. I give the newly developed argument some weight (LO1: development of the argument) but about twice as much to the critique and reflection combined (addressing LO's 2, 3, and 4 identifying the cues that suggest more deliberative thought). My purpose here is to have students articulate their perspectives on the difficulty of thinking from the other side, of how to find good sources, and when they believe this slower process is warranted.

I also initiate a first pass at de-briefing in class just before the papers are due. This has several elements. First, I ask them to reflect on the discussions we had developed around the quality of sources. I complement this with some exercises on how to vet a source. Second, since this topic will come up in many papers in one form or another, we discuss the idea of merit as a basis for hiring, pay, and promotion. The objective here is to get students to think about the assumptions that underlie a philosophy like this. For example, a commonly argued cure in the class has been that the standard should be to "hire the best qualified". The discussion here leads students into considering how hiring or promotion standards are often not clearly objective, which can lead to biased decisions because decision makers rely on other, implicit standards. This is followed a week later by an extended discussion on cognitive biases where their own personal experience is used as an illustration of how unconscious these intuitive processes are. The response from students mostly hinged on how they moderated their original opinions:

"We surround ourselves with likeminded people and information that supports our preconceived positions. Forcing myself to defend the alternative side moved me further towards the middle of the issue"

"This goes to show that it is always a good idea to understand how strong the viewpoint and stance is on a topic by looking at the other side and the counter argument."

"My viewpoint on the gender pay gap, prior to this research and class discussion, was that it was somewhat sensationalized...the large amount of evidence and high-quality studies convinced me otherwise"

"I am honestly shocked how much this new data has changed my perspective on the topic."

Caveats

This works better if the choices are lightly guided. For example, if a student chooses the argument that White privilege exists, then arguing the opposite is difficult when it comes to finding sources that are reliable in the way we had discussed them. In this case, it should be clear to the student that he or she can make the argument with the sources they can find but take the opportunity in the critique to address that problem and what it means.

Second, framing the question they choose can be difficult. To channel these ideas toward a set that benefits from discussion and exchange of sources, I learned to give students a menu of sorts. For example, students interested in the gender pay or promotion topics could choose from:

- a) A pay (or promotion) gap exists and is due to discrimination
- b) A pay (or promotion) gap exists but is not due to discrimination
- c) A pay (or promotion) gap does not exist

Then, for those who chose a, the flip would be that a gap exists but not because of discrimination. If the student chose b or c, the flip would be that there is a gap, and it is caused by discrimination. Similar choice menus were constructed for issues in race.

CONCLUSION

Cognitive biases can lead to errors in thinking and decision making that require attention to overcome. Simply asking people to be more reasoned or thoughtful does not work well (Lord, Lepper et al., 1984) but many techniques for taking people out of the bias have been tested and shown to work. These interventions or de-biasing approaches typically develop a way to make people think more slowly or carefully about their decision. One well used method is having people "consider the opposite".

The approach used here is a multi-step effort that begins with inviting students to take a position on topics in a controversial subject area. They are encouraged to present their views and support them with evidence. Once they have committed to a position, they are assigned to write a paper from the opposite perspective and defend it as best they can. They are also assigned to critique the argument they built and then reflect on the process and what was learned. The development process is complemented by in-class discussions on sources and an illustration of

identifying and thinking through assumptions. Students typically finish the exercise with a more nuanced view of the topic and sources than they had before.

REFERENCES

- Battersby, M. and S. Bailin (2011). Critical Inquiry: Considering the context. *Argumentation: An International Journal on Reasoning*, 25(2), 243-253
- Berthet, V. (2021). The measurement of individual differences in cognitive biases: A review and improvement. *Frontiers in Psychology*, 12. <https://doi.org/10.3389/fpsyg.2021.630177>
- Bhatti, A. (2018). Cognitive bias in clinical practice – nurturing healthy skepticism among medical students. *Advances in Medical Education and Practice*, Volume 9, 235–237. <https://doi.org/10.2147/amep.s149558>
- Byyny, R. L. (2017). Cognitive bias: Recognizing and managing our unconscious biases. *The Pharos*, Winter, 2-6.
- Christensen, J. and D. P. Moynihan (2020). Motivated reasoning and policy information: Politicians are more resistant to debiasing interventions than the general public. *Behavioural Public Policy*, 1–22. <https://doi.org/10.1017/bpp.2020.50>
- Croskerry, P., Singhal, G., & Mamede, S. (2013). Cognitive debiasing 1: Origins of bias and theory of debiasing. *BMJ Quality & Safety*, 22(Suppl 2), ii58–ii64. <https://doi.org/10.1136/bmjqs-2012-001712>
- Garrison, D. R., & Arbaugh, J. B. (2007). Researching the community of inquiry framework: Review, issues, and Future Directions. *The Internet and Higher Education*, 10(3), 157–172. <https://doi.org/10.1016/j.iheduc.2007.04.001>
- Graf-Vlachy, L. (2017). Like student like manager? using student subjects in Managerial Debiasing Research. *Review of Managerial Science*, 13(2), 347–376. <https://doi.org/10.1007/s11846-017-0250-3>
- Inside higher ed*. Teaching students to think critically (opinion). (n.d.). Retrieved January 26, 2023, from <https://www.insidehighered.com/views/2020/03/02/teaching-students-think-critically-opinion#:~:text=It's%20Time%20to%20Get%20Serious,the%20bank%2C%20writes%20Jonathan%20Haber.>
- Kahneman, D. (2015). *Thinking, fast and slow*. Farrar, Straus and Giroux.
- Lord, C. G., Lepper, M. R., & Preston, E. (1984). Considering the opposite: A corrective strategy for Social Judgment. *Journal of Personality and Social Psychology*, 47(6), 1231–1243. <https://doi.org/10.1037/0022-3514.47.6.1231>
- Martel, C., Pennycook, G., & Rand, D. G. (2020). Reliance on emotion promotes belief in fake news. *Cognitive Research: Principles and Implications*, 5(1). <https://doi.org/10.1186/s41235-020-00252-3>
- Inside higher ed*. Roadblocks to better critical-thinking skills are embedded in the college experience (essay). (n.d.). Retrieved January 26, 2023, from <https://www.insidehighered.com/views/2016/11/29/roadblocks-better-critical-thinking-skills-are-embedded-college-experience-essay>
- Judge, T. A. (2017). *Essentials of organizational behavior*. Pearson Education (us).
- Sellier, A.-L., Scopelliti, I., & Morewedge, C. K. (2019). Debiasing training improves decision making in the field. *Psychological Science*, 30(9), 1371–1379. <https://doi.org/10.1177/0956797619861429>
- Sieck, W., & Yates, J. F. (1997). Exposition effects on decision making: Choice and confidence in choice. *Organizational Behavior and Human Decision Processes*, 70(3), 207–219. <https://doi.org/10.1006/obhd.1997.2706>

- Strachanová, D., & Valuš, L. (2019). Mental simulation as a remedy for biased reasoning. *Studia Psychologica*, 61(2), 99–109. <https://doi.org/10.21909/sp.2019.02.775>
- Suhay, E., & Erisen, C. (2018). The role of anger in the biased assimilation of political information. *Political Psychology*, 39(4), 793–810. <https://doi.org/10.1111/pops.12463>
- Swami, V., Voracek, M., Stieger, S., Tran, U. S., & Furnham, A. (2014). Analytic thinking reduces belief in conspiracy theories. *Cognition*, 133(3), 572–585. <https://doi.org/10.1016/j.cognition.2014.08.006>
- Swan, K., et al. (2009). A constructivist approach to online learning: The community of inquiry framework. Information technology and constructivism in higher education: Progressive learning frameworks. C. R. Payne. Hershey, PA, *IGI Global*, 43-57.
- Warner, A. G. (2016). Developing a community of inquiry in a face-to-face class. *Journal of Management Education*, 40(4), 432–452. <https://doi.org/10.1177/1052562916629515>
- Williams, J. D. (2018). Accountability as a debiasing strategy: Testing the effect of racial diversity in employment committees. *Iowa Law Review*, 1593-1638

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EMPLOYEE SUSCEPTIBILITY TO SOCIAL ENGINEERING: A CONCEPTUAL FRAMEWORK USING DEMOGRAPHICS AND PRINCIPLES OF PERSUASION

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ABSTRACT

This paper will discuss the theoretical and conceptual frameworks used to guide a proposed research study on social engineering susceptibility. Social engineering can be defined as the act of manipulating human beings, most often with the use of psychological persuasion, to obtain unauthorized access to systems containing data, documents, and general information that the social engineer should not have access to. There are several ways in which research studies can be planned and implemented and various lenses through which these studies are viewed.

Specifically, a theoretical framework grounded in Cialdini's principles of persuasion is one way to better understand social engineering susceptibility in organizations. These principles can be used in conjunction with a cybersecurity framework to study whether those two concepts influence whether employee demographics have an impact on social engineering susceptibility of employees in organizations.

INTRODUCTION

Businesses of all types and sizes are facing an unprecedented threat to the data they utilize and store in the natural course of their operations. Hackers and others who are not authorized to access this information are using sophisticated techniques to work their way into organizations by a variety of methods including social engineering. This type of hacking technique has been identified as the most widely used method (Ashford, 2016) and considered one of the leading threats to information security today (Airehrour, Nair, & Madanian, 2018; Mitnick & Simon, 2002).

Social engineering can be defined as the act of manipulating human beings, most often with the use of psychological persuasion, to obtain unauthorized access to systems containing data, documents, and general information that the social engineer should not have access to (Heartfield & Loukas, 2015; Mitnick & Simon, 2002; Tetri & Vuorinen, 2013). Social engineering today mostly focuses on the information security realm and the potential threats that face both large and small businesses as well as individuals. There exists a lack of a solid framework within which to view social engineering and specifically social engineering susceptibility. A proposed framework to study susceptibility is outlined here using the following unique variables: Cialdini's principles of persuasion, a cybersecurity framework, and demographic characteristics of employees.

THEORETICAL FRAMEWORK

Psychological theories guide many of the studies on social engineering by providing a lens to view the intricacies of the subject. Several researchers (Bullee, Montoya, Pieters, Junger, & Hartel, 2015; Bullee, Montoya, Pieters, Junger, & Hartel, 2018; Muscanell, Guadagno, & Murphy, 2014) have studied the principles of persuasion as identified by Cialdini (2007). Tetri & Vuorinen (2013) are critical of the application of Cialdini's principles of persuasion to the information security field suggesting that it is difficult to view the principles in that type of environment. However, social engineering attacks do not occur in isolation and solely within the realm of information security. Rather, they take place in the typical, social workplace environment with all the complexities of various people, systems, and multiple factors impacting the attack itself and the success of it. It is logical then to apply the principles of persuasion to a variety of environments, anytime persuasion is used to convince someone to do something.

Cialdini's Principles of Persuasion

Cialdini (2007) proposed six principles of persuasion that can be used in a variety of fields such as business, sales, politics, and even in personal relationships such as with a spouse or when raising children. He initially explains the concept of fixed-action patterns derived from the study of animals in their natural environment. Human beings also exhibit a similar process of fixed patterns of behaviors without much thought given to those behaviors. This automatic behavior serves an appropriate function in people's lives by allowing individuals to make quick decisions for daily repetitive choices and react quickly when a situation requires an immediate response. People sometimes do not have the time or capability to analyze every aspect of their situation which makes the fixed-action patterns important. There exists a trigger mechanism that prompts a response or an action, but sometimes the triggers incite the fixed-action

behavior at an inappropriate time. It can be easy for someone to manipulate one of the triggers and trick someone into an action that would not have been taken if the person analyzed the situation rather than relying on the fixed-action pattern that he or she was accustomed to.

This type of manipulation is at the core of social engineering attacks and is relied on heavily by the attacker, knowing that the victim will likely react in a pre-established way when faced with a request. The six principles of persuasion are used by social engineers as they construct the setting, word choice, and mode of communication used to hopefully lead to a successful attack, one in which data, access, or sometimes both are freely given to the attacker.

The first principle outlined by Cialdini (2007) is reciprocity which is the act of providing something in return to someone who has done a favor for the person. Cialdini (2007) provides a reciprocity example in which people feel obligated to give a birthday gift to someone who has given a gift to them. Adherence to the unwritten reciprocity rule is found in almost every culture which makes it a highly successful form of persuasion. In fact, even a small favor done for someone has been shown to be met with an equal or even bigger favor in return. This idea is so convincing to individuals because of their inherent need to be accepted and liked by society. Since it is an expectation in almost every culture that a favor be returned, people may think that society, or their immediate sub-set of it, will not look favorably on them if they do not adhere to this rule. Applying this principle to social engineering suggests that the attackers may have a higher probability of a successful attack if they first offer the potential victim a small gift or perform a small gesture. In return, the victim feels obligated to provide the information or access required by the social engineer.

The second principle is commitment and consistency. Human beings have a penchant for standing by decisions they have made even when contrary evidence supports they are wrong. It essentially has a snowball effect in that individuals will continue to make decisions based on that earlier, and sometimes wrong, decision. Sticking with a previous choice reflects consistency which is a highly sought characteristic in people. The idea that human beings cannot process all the information available or think through appropriate behavior in every situation further supports the significance of consistency. It ensures that individuals will not think about their actions; rather, they will just act consistently with prior behavioral patterns. If the social engineers can make the victim commit to something, then they can rely on the consistency of the behaviors that follow the commitment. This consistency and eventual lack of thinking on behalf of the victim have a high potential of leading to a successful attack.

Social proof can be considered the third principle of persuasion as defined by Cialdini (2007). This concept supports the idea that people determine what is correct based on what others think. This is especially true in uncertain times when most people will look at the actions and behaviors of others to determine their own ways of acting. Even more specifically, individuals tend to model their behavior or respond favorably to those who are like them. This principle has major implications for social engineering. The attackers might be much more persuasive if they can convince the victim that by complying with their request, the victim is acting similarly to everyone else. The idea of social proof encourages certain types of behavior and permits individuals to act in such a way that they feel they fit in socially with those around them. Even if people question their behavior in terms of what everyone else is doing, they often assume that other people must have more information or knowledge on the subject so behaving in that way, even though it may inherently seem wrong, will suddenly become more apparent and seem like the right thing to do. Watering hole attacks are a type of social engineering technique that capitalizes on social proof. Rather than targeting an individual, the attacker targets a social platform in which people collectively tend to visit based on similar characteristics. An example of this would be the targeting of a website that provides industry-wide regulations, knowing that the collective employee base of one company would likely visit that site (Watering Hole, 2017).

The fourth principle is liking which means that people who wish to influence or persuade will usually try to convince others to like them. Attractive people are usually associated with favorable characteristics whether or not they actually exist in the individual. In addition, people tend to like others they are comparable to in terms of a similar upbringing, the same hobbies and interests, or matching opinions. Human beings also are inclined to fall for flattery whether it be honest or insincere. Cialdini cites an “automatic positive reaction” to flattery which distorts our observation and thinking about a certain situation (2007). The more that an individual likes someone, the more influence that person can exert. A social engineer can use many of the concepts associated with this principle of liking to ensure a

successful attack. It benefits the attackers to convince the victim to like them, compliment the victim, and show proof, whether real or fake, that they are similar in some way.

Authority is the fifth principle and the one most often used in social engineering attacks (Bullee et al., 2018). Adherence to authority is common in many cultures, and people are expected to behave in ways that respect and obey authoritative figures. This behavior provides advantages on a societal level to ensure order and reduce chaos, and it is usually ingrained in most people that this is common behavior. Similar to the commitment and consistency principle, authority is another means of providing a guide for behavior and thoughts when there is just too much information to process and determine how to act. Authority provides an immediate and automatic response and compliance to requests since it is assumed that those in positions of power have more knowledge and control. The use of titles and clothing choice can provide visual clues as to who has power, and even more specifically, the extent of that power. Social engineers can mimic authority figures by dressing a certain way and introducing themselves with a prestigious or authoritative title. In most situations, this persuasion technique diminishes the chance for the victim to question the request and more importantly, encourages him to comply with it.

The last principle of persuasion is scarcity which means that a limited or diminishing quantity of something, be it a product, time, or individual, makes it more enticing to a person. The threat of losing something is a strong motivator especially when viewed in terms of limiting people's freedoms. By removing choices, the opportunity to decide among many options is taken away and as a result, it causes people to cling to those options, ensuring that they will continue to have access to them. Limitless and unceasing options do little to influence a person since they are missing the element of scarcity. Things also become more desirable if people must compete against each other for it. Social engineers can use this tactic to influence a potential victim by explaining what can be lost if the individual does not comply with the request. Denial of the request can be explained to correlate with limiting opportunities for an individual, making that person cling more tightly to whatever freedoms he may be enjoying. In order to not have freedoms taken away, the victim may decide to comply with the request.

As applied to a proposed study, the principles of persuasion support the idea that the demographic characteristics could possibly influence susceptibility to social engineering based on how each of the demographic measures responds to the principle used in the social engineering attack. Cialdini (2007) proposed that people use the available information around them to make decisions especially in times of stress or uncertainty; however, only a small amount of that information is utilized by individuals because of the inadequate capacity to comprehend everything or because of limited time. There is so much knowledge surrounding people, more than ever before, that human beings are forced to rely on cues in the environment to tell them how to act and respond. Social engineers have found ways to manipulate these cues. Using this theoretical framework, a research study can be designed to examine individual behavior in response to cues used in conjunction with the principles of persuasion. The study could determine if there is a significant difference in the way that employees respond to environmental cues which would influence their susceptibility to social engineering.

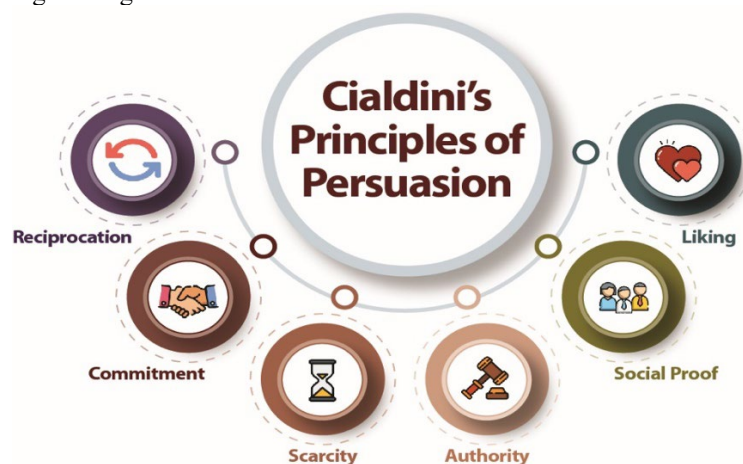


Figure 1. Cialdini's six principles of persuasion. This figure illustrates the principles outlined by Cialdini that are used in persuasive situations (2007).

Cybersecurity Framework

Persuasion principles can be used in conjunction with a cybersecurity framework such as one provided by the National Cybersecurity and Communications Integration Center (NCCIC) from the United States Department of Homeland Security to guide the research. A perspective on influence and persuasion helps to analyze the psychological aspects inherent in social engineering attacks. When combined with a professional, practical model, the two perspectives provided a solid framework for a research study.

This cybersecurity framework was initially created as a guide for organizations to protect themselves from cybersecurity threats. There are five functional areas included in this framework. The first is *Identify* and provides the basis on which the other areas will be built upon. It explains the need for organizations to assess their risks in the operational environment. They should understand the systems, processes, and other resources utilized in their environment, the risks from both an inherent and external view, and their assessment and governance policies. The second area is *Protect* and involves the deployment of protections to guard against intrusions to any of the components identified in the first functional area. The third area is *Detect* and encompasses the efforts of exposing an attack. This functional area should not only be concerned about an attack that has already occurred, but also the events that led up to it and a process for continuous observation. The fourth area is *Respond* and involves the reaction to an attack. Responses can include physical actions, communication, and analyzing the attack. The fifth and final area is *Recover* and involves the strategies utilized to maintain resistance to cybersecurity attacks in the organization. The plans in this area should include how to recapture any lost functionality that occurred during the attack and how future events can be mitigated (NCCIC, Cybersecurity Framework).

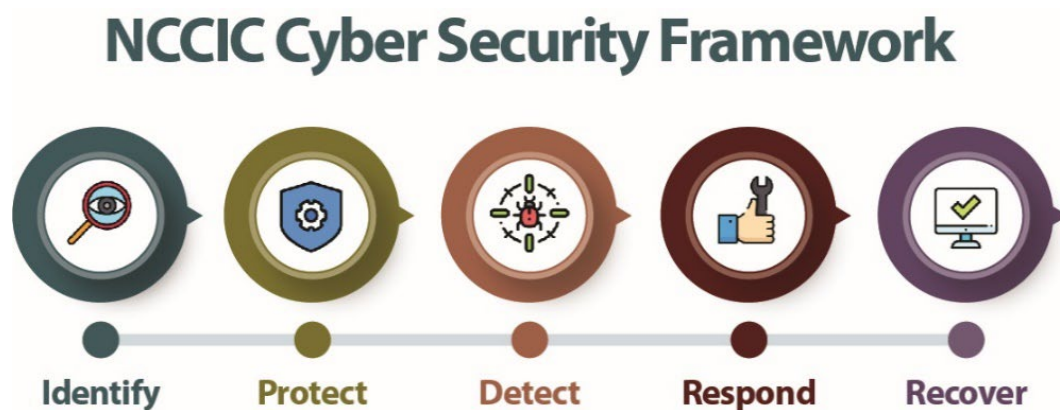


Figure 2. NCCIC cybersecurity framework. This figure outlines the five functional areas of the framework suggested to increase cyber resilience in organizations.

The intention of the Cybersecurity Framework is for it to be used as a means of cyber resilience in organizations. Resiliency in cyberattacks means becoming less susceptible to social engineering and the ability to recover and continue business operations after a social engineering attack occurs. The effectiveness of persuasion on the demographic characteristics can be increased or decreased depending on the strength of the Cybersecurity Framework, and as a result, employee susceptibility might also increase or decrease.

CONCEPTUAL FRAMEWORK

The conceptual framework for a proposed research study utilizes the six principles of persuasion as identified by Cialdini (2007) including reciprocity, commitment, social proof, liking, authority, and scarcity. Either one, some, or all the principles are used as the underlying force in all social engineering attacks. The principles could impact employees to various extents, perhaps based on certain demographic characteristics. The degree to which employees are influenced by the principles are possibly based on these demographic characteristics and relate to that employee's susceptibility to social engineering.

A cybersecurity framework, such as one provided by the United States Department of Homeland Security, can be implemented in organizations today as a safeguard between the principles of persuasion and the employee base in organizations. The framework can be modified based on the organization's particular needs, composition of employees based on demographic features, and other factors in the internal and external environment that may impact information security.

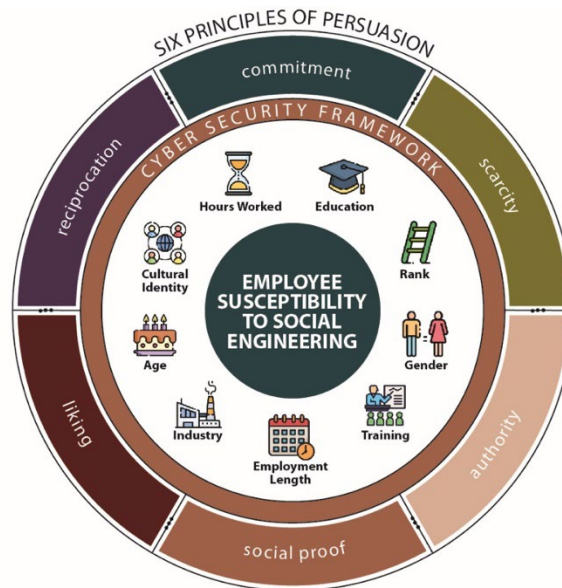


Figure 3. Employee susceptibility to social engineering. This figure shows how the six principles of persuasion outlined by Cialdini (2007) can influence responses to social engineering attempts based on the use of a cybersecurity framework and employee demographics

A research study is proposed, using this framework, to examine how the principles of persuasion influence employees based on their demographic characteristics. This influence can be further explored to determine whether the existence or strength of a cybersecurity framework can diminish the effect of the principles of persuasion used in social engineering attacks. The components of this proposed study should eventually help to determine whether the three factors, principles of persuasion, a cybersecurity framework, and employee demographics, have an impact on susceptibility to social engineering.

CONCLUSION

Social engineering is a real and growing threat to individuals and businesses today. There is an increasing need to study the topic, and this paper has provided a theoretical and conceptual framework to guide such a study. With future research, a greater understanding of social engineering can be gained, and the risks posed to individuals and businesses can be reduced.

REFERENCES

- Airehrour, D., Nair, N., & Madanian, S. (2018). Social engineering attacks and countermeasures in the New Zealand banking system: Advancing a user-reflective mitigation model. *Information*, 9(5), 10. doi: 10.3390/info9050110
- Ashford, W. (2016). Social engineering is top hacking method, survey shows. *ComputerWeekly.com*. Retrieved 2022, from <https://www.computerweekly.com/news/4500272941/Social-engineering-is-top-hacking-method-survey-shows>
- Bullee, J., Montoya, L., Pieters, W., Junger, M., & Hartel, P. (2015). The persuasion and security awareness experiment: Reducing the success of social engineering attacks. *Journal of Experimental Criminology*, 11: 97-115. doi: 10.1007/s11292-014-9222-7
- Bullee, J., Montoya, L., Pieters, W., Junger, M., & Hartel, P. (2018). On the anatomy of social engineering attacks: A literature-based dissection of successful attacks. *Journal of Investigative Psychology and Offender Profiling*, 15(1), 20 – 45. Retrieved 2022, from Social Sciences Citation Index.
- Cialdini, R. (2007). *Influence: The psychology of persuasion*. New York, NY. Harper Collins.
- Heartfield, R. & Loukas, G. (2015). A taxonomy of attacks and a survey of defense mechanisms for semantic social engineering attacks. *ACM Computing Surveys*, 48(3), doi: 10.1145/2835375
- Mitnick, K. & Simon, W. (2003). *The art of deception*. Indianapolis, IN. Wiley.
- Muscanell, N., Guadagno, R., & Murphy, S. (2014). Weapons of influence misused: A social influence analysis of why people fall prey to internet scams. *Social and Personality Psychology Compass*, 8(7), 388-396. <https://doi.org/10.1111/spc3.12115>
- NCCIC Cybersecurity Framework. Department of Homeland Security. Retrieved 2022, from <https://uscert.cisa.gov/resources/cybersecurity-framework>
- Tetri, P. & Vuorinen. (2013). Dissecting social engineering. *Behavior & Information Technology*, 32(10). doi: 10.1080/0144929X.2013.763860
- Watering hole attacks – CompTIA Security + SY0-501-1.2 (2017). Retrieved 2022, from <https://www.professormesser.com/security-plus/sy0-501/watering-hole-attacks/>

Amy Washo, Ph.D., is Assistant Professor of Accounting at Marywood University, Controller at Sho Technology Solutions and President of the Remember JEA Foundation. Her research interests include business behaviors as they relate to accounting fraud and information security, as well as researching trends and changes in the higher education landscape.

Thursday October 20, 2022

Registration – Registration Desk	7:30 am – 3:00 pm
Breakfast – President’s Hall 4	7:30am - 9:30 am
Welcome – President’s Hall 4	8:00am - 8:15 am
<i>Discussion Regarding Publication in the Peer-Reviewed Conference Proceedings</i>	8:30am - 9:30 am

Norman Sigmond, Kutztown University of Pennsylvania

Chairman, NABET Executive Board

Jerry Belloit, Clarion University (retired)

Vice Chairman, NABET Executive Board

Session 1: Room 104 **9:35 am – 10:35 am**

ACCOUNTING/FINANCE / MARKETING

Session Chair: David Latzko, Pennsylvania State University

The Role of Colleges and Universities in Bridging the Financial Literacy Gap

Sinead Gallagher

Juniata College

The goal of this proposal is to stimulate discussion on the role colleges and universities could/should play in bridging the financial literacy gap. This researcher is concerned about the gap and how it can be bridged through education. Financial literacy education has the potential to improve individual standard of living and reduce income inequality. Financial literacy is a critical life skill which, together with the benefits mentioned above, has a positive impact on the well-being of individuals. Nonetheless, only a handful of States have a state-wide requirement for a stand-alone personal finance course (Pennsylvania not being among them). Given the demographics of those attending colleges and universities, these students are likely to be higher on the financial literacy spectrum. Thus, the purpose of this research is to explore ways that we can reach individuals who are not in our classrooms. The hope is that the findings from this research (which will also include ideas generated by students) can propel us forward, as educators, to address this need.

Has Home Rule Resulted in Higher Taxes in Luzerne County, Pennsylvania

David Latzko

Pennsylvania State University

The budget-making powers of county governments in Pennsylvania are normally tightly constrained by state law. The state legislature imposes statutory rate limitations on property and other taxes levied by local governments. However, municipalities in Pennsylvania are allowed to adopt a home rule charter which shifts much of the responsibility for county government from the state legislature to the local community, including control over the structure and operations of county government. The state legislature specifically stated that counties and other municipalities adopting a home rule charter are not bound by the state legislature's maximum tax rates and may set rates higher than the limits provided in state law for real estate taxes and for personal taxes levied on residents. A major concern of home rule critics has been the potential abuse of local taxing powers. Opponents of the proposed Luzerne County home rule charter in 2010 argued that home rule would lead to higher taxes. Little research has been done on this question of the impact of home rule on county and municipal budgets in Pennsylvania. This paper will present a case study investigation on the effects of the adoption of a home rule charter on the taxes paid by Luzerne County residents.

The Blockchain Technology and Digital Marketing

Gerardo Eloy Soto Ruiz

Jeffrey Yi-lin Forrest

Xiaoxu Han

Ralph E. McKinney, Jr.

Anindya Chatterjee

Autonomous University of the West

Slippery Rock University of Pennsylvania

Baylor University

Marshall University

Slippery Rock University of Pennsylvania

This paper reviews the literature on blockchain technology in light of digital marketing. It also highlights specific characteristics of that technology that is revolutionizing business practices. We sorted through published research to identify patterns and associations between blockchain technology and digital marketing. The methodology of documentary research facilitates a broad view of the bibliography and systemic review of the literature. This paper presents applications of blockchains in different areas of business, such as financial services, supply chains, health care, tourism, and smart contracts to execute secure transactions on exchanges. Specifically, digital marketing is emphasized within the environment of social networks, such as Facebook, Twitter, YouTube, LinkedIn and Instagram. Based on the behavioral data of customers within social networks, this paper also describes the current state of digital marketing and its future trends. We conclude that blockchain technology will consistently influence future operations of digital marketing, social media marketing (including influencer marketing), e-commerce, and analysis of networks. Understanding the disruptive effect of this technology's potential on industries and people's lives can prepare the world to eventually embrace the technology in the years to come.

Session 2: Room 105

9:35 am – 10:35 am

ACCOUNTING/ECONOMICS/FINANCE

Session Chair: Joshua Chicarelli, PennWest University-California

Are Emily and Greg Still More Employable Than Lakisha and Jamal in Public Accounting Firms

Mark Anthony Nickerson
So-Jin Yu

State University of New York-Fredonia
State University of New York-Fredonia

According to the 2021 American Institute of Certified Public Accountants (AICPA) Trends Report, only 7% of new accounting graduates with either bachelor's or master's degree are Black, an unchanged statistic for the past 15 years at least, despite a number of efforts by the AICPA to increase diversity and inclusion among students enrolling in accounting programs across the U.S. Additionally, only 5% of new hires in the U.S. CPA firms were Black in 2020, representing a decrease from a high of 8% in 2007. While the industry presses for more Black students to enroll in accounting programs, is that enrollment the true remedy? Specifically, are Black graduates successful in the job hunt as compared to their White peers? This study seeks to evaluate the validity of this notion through primary research of accounting firms based on the 2003 landmark study. Are Emily and Greg more employable than Lakisha and Jamal? A field experiment on labor market discrimination, but within the scope of public accountancy.

Session 3: Room 106

9:35 am – 10:35 am

PEDAGOGY

Session Chair: Robert John O'Connell, York College of Pennsylvania

Student Engagement During Class time

Monica L. Law

Marywood University

Engaging students during class time is important for a variety of reasons. Ultimately, if students are actively engaged in the learning process, it can help promote a meaningful experience, and aid in the transfer of what has been learned into a practical real-world situation. This is important because, as educators, we are preparing students for the real world. It is important they have retained as much information as possible for the effective transfer of learning into that work environment. The purpose of this presentation is trifold: 1) Discuss why engagement is important, 2) Discuss strategies to promote engagement during class, and 3) Discuss the student perspective in what helps them stay engaged during class time.

Teaching Respect in the Business Curriculum

Robert John O'Connell

York College of Pennsylvania

The genesis of this paper was my evening review of the very first online discussion question assigned to my mostly-freshman principles class identify what the manager was doing 'wrong' to push you away from, or at least make you unhappy in your job. For many of those students, this was most likely the first short essay they had written in college. Several indicated that lack of respect was at least one of the motivators to them quitting a job. Later, in the classroom, where I could put faces to the responses, I noticed that a couple of students with that response were African-American students, just anecdotal and nothing I commented on. However, a day or two later I read and saw on TV a report about a local murder where the arrested suspect who was African American, stated to authorities that he shot the victim because he disrespected the suspect. Again, anecdotal, but it caused me to question if this concept of respect is much more important to different racial, ethnic, and cultural groups than it is to others. Understanding the importance, sensitivity, and significance of this concept may not only improve our teaching approach, but also, better prepare future managers and business leaders. Therefore, this exploratory research will explore the existing research and conclusions to determine if evidence supports my anecdotal observations, and if such research supports the need for greater coverage of this topic in business courses.

Session 4: Room 107

9:35 am – 10:35 am

FINANCE / HEALTHCARE

Session Chair: Jerry D. Belloit, Clarion University (retired)

Playing Tag Allows Student Athletes to Chase Higher NIL Profits

David Gargone
Donald Conway
Meaghan Kelly
Kyle Vandenberg
Ryan Vandenberg

Misericordia University
Misericordia University
Misericordia University
Misericordia University
Misericordia University

The implementation of name, image and likeness (NIL) practices has continued to impact the collegiate athletics industry, especially in terms of the recruitment of potential high school and transfer student-athletes. For these student-athletes, gone are the days of just considering academic majors, athletic facilities, and relationships with peers and coaches. Now, potential student-athletes need to consider their personal brand growth and earnings potential as part of this process. This study examines the opportunities for brand growth in this process and the impact university athletic departments and individual programs can have on potential student-athletes. An analysis of projected student-athlete NIL valuations and how athletic departments and programs influence these values was conducted.

Governmental Response to Surprise Medical Billing Practices

John Cameron

Penn State University

No surprise medical billing legislation affords states the ability to protect consumers from certain health care balance billing practices. Federal and state consumer protection laws now apply to situations in which unforeseen medical services are rendered by an out-of-network provider at an in-network facility. Balance billing practices apply to bills exceeding the amount of an insured individual's cost sharing requirements including copayment, coinsurance or deductible obligations. State intervention will need to be considered in light of existing insurance oversight that is reserved to the states. In response, states have begun to introduce legislation or executive actions to address the issue of surprise medical billing practices. The no surprise bill concept raises social concerns, insurance protections, consumer notice, disclosure, patient consent, access to care, equal healthcare, prohibitions, and compliance enforcement. Governmental authority and responsibility in matters of health insurance and managed care plans is essential in order to coordinate covered services, rate settings, plan methodologies and reimbursement obligations. Health insurance decisions are made in conjunction with health insurers, health care providers, employers, consumer advocates and the general public. Prior research to examine the variances in the policy making associated with medical balance billing legislation or executive action within the United States has been limited. To address this gap in the literature, this paper will examine surprise medical bill legislative trends including health care network adequacy, assignment of benefits, enrollee rights, payment of claims, cost sharing arrangements, dispute resolution process, consent to services requirements, and standardized methodology.

Session 5: Room 104

10:50am – 11:50am

MARKETING

Session Chair: John M. Zych, The University of Scranton

Itching for Better Service - Help Yourself

Audrey Guskey

Duquesne University

While there is an abundance of research on how a company can provide better service, there is little research on how consumers can get better service. This research is positioned from the consumer's view. How can a consumer get better service? The philosophy of the research, customers helping service providers, is contrary to popular belief. Most consumers believe that it is solely the job of the service provider to help them. Wrong! It is also their job to help the provider satisfy them. The research behind *Itching for Better Service? Help Yourself!* provides practical rules and tools for customers to get the service that they want. The author has been conducting research on customer service for over 30 years. This study collected and analyzed 1,548 stories from consumers which tell strategies of how they got better service. These stories morphed into ten ITCHES: WHICH? NICHE, PITCH, BEWITCH, HITCH, ENRICH, GLITCH, BITCH! SNITCH, DITCH & SWITCH. Within each of these are Service Rules for how to be treated like a favorite customer such as: What's it worth to you? Know your role. Tell your story. Act the part. Make a friend. Be out of sync. Stop the twitch. Complain right. Create a buzz, and Vote with your dollars. Each rule includes real-life stories from consumers that illustrate how that rule was used. The practical tools consumers used for putting each rule into practice are also included in the paper.

Teaching Students How to Incorporate an Emerging Segment in Marketing Strategy Formulation

John M. Zych

The University of Scranton

Developing effective marketing strategy requires accurate identification of emerging target markets. It is not sufficient to look at current market conditions; consideration of developing trends is paramount. For example, in the automotive market developing market conditions include new government incentive programs for electric cars that are conditioned on where the parts originate. Students were assigned a group project to develop a marketing plan and presentation for an assigned automobile model from a domestic or foreign manufacturer. Superficial consideration of target markets would explore consumer preferences for American heritage brands such as Ford and GM versus foreign manufacturers. Traditionally, automotive markets were delineated along these lines. A more sophisticated approach, however, would consider an emerging segment which looks beyond the brand name and where a vehicle is manufactured. Additionally, it would consider where the parts used in the manufacturing process are sourced as part of its decision-making process. For this segment, identifying an automobile as domestic or foreign is more complicated than looking at the brand plate on the vehicle. The conference presentation will use examples from a marketing strategy class to illustrate how to integrate current market conditions with emerging trends. Student reactions to the assignment also will be discussed.

Session 6: Room 105

10:50 am – 11:50 am

ECONOMICS/FINANCE

Session Chair: Jeffrey Yi-lin Forrest, Slippery Rock University of Pennsylvania

GDP and Monetary Policy

William Carlson

Duquesne University (retired)

In 1980-82 Paul Volcker solved the 1965-82 inflation problem with back-to-back recessions in 1980 and 1981-2, unemployment of 10.8%, and a Fed Funds rate of 20%. It was a "hard landing". Now Chairman Powell faces another bout of inflation with hopes of a squishy if not soft landing. The question is: Is it possible to stop inflation without having a recession. We have run some inflation regressions on money growth and interest rates without much success. But we have noticed that recession declines in GDP and increases in unemployment have led to inflation declines. Accordingly, we believe that inflation is affected by a chain of events running from money and interest rates to GDP to employment and then to inflation. It turns out also that other events such as oil shocks and the shipping traffic jam of the second half of 2021 affect the supply chain and increase prices. In this part of the paper, we look at how the relation of GDP to monetary policy changed around 1984 as well as the surprising persistence of energy problems. First, we look at how money and the Fed Funds Rate affect GDP, then how oil prices affect inflation. In Part 2 inflation is investigated.

Remarks on Production Possibilities Optimal Production Correspondence and Conditional Factor Demand

Jeffrey Yi-lin Forrest
Kurt Schimmel
Fen Wang
Ashkan Hafezalkotob
Jian Liu

Slippery Rock University of Pennsylvania
Slippery Rock University of Pennsylvania
Central Washington University
Islamic Azad University, South Tehran
Nanjing University of Science and Technology

By taking an axiomatic approach, this paper looks at several of the main results in the producer theory to see whether they hold true generally or only conditionally in light of a firm's value-belief system. By

employing the language and methodology of multi-dimensional Euclidean spaces, this paper derives its results without imposing those unnecessary conditions as widely done in the literature. By constructing counter examples, it can be shown that the optimal production correspondence is not generally homogeneous of degree zero; and it reestablishes several well-known results that hold true under very specific conditions in more general terms. At the same time, this paper elevates several other conclusions that are important in producer theory, such as Shepard's lemma, to much stronger versions. A few topics of expected significance are suggested for future research in the conclusion section.

Session 7: Room 106

10:50 am – 11:50 am

PEDAGOGY

Session Chair: *Linda Hall, State University of New York–Fredonia*

Comparing Student Learning and Course Evaluation Among Teaching Modalities Before and During the COVID19 Pandemic

Kuan-Pin Chiang

Central Connecticut State University

This study conducted a comparison of face-to-face, online and HyFlex teaching modalities in an undergraduate course taught by the same instructor over three semesters to determine if there were differences in student learning and course evaluations across modalities before and during the pandemic. The results show that teaching modality does not significantly affect student perception on the types of skills and knowledge emphasized in the course. Student grades and course evaluations, although online and HyFlex modalities, require students to put more effort and personal responsibility to accomplish learning objectives of the course. Neither modality was more effective than the other before and during the pandemic.

Primary Education Outcomes and Efficiency in Sierra Leone: Evidence from the Sierra Leone Integrated Household Survey

Elkanah Faux

Bowie State University

This paper investigates the factors that affect students' performance measured using literacy and numeracy in primary schools in Sierra Leone using data from the Sierra Leone Integrated Household Survey (SIHS). SIHS is the third income and expenditure survey of Sierra Leone collected in 2018 that gathers household members' characteristics on agriculture and consumption. The study differs from other studies that use completion rates rather than students' test scores in reading and math to measure educational outcomes. The developed model links reading and numeracy skills to a set of household-specific and socioeconomic characteristics of the pupils and how they affect primary education outcomes in Sierra Leone. The findings suggest that the Government can enhance the efficiency of the primary school system by providing qualified teachers and allocating more public funds to primary Education.

Session 8: Room 107

10:50 am – 11:50 am

TECHNOLOGY

Session Chair: *Joshua Chicarelli, PennWest University-California*

Public Policy Expenditures: IT Budgets

Carolyn LaMacchia
Scott Mehall

Commonwealth University-Bloomsburg
Commonwealth University-Bloomsburg

Establishing and maintaining a secure cybersecurity management policy is a challenging ongoing responsibility for all organizations. This need is particularly important to those organization where processing private personal information is integral to operations. Government municipalities of various sizes direct budget funding to various initiatives driven by the constituents that elected them to office. Some of the budget is directed toward Information Technology (IT) where cybersecurity protection is funded. How much attention is necessary to protect the services that are dependent upon IT? This research exams of trends in IT expenditures in publicly available budgets for a wide variety of municipalities.

Blockchain: Public, Consortium or Private

Carolyn LaMacchia
Scott Mehall

Commonwealth University-Bloomsburg
Commonwealth University-Bloomsburg

Although often associated with cryptocurrency, blockchain platforms are the foundation for a wide variety of applications. There are three distinct blockchain designs which differ by the parameters directing participation and the block verification process. With current attention on blockchain resources requirement and some unique cyber security threats, it is important to select the appropriate blockchain design when addressing the security sharing of information. This research describes the three varieties of blockchain implementations. It examines data on existing blockchain use cases to develop insight in industry trends to blockchain implementation designs.

Session 9: Room 108

10:50 am – 11:50 am

BUSINESS

Session Chair: *Adnan Chawdhry, PennWest University-California*

How Green is the Green New Deal

Jerry Douglas Belloit

Clarion University of Pennsylvania (retired)

This paper will look at the costs and benefits of an actual implementation of a solar home in Florida and a plug-in hybrid. The advantage of this study is actual primary data with actual real costs and real cost usage. This study will provide a cost-benefit analysis of the actual costs of implementing the solar system and its extension to the operation of a plug-in hybrid Ford Escape. The study will show that the Modified Internal Rate of Return on the Solar System projected conservatively to be 9.6%. The extra cost for the plug-in hybrid has a payback period of 4.59 years. The study points out several of the hidden assumption difficulties in doing an accurate cost-benefit analysis of implementing solar and EV solutions. It also points out the relative carbon footprints of various methods of energy production necessary to support implementation of Solar and EVs.

Employee Susceptibility to Social Engineering: A Conceptual Framework Using Demographics and Principles of Persuasion

Amy Washo

Marywood University

This presentation will discuss the theoretical and conceptual frameworks used to guide a proposed research study on social engineering susceptibility. Social engineering can be defined as the act of manipulating human beings, most often with the use of psychological persuasion, to obtain unauthorized access to systems containing data, documents, and general information that the social engineer should not have access to. There are several ways in which research studies can be planned and implemented and various lenses through which these studies are viewed. Specifically, a theoretical framework grounded in Cialdini's principles of persuasion is one way to better understand social engineering susceptibility in organizations. These principles can be used in conjunction with a cybersecurity framework to study whether those two concepts together influence whether employee demographics have an impact on social engineering susceptibility of employees in organizations. Graphical representations of the framework will be provided, and the specific framework developed by the researcher allows for flexibility for businesses of all types and sizes to use the framework as it best suits their business needs.

Is Self-Efficacy an Attribute or Skill of Professional Development

Scott T. Stroupe

Penn State University - Behrend

Controlled experimental and field studies support the conclusion that a person's belief in their capability to achieve a goal correlate to their self-motivation and action towards that goal. (Bandura, 1997, 2008b; Bandura and Locke, 2003). The strong association between self-efficacy and career choice (Betz & Hackett, 1986), job engagement (Han, Perron, Yin, & Liu, 2020), and perhaps even entrepreneurship (Boyd, Vozikis, 1994), makes it relevant to the objectives of professional development. This review of research focuses on whether self-efficacy should be addressed as a discreet skill to be taught in the context of a business school's professional development program.

Session 10:Room 104

1:10pm – 2:10 pm

ACCOUNTING/TECHNOLOGY

Session Chair: *John D. Grigsby, Thomas Jefferson University*

How to Avoid an IRS Audit

John D. Grigsby

Thomas Jefferson University

The recently enacted Inflation Reduction Act substantially increased funding for IRS audits and other enforcement measures. The Act provided funding for hiring 87,000 Revenue Agents to perform audits of tax returns. As a result of the Act, the chances of being selected for audit have increased significantly. IRS audits are extremely stressful, painful, time consuming and expensive. This paper discusses ways to avoid an IRS audit, what to do if selected for an IRS audit, and how to appeal a negative decision.

Cybersecurity Immunity: A Survey of Data Security Practices Among Tax Professionals

John D. Grigsby

Linda A. Hall

Thomas Jefferson University
State University of New York-Fredonia

Identity theft and data security have been an ongoing problem for the Internal Revenue Service and the tax profession. Although joint efforts by the Internal Revenue Service, Congress, and the tax community have been made to raise awareness among tax practitioners and strengthen data security across the tax industry, thefts reported by tax professionals to the Internal Revenue Service have risen each year since 2015. Identity theft and data security breaches can have a devastating effect on a tax professional's practice.

Maintaining and safeguarding confidential client information must be a top priority for every tax practitioner. The purpose of this research is to determine the Best Security Practices of tax professionals during the tax season of 2023. These practices should be considered for on-going professional and practice development, and in accounting curricula to support the sustainability of accounting practices in the face of future thefts and breaches. We hypothesize that many tax practices have unknown security weaknesses and are vulnerable to attacks and theft. We further hypothesize that a majority of tax firms underestimate the impact associated with the breach of data security. Lastly, we believe that firm characteristics influence preparedness and the level of risk tolerance necessary for sustained operation. This study evaluates data in terms of responses to survey questions posed by the research team to a sample of tax firms.

Session 11: Room 105

1:10 pm – 2:10 pm

PEDAGOGY

Session Chair: *Lisa M. Walters, State University of New York-Fredonia*

The Limitations of Career Centered College Curriculum: A Meso Economics Approach

Samuel Enajero

Bowling Green State University

No doubt, education is viewed as the acquisition of human capital that helps stimulate technology and socio-economic growth. Long-run economic growth is a function of innovations by economic agents who are carriers of new ideas. Employment and unemployment are short-run economic phenomena and may not lead to sustainable growth. Moreover, innovations for growth occur at a higher-order generic domain than employment that rises and falls at a lower operational domain. Based on Schumpeterian meso-economics analysis, social progress propelled by never-ending restructuring at the first-order rule is initiated by rule carriers of education for innovation. This paper argues that learning for innovation occurs in a higher domain, a different consciousness, than learning for employment for the sole purpose of routine operational tasks.

Effect of COVID19 on the Standardized Field Test Results for Undergraduate Business Students

Cheryl Moore
Rajkamal Kesharwani

Mercyhurst University
Mercyhurst University

Mitigating a global pandemic was certainly not at the forefront of planning for educators prior to March 2020. Educators were forced to move classes out of the classroom in a matter of days, while still offering students the level of education they expected and deserved. Students were expected to navigate online learning while working through various obstacles like poor and no Internet access, time zone differences and having family members in the same area. This challenged students mentally, socially, and psychologically as they were eventually required to return to campus but with one foot in the classroom and one foot remaining in remote learning. This empirical study examines the effects of Covid 19 on the Educational Testing Services Major Field Test taken by undergraduate students studying in the business department of one university in Northern Pennsylvania through analytics methods applied on data collected during a four-year period.

Session 12: Room 106**1:10 pm – 2:10 pm****BUSINESS / MARKETING****Session Chair:** *Michele C. Welliver, Susquehanna University***Antecedents and Outcomes of Privacy Concerns in a Retail Loyalty Marketing Context**Richard D. Kocur
Jeffrey M. BuckGrove City College
Purdue-Global University

Given the volume of information now being produced, gathered, and analyzed in marketing exchanges, information privacy is a growing concern among consumers and retailers alike. This research made use of an existing and validated model called Antecedents-Privacy Concerns-Outcomes (APCO) to assess the model's applicability in a retail loyalty marketing context. Data was gathered via a survey instrument administered to an online panel of loyalty card shoppers with a major United States grocery store. Structural equation modelling was utilized to analyze and interpret the relationships between the antecedents and outcomes of a concern for information privacy. Research findings suggest that privacy awareness has a direct impact on a concern for information privacy in a retail loyalty marketing context, regardless of age or gender. Furthermore, shoppers with a heightened concern for information privacy also exhibit higher privacy protecting behaviors. Results of this research extend the application of the APCO model and will help inform the decisions made by retailers regarding the privacy elements associated with their loyalty marketing programs.

The High School Sales Competition: A New Recruitment Tool for Professional Sales Programs

Michele C. Welliver

Susquehanna University

As undergraduate enrollment continues to decline, college choice is not just about where but whether to attend. Although recruiting high school students is the role of university admission departments, faculty are increasingly being asked to assist writing personal notes to prospective families, speaking on panels, and attending admission events. In this presentation, the discussion will center on how hosting an annual high school sales competition on a university campus can supplement current efforts and be a key recruitment tool. Because the competition is open to all high schoolers, students who may not have considered the school, or attending college, may visit campus. Testimonials from high school students, teachers, university faculty, and student volunteers will be shared regarding their experiences at the event. Also discussed will be follow-up survey data and admission statistics resulting from the competition. Ultimately, the goal of the presentation is to illustrate how the High School Sales Competition helps promote the Professional Sales program, recruit students, and gain buy-in from the campus community.

Session 13: Room 107**1:10 pm – 2:10 pm****BUSINESS/SPORTS MANAGEMENT****Session Chair:** *Norman C. Sigmond, Kutztown University of Pennsylvania***The Hidden Taxes of the Name Image and Likeness for Student Athletes**

Andrew Junikiewicz

Albright College

The National Collegiate Athletic Association (NCAA) and Pennsylvania Interscholastic Athletic Association (PIAA) have enabled collegiate and high school student athletes to monetize their Name,

Image, and Likeness (NIL). This recently added initiative will play an important role in allowing student athletes to build and market their brands with national, regional and local companies. This paper examines the tax consequences that student athletes need to consider in monetizing their NIL brands.

Is a Professional Athlete Property of the Team?

Norman C. Sigmond

Kutztown University of Pennsylvania

In professional sport, should the athlete be thought of as the team's property? In current practice, the team has the right to trade an athlete to another team as it might trade physical property. Also, the team, the seeming owner of the player (property) could have significant power over the player in terms of the player's athletic training, performance on the field, food, injury treatments and rehabilitation, rules for drug and other substance consumption and other seemingly personal aspects of the athlete's life. However, does this mean that the team owns the player as though the player were property? Since the inception of professional sport, this issue has been discussed and legally challenged via union contract negotiations and in the courts. Has the issue been settled? This article will explore the practical and legal aspects of this question by examining the most significant of the legal challenges.

Session 14: Room 104

2:30 pm – 3:30 pm

PEDAGOGY

Session Chair: *Mark Michael Capofari, Penn State University*

Mentorship for the Enhancement of Personal and Professional Development in the Transition from College to Early Careerist

David William Jordan
Peter Mills Eberle

Slippery Rock University of Pennsylvania
Penn State University

The importance of soft skills for those beginning their professional career is vital for early success. Individuals nearing the end of their college experience often have many of the necessary knowledge, skills, and abilities. However, have not accrued enough life experience to effectively employ these tools in the most effective manner with their peers who possess more job-based experience. Research suggests effective mentorship can help bridge this gap by helping individuals activate personal resources to achieve career goals in the uncertainty experienced by most early careerists (Dumulescu, Daniela & Sarca, Diana & Necula, Constantin, 2020). Other research suggests mentorship can improve self-efficacy and career adaptability for greater employability (O'Malley & Antonelli, 2016; James, 2019). Our research will examine additional evidence associated with mentoring and those entering the professional workplace. This study will build on other mentorship models, such as Bolton-King, 2022 and James, 2019, and will include developing a plan to study data post-graduation.

How Am I Doing? A Pilot Study of Consultative Grading as Performance Management

Mark Michael Capofari

Penn State University

Business educators receive considerable criticism for prioritizing theory over practice, leaving students under-prepared for the practical demands of real-world companies (Baldwin et al, 2011). This has led to a shift towards experiential education to strengthen the career readiness of business majors (Bghagra & Sharma, 2018; Niman & Chagnon, 2021). These efforts have begun to pay off. Employer surveys indicate noticeable gains in career readiness (Succi & Canovi, 2020), but a few challenges persist, including the ability of students to learn from feedback (Jose et al, 2022). Predominant assessment strategies in higher

education leave little space for constructive criticism and utilize practices that bear little resemblance to current best practices in performance management.

This paper will present the results of a pilot project that seeks to integrate consultative grading, a variant of un-grading or labor-based grading practices (Blum, 2020, Taylor, 2022) into a multi-stage, semester-long research project in an upper-division logistics management course. Consultative grading involves a continuing dialogue between the student and the instructor, with the student conducting a series of self-assessments that are then negotiated with the instructor. Participants will learn more about the challenges and opportunities related to the integration of new grading practices in business courses, such as consultative grading and evaluate the nexus between classroom-based assessment and corporate rankings that utilize performance management standards.

Session 15: Room 105

2:30 pm – 3:30 pm

PEDAGOGY/BUSINESS

Session Chair: *Lisa Marie Walters, State University of New York -Fredonia*

Embedding Crisis Management Modules in Business Core Courses

Robert S. Fleming
Michelle Kowalsky

Rowan University
Rowan University

During the past year, we developed and implemented crisis management modules in all sections of four business core courses. During the Spring 2022 Semester, over 1,350 students in 40 sections of these four business core courses experienced these innovative and timely learning modules. Our presentation will share our experience and the process that we followed which included a dedicated team of business school faculty and regional business leaders. This innovative project received an "RCB Dean's Choice Teaching Award" and has been recognized in an article in "AACSB Insights." This initiative is part of the commitment of the Rohrer College of Business to prepare our graduates for the many challenges that they will face throughout their business careers and is part of our commitment as a regional and national "thought leader" in crisis management.

Defending the Opposition: A “Hornswoggle” to Overcome Confirmation Bias

Al Warner

Penn State University

Cognitive biases are systemic lapses in rationality that lead to poor or incorrect decisions. These are usually attributed to intuitive or heuristic-based decision models versus more considered reasoning. One approach to helping people remedy this problem is through debiasing interventions or specific efforts to resolve a particular bias by forcing people out of reliance on heuristics and into deliberate reasoning. The debiasing technique described here addresses confirmation bias, or the tendency to seek out supporting evidence and not consider the alternative. Students are asked to develop a paper topic on issues in discrimination. Once they have chosen, the assignment is released which requires them to write their paper from the opposite perspective. It also requires critique of the argument they build and then to reflect on what could prompt them to make a similar cognitive effort in other topics. Supplemental material for the students includes discussions on identifying good sources and assumptions underlying issues like career choice or merit.

Reimagining the Introduction to Business Course

Lisa Marie Walters
Bret Wagner
Decker Hains

State University of New York-Fredonia
Western Michigan University
Western Michigan University

According to a recent survey, 54% of 18 and 24-year-olds perceive capitalism negatively (Manchester 2021). One mechanism to address this perception is through an Introduction to Business (I2B) course. Bordon (2016) provides that the first experience a student has with a course is critical in establishing expectations for a successful collegiate career. These courses provide a broad survey of business concepts to ready students for further business study and to also excite students in terms of the content (Borden, 2016). This research will provide insight into historical developments of such courses. It will track on-going improvements, including the use of gamification and simulation (Greenlaw and Wyman, 1973; Despeisse, 2018; Elliott et al, 2021), coupled with the use of reflection (Kember et al, 2000; Teach and Szot, 2019). It will deeply explore the use of simulation as it impacts business understanding along with a text accompaniment (Wagner, 2019), specifically focusing on a next generation simulation (NextGenSIM) Scrimmage (Nightingale, 2019; Haines et al, 2019). Two course designs using this simulation will be presented, one where the I2B course is mature, and the other which is in the early stages of implementation. Outcomes of the course designs will be discussed, comparing the results at the school where the curriculum was developed and is more mature, and the school that is less mature in its implementation. These results will center on student feedback. Recommendations for further development of the course will also be offered as well as opportunities for further study related to the curriculum pedagogy.

Session 16: Room 106

2:30 pm – 3:30 pm

SUSTAINABILITY

Session Chair: *Maung Min, Penn State University*

Starting a Business in the Second Half of Life

John Golden

Slippery Rock University of Pennsylvania

Conventional opinion suggests that younger persons are the most likely to start and build successful new businesses. Images of a young Bill Gates or Mark Zuckerberg seem to confirm this observation. Mark Zuckerberg, the founder of Facebook, was himself quoted as saying "Young people are just smarter." Yet the data seem to suggest otherwise. One study concludes that a 50-year-old founder is 1.8 times more likely to achieve upper-tail growth than a 30-year-old founder and that founders in their early 20s have the lowest likelihood of successful exit. (Azoulay, Jones, Kim and Miranda, 2020). If age does seem to predict success, may be different from what we think. This paper investigates some of the reasons why older entrepreneurs are successful and how an online peer-to-peer network of entrepreneurs in the second half of life can share resources and expertise to assist each other with successful startups.

Case Closed: A Mixed Methods Study of How Business Management Students Engage in Sustainable Decision Making

Maung Min
Laura Cruz

Penn State University
Penn State University

This interactive session focuses on the results of a six-semester study intended to foster sustainable decision making across multiple courses in the business management curriculum at one campus of a large, public, research-intensive university. Sustainability, simplistically, covers the pillars of economy, society, and the environment and requires one to make decisions by looking through these lenses, also known as

triple bottom line. Previous studies by the same authors had indicated that students in these courses struggled to achieve higher-order integrative thinking goals when working with the case method. While students could make connections across the domains of the triple bottom line, notably absent was evidence of synthesis, or the ability to bring together concepts across multiple domains in ways that are novel and adaptive. In other words, we wanted to enable them to make more compelling business decisions in a sustainability context. To foster these higher levels of integration, the instructor redesigned the course using a repeated concept-application-integration cycle. The implementation of this cycle served to providing students with repeated opportunities to practice integrating knowledge across multiple domains, culminating in their final recommendations for addressing issues that had arisen within a sustainable decision-making case study. A structured content analysis of these recommendations (n=122) reveal that students were more effective in integrating their knowledge, enabling them to articulate solutions that were more original, actionable, and, ultimately, sustainable.

Session 17: Room 107

2:30 pm – 3:30 pm

BUSINESS/TECHNOLOGY

Session Chair: Satish Mahadevan Srinivasan, Penn State University

Explainable AI and Trusted Corporate Distress Modelling in Zimbabwe

Louisa Muparuri
Nina Kajiji
Gordon H Dash
Victor Gumbo

University of Botswana
University of Rhode Island
University of Rhode Island
University of Botswana

Zimbabwe was once a thriving economy and considered Africa's food basket. However, years of industrial mismanagement and a depreciated currency have led to an economic collapse. Currently, Zimbabwe's *traded corporations* face financial distress and the possibility of delisting. This research fills the knowledge gaps in distress modeling in underdeveloped nations like Zimbabwe. Annual financial data for 2014 to 2021, inclusive, was obtained for the 61 companies listed on the Zimbabwe Stock Exchange (ZSE). Principal component analysis with Varimax rotation was conducted on the computed financial ratios to weight their significance to the objectives of the study. Next, we implicate a machine learning model by invoking a Bayesian enhanced regularized radial basis function neural network (K4-RANN). Estimated feature weights are combined to explain the probability of corporate distress. By incorporating a Softmax activation function and the Generalized Cross Validation error minimization rule the corporate distress model produced an *R-Square* of 99.28% and an Akaike Information Criterion (AIC) of -2292.54. Despite higher accuracy than models reported in extant literature, it is well known that machine-learning models often fail to interpret the rationale behind model weights and associated predictions. This study overcomes this research gap by expanding RANN results through an 'explainable AI' (XAI) investigation. XAI is implemented using SHapley Additive exPlanations (SHAP) to elucidate econometric model results. Game-theoretic SHAP values underscore the reliable explanation of why certain financial ratios (e.g., total assets to debt) are the most significant contributors when seeking to identify financial distress among traded firms in Zimbabwe.

Exploring the Potentiality of Recurrent Neural Networks for Emotion Classification

Satish Mahadevan Srinivasan
Shichu Chen

Penn State University
Penn State University

Textual data in the form of tweets, status updates, blogs, articles are being generated in a vast amount

through social media sites and blogs. These textual data are emotionally rich and are a good representative of emotions expressed by an individual or a group. Analyzing the emotions within these textual data can provide us with an idea about how an individual or a community communicate their thoughts and insights on any given topic. Various predictive analytic techniques are available to analyze the emotions within these texts. Widely used supervised classification techniques suffer from the imbalance in the training dataset thus failing to classify the emotional classes. Here, we have explored the potentiality of the deep learning classifier especially the different Recurrent Neural Network (RNN) architectures to address a six-class emotion (anger, sadness, happiness, surprise, love and fear) classification problem. By appropriately tuning the hyper parameters of the RNN classifier our study reveals that both the Long Short-Term Memory (LSTM) and the Bidirectional LSTM performs significantly better than a simple RNN classifier for a six-class emotion classification problem.

Session 18: Room 108

2:30 pm – 3:30 pm

BUSINESS/FINANCE

Session Chair: Cheryl Crespi, Central Connecticut State University

Does Sentiment Depend on Reference Level Evidence from Hong Kong Typhoon Signals

Jinghan Cai

The University of Scranton

Using the typhoon signal mechanism in Hong Kong as a natural experiment, we find empirical evidence supporting the expectation-based reference-dependent preference through sentiment created by days-off from typhoons. First, sentiment is experienced relative to a reference level: The stock market gains from likely day-off from looming typhoons and it is stronger than the holiday effect from weekends and public holidays. Second, the reference level is based on expectation: The market gains more under strengthening typhoon signals but less under weakening signals. Third, not-so-informative good news can be undesirable. The market drops under weak standby signals.

Falsification and Misrepresentation in Professional Credentials: Historical and Contemporary Issues in Credentialing

Cheryl Crespi

Central Connecticut State University

In the contemporary world, falsification of academic degrees and misrepresentation of academic credentials has become a wide-spread phenomena. Unfortunately, just as most of the public cannot distinguish an authentic painting from a forgery, many are unaware of the proliferation of the falsified academic degrees and professional credentials. One government office found that hundreds of federal employees had successfully secured federal employment despite false credentials. Universities and academics are not beyond such misrepresentations, and the accounting profession has engaged in public deception of some professional credentials. This paper explores the historical perspective of academic fabrication of credentials with a key discussion on falsification. The use of prominent examples of falsification help provide illumination to this ethical and moral dilemma.

BEST PAPER PRESENTATION*Session Chair: Lisa M. Walters, State University of New York-Fredonia***Management and Leaders Understanding Communication Dynamics: The Impact of Internal Communication on Satisfaction, Performance, and Motivation**

Joshua Joseph Beck

West Virginia Wesleyan College

The purpose of this survey research study was to address the reasons communications preferences of employees are often left unfulfilled. A questionnaire was administered to employees in four mid-sized companies located in the northeastern part of the United States. The researchers found that 178 respondents desire frequent, open, honest, and transparent communication from their organizations and supervisors. Furthermore, across measurements of managers and employees, men and women, baby boomers (approximately born from 1940 to 1964), generation Xr(s) (approximately born from 1965-1980), and millennials (approximately born from 1981-1995) indicate they want to know how their work tasks contribute to the organization. The findings of this study indicate that knowing the reason behind task assignments can create a favorable culture and positively impact job satisfaction, performance, and motivation. Moreover, understanding why the task existed between blue collar and white-collar employees is also significant. White collar employees had statistical differences from blue collar, indicating they desire more information about why they were assigned work assignments and how it impacts the organization. White collar employees were also more satisfied with their jobs than blue collar employees. Finally, baby boomers were statistically more satisfied with their jobs than millennials.

Friday October 21, 2022

Registration – Registration Desk	7:30 am – 12:00 pm
Breakfast – President’s Hall 4	7:45 am – 9:30 am
Welcome – President’s Hall 4	8:30 am - 8:45 am
<i>Discussion Regarding Publication in the Journal of Business, Economics and Technology</i>	8:45 am - 9:30 am

Norman C. Sigmond, Kutztown University of Pennsylvania

Chairman, NABET Executive Board

Jerry D. Belloit, Clarion University (retired)

Vice-Chairman, NABET Executive Board

Session 19: Room 104

9:35 am – 10:35 am

BUSINESS/PEDAGOGY

Session Chair: *Y. Bora Senyigit, King's College*

An Analysis of the Demand for Business Education

Kelly Terhune

West Virginia Wesleyan College

Tracie Dodson

West Virginia Wesleyan College

If purpose of a business is to meet the needs of the customer, and that customer is changing and decreasing in number, an analysis of the business practices and offerings is warranted. As academicians, it is easy to fall into the status quo in terms of mission and curriculum but as business schools, it is our responsibility to reflect on the market and purpose of our organization. This research looks at two strands influencing the demand for business education, the mission and purpose of our School of Business and the market demand for qualified professionals in the degrees we offer. An analysis was conducted to look for areas of alignment between current offerings and potential market growth or gaps. Data from the analysis can be used to make informed decisions about curriculum and course changes needed to prepare students for the job market. Results will be presented and a model for duplication will be shared including trend-projections, lessons learned and insights.

Incorporating Data Analytics into a Managerial Accounting Course: Students' Perception

Y. Bora Senyigit

King's College

Managerial accounting education is undergoing a transformation due to the advancements in technology, specifically the use of data analytics. Higher education institutions update their courses by incorporating data analytics into the curriculum. This study introduces the experience of incorporating data analytics into the accounting curriculum, specifically an advanced-level managerial accounting course at a small liberal arts college. When incorporating data analytics into a managerial accounting course, the goal was to teach the same content of the course in an innovative way using a new mindset. This new mindset is based on data analytics and critical thinking skills. The main purpose of this study is to explore students' perception of using data analytics in an advanced-level managerial accounting course at a small liberal arts college.

This study contributes to the discussion on how to incorporate data analytics into the accounting curriculum by providing students' perspectives.

Session20: Room 105

9:35 am – 10:35 am

FINANCE/MARKETING

Session Chair: *Tibebe A Assefa, Bowie State University*

It's Gameday in Pittsburgh: Creating an Artificial Neural Network to Predict Pedestrian Flow Rates to Restaurants and Bars

Bradley J. Congelio

Kutztown University of Pennsylvania

It is not surprising that restaurants and bars alike see considerably more business when the local professional team (NFL, MLB, NHL, or NBA) is competing at their respective nearby home stadiums. In fact, prior studies indicate that not only do NFL games, for example, increase sales by nearly 25-percent on any given Sunday, but restaurants employ upwards of 50-percent more staff during the in-season months. Building upon this understanding, this research uses visitor and demographic aggregation data drawn from anonymous mobile data to construct an artificial neural network that seeks to predict pedestrian flow to restaurants and bars in Pittsburgh, Pennsylvania on gamedays. To further strengthen the model's output nodes, additional information including distance from stadiums, individual game moneylines, team win percentages, day of the week, time of game, and historical weather data is merged on a per day basis with the SafeGraph information.

The Effect of COVID-19 Announcements on the US Stock Market

Tibebe A Assefa

Bowie State University

Sunando Sengupta

Bowie State University

Satina V Williams

Bowie State University

World Health Organization formally announced on 31 December 2019, that an unknown virus found in Wuhan City in China. On 20 January 2020, 282 confirmed cases of COVID-19 and 6 deaths reported from four countries, including China, Thailand, Japan and the Republic of Korea (WHO, 2020). On February 25, 2020 the Centers for Disease Control (CDC) announced COVID-19 heading to be pandemic. On the 11th of March 2020, officially, WHO declared that COVID 19 characterized as pandemic disease. The COVID 19 outbreak on global stock markets was staggering. In this study, the event study method is used to examine the impact of the COVID 19 out-break on US stock markets, specifically comparing the postdate volatility following three key dates: **1)** February 25, 2020; CDC's announcement, **2)** 11th of March 2020; World Health Organization's announcement, and **3)** March 13, 2020; Trump/White House's announcement. There have been other papers studying US market volatility following COVID-19 announcement dates, but this paper will uniquely try to gauge and compare how investors and US markets reacted differently following the three announcements. Our study will shade light on the investors' behavior or reaction to each announcement and which announcement have greater impact on the US stock market. We use DOW Jones and NASDAQ indices to investigate the US stock market. Furthermore, we will investigate to show if there was a lag in changes in investment behavior. We expect to find a stronger market volatility response to the days following Trump's declaration as compared to the previous two dates.

BUSINESS/TECHNOLOGY**Session Chair:** *Yi Li, Slippery Rock University of Pennsylvania***The Pandemic Effect on the Dunning-Kruger Effect in Principles of Economics Classes**

Yi Li

Slippery Rock University of Pennsylvania

Thuy Bui

Slippery Rock University of Pennsylvania

The Dunning-Kruger effect refers to the cognitive bias that people with higher cognitive ability tend to underestimate their performance and people with lower cognitive ability tend to overestimate. We collected data about students' performances and perceptions of their final exam in Principles of Economics class during three stages of the Covid-19 pandemic: Before (fall 2018, spring 2019), during (spring 2020) and after (spring 2022) to study the pandemic effect on the Dunning-Kruger effect. We first confirm the existence of Dunning-Kruger overall. We also find out that compared with the pre-pandemic, during the early stage of the pandemic, students are less likely to overestimate their performance; on the other hand, during the post-pandemic, students are more likely to overestimate their performance. However, the confidence of accuracy of students's estimate on their performance drops during post-pandemic compared with pre-pandemics.

Comparative Analysis of Factors Influencing Consumer Brand Choice and Switching Behavior in GSM Industry in The Gambia

Ansu Bayo

University of The Gambia

Abdou Karim Jallow

Slippery Rock University of Pennsylvania

In The Gambia, Global System for Mobile Communication (GSM) service was introduced by GAMCEL in 2001. The growth in The Gambia's mobile telecommunication industry within the past few years has led to intense competition requiring the four GSM operators to devise strategies back-up by customer focused policies. To stay competitive, operators develop competitive strategies with focus on factors that influence consumer brand choice and switching behavior. The aim of the research was to investigate the possible causes of customer behavior and choice regarding brand switching in the mobile cellular industry in The Gambia. Quantitative research method was used to collect data. A random sample was taken from a cross section of GSM users from the four operators within the West Coast Region and Kanifing Municipal Council. A questionnaire was designed and distributed among 200 respondents with 50 questionnaires for each service operator. Descriptive statistic and correlation analysis methods were used for analysis and interpretation of data through STATA 2013. The results showed that factors such as service quality, price, and customer service/care (independent variable) have significant impact on brand switching (dependent variable). Customer inconveniency has negative correlation with brand switching whereas price, service quality, customer service/care has positive significant correlation. The study concludes that GSM service operators should consider continuous improvement of their service quality, customer service and charge competitive prices to attract more customers and retain the existing one. Further work is required to extend the scope of the study to other regions of The Gambia.

PEDAGOGY

Session Chair: *Mostafa M. Maksy, Kutztown University of Pennsylvania*

Financial Statement Analysis Disruption: The Loss of Continuity Created by Accounting Principle Changes

A.J. Stagliano
Matthew T. Kelly

Saint Joseph's University
Saint Joseph's University

What happens when generally accepted accounting principles change? As a rule, impacted companies are required to restate the prior period's financial data so that there is reporting consistency. But, does this altered rendition of economic history do justice to longitudinal financial statement analysis and the needs of investors to see an authentic picture of business activity outcomes over time? The research reported on here is a case study closely focused on the significant disruption created by the accounting establishment's altering recordation and reporting of lease arrangements through promulgation of Accounting Standards Update 2016-02. Our empirical analysis of companies affected by this fundamental change in financial accounting principles encompasses a three-year study (2019-21) of all firms included in the Standard & Poor's 500 index for 2018. Comparative asset-activity and profitability metrics detail the abrupt series deflection in several standard financial statement analysis ratios.

Millennial Generation Perceptions on Sustainability

Shruti Gupta
Denise T. Ogden

Penn State University
Penn State University

Millennials are an important demographic with an estimated spending power of \$2.5 trillion/year. According to several sources, this population is highly concerned with sustainability and are willing to spend more with companies that embrace these practices. In this paper we present results of qualitative research based on in-depth interviews with millennial consumers concerning their knowledge and perceptions of sustainability. The goal of the research is to uncover perceptions on sustainable business practices and attitudes toward companies with sustainable business models.

Is Free Cash Flow Helpful in Investment Decisions? The Case of the US Utilities Industry Sector

Mostafa M. Maksy

Kutztown University of Pennsylvania

The purpose of this study is to identify the accounting definition of free cash flow (FCF) that is the most helpful to investors in the Utilities companies. The results would help retail investors make better decisions and may encourage accounting standards setters to require the Utility Industry Sector companies to use a specific definition of FCF to enhance comparability. Using correlations and multiple regression analysis on a sample of 3,352 observations covering the 30-year period from 1988 to 2021, the author concludes that FCF information is not helpful in investment decision-making with respect to the Utility Industry sector. This result is in agreement with some prior research in the literature review.

Session 23: Room 108**9:35 am – 10:35 am****BUSINESS/FINANCE****Session Chair:** *Eric L. Blazer, Millersville University of Pennsylvania***Catholic Colleges: “At Risk” Before the Pandemic**

Michael J. Gallagher

DeSales University

The financial realities of higher education override many of the commitments that institutions make to the various potential missions of a Catholic University. Small regional tuition driven catholic colleges follow the demands of the customer and the higher education landscape. The best response for any given institution will depend greatly on how other institutions change behavior (Grawe, 2018). The elite universities use their endowment to spend more money per student as compared with the smaller tuition driven colleges. Many of these colleges are also building an impressive physical plant with the elite colleges using donations and their endowments as compared to the small tuition driven universities using debt financed bond issues. Catholic Colleges and Universities are also facing financial risks because of the narrowing enrollment pipeline from Roman Catholic K-12 enrollment. This enrollment fell by 6.4 percent in the fall of 2020 (Seltzer,2021). This paper provides an analysis of the financial position and results of operations at selected catholic universities. The study uses a random selection of thirty catholic colleges originally broken into three tiers based on endowment. The study included the fiscal years ending June 30, 2018, June 30, 2019 and June 30, 2020. The 990 tax forms for these years were used to create the summary table.

Session 24: Room 104**10:55 am – 11:55 am****ACCOUNTING/FINANCE****Session Chair:** *Sunita Ahlawat, The College of New Jersey***A Preliminary Analysis of Open Web Payments**Andrew Mangle
Adetunji OduduwaBowie State University
Bowie State University

The world wide web is an amalgamation of content and services. The Interledger protocol proposes a novel paradigm for open payments and supports near-instant reconciliation to support web monetization. The research explores the technology protocol and open web payment architecture to enable web monetization, specifically content creators, through existing platforms and business models. Various open web payment protocols are analyzed to highlight differentiating features to offer literature supported critiqued to aid firm-level strategic opportunity. This research evaluates opportunities and challenges addressed through available web payments and explores the specific use case of content creators using open payments. A systematic literature review and software analysis explore open payment systems.

The Bayer Acquisition of Monsanto

Bruce Alan Kibler

Gannon University

This paper analyzes one of the most expensive takeovers in German history, the acquisition of Monsanto by Bayer. The strategic considerations that led to this takeover are examined, as are the high legal risks that were accepted to push the deal through. The lobbying activities carried out by Monsanto and their impact on the takeover by Bayer are also considered. Furthermore, the importance of corporate

governance and the role of controlling in mergers and acquisitions are examined.

The Public Accounting Oversight Board PCAOB at Work – An Inspections and Enforcement Update

Sunita Ahlawat

The College of New Jersey

In this study, we review the Public Company Accounting Oversight Board (PCAOB) inspections and enforcement actions for eight firms (Big-4 and four second-tier firms) from 2009-2020 to assess the level of regulatory oversight and whether the scrutiny seen in the early years is maintained. Inspection reports identify audit deficiencies in a firm's audit which may also reflect the audit quality. Through inspection reports, we analyze the number of audit deficiencies, the nature and severity of these deficiencies, the financial statements impacted, and whether there are any recurring deficiencies. The PCAOB utilizes enforcement actions such as fines to encourage compliance. We analyze the amount and severity of consequences through enforcement actions. Our analysis revealed a gradual decrease in the percentage of audits showing deficiencies, the severity of deficiencies, the number of firms that fail to address quality control criticisms satisfactorily, and the extent of enforcement actions. In addition, we identified common weaknesses related to the same recurring auditing standards and noticed a downward trend in the frequency of occurrence. The downward trend may suggest that, over time, there has been an improvement in the quality of audits. However, whether it is truly a sign of improved audit quality or perhaps a diminished appetite for regulatory oversight on the part of the PCAOB is debatable. The results do not indicate a significant difference between the Big-4 and Second-Tier firms regarding PCAOB inspection findings and enforcement actions.

Session 25: Room 105

10:55 am – 11:55 am

BUSINESS/MARKETING

Session Chair: *Shahriar Gias, Slippery Rock University of Pennsylvania*

Influence of Personality Traits on Marketing Students' Intent to Pursue a Sales Career

Gary Chao

Kutztown University of Pennsylvania

College advisors help students meet the degree requirements as well as identify their career directions. Here we tried to identify marketing major students who are interested in a sales career. Peltier et al. (2014) developed twenty-two questions to construct the Intent to Pursue a Sales Career (ITPSC) instrument where there are four factors: perceptions of (1) sales ethics, (2) the sales profession, (3) sales knowledge, and (4) salespeople. These intentions can be cultivated through our Marketing education. Meanwhile, we believe their own personality traits may play the role to drive those intentions to seek for sales career. Big 5 personality traits are widely studied in verbal descriptions, personal health, group dynamics and the career choices etc.. We want to see the correlation between ITPSC and Big 5 personality traits. We found that three traits, Extroversion, Openness, and Emotion, correlate with students' intent to pursue a sales career. These findings converge with research on sales career success regarding the first two traits but diverge from existing research regarding the third trait.

Agile Salesforce for a Post-Pandemic World

Shahriar Gias
Justin Proskin
Rachel Beatty

Slippery Rock University of Pennsylvania
Slippery Rock University of Pennsylvania
Slippery Rock University of Pennsylvania

Drastic changes in the workforce and economy throughout the pandemic have forced marketers to find new tactics to be successful. The objective of this paper is to emphasize the various facets of agile salesforce for business-to-business marketing. The focus here is to explore the types of changes that can affect the salesforce. Furthermore, marketing agility in relation to salesforce agility, and how it empowers the workforce, is discussed. Marketing agility refers to the necessary changes a workforce makes to conform to its new environment. This summary focuses on a strong foundation of the business so they can pivot as necessary. It is about putting the customer first and responding to change agilely. Business to business marketing is all about building long-term relationship. The authors focus on the internal relations that a business needs to adopt to be a successful agile workforce. They focus on the top down, where C-Suite leadership needs to provide the proper leadership and resources for their employees. The authors highlight these various sales outcomes behavior in respect to sales agility.

Session 26: Room 106

10:55 am – 11:55 am

PEDAGOGY

Session Chair: *Denise T. Ogden, Penn State University*

Importance of the Equity-Minded Syllabus

Denise T. Ogden
Eileen Grodziak

Penn State University
Penn State University

The syllabus is often the first point of contact that a student has with an instructor. Syllabi are often seen as contracts between students and faculty and serve to record what will be covered and how students will be evaluated. Syllabi can also communicate the tone of the course and how the faculty member supports students. An equity-minded syllabus review is needed to promote inclusion, especially for first generation and minority students. This type of syllabus sends a message to students that they will be supported. The importance of the syllabus in setting a welcoming tone and tips on how to revise the syllabus to make it more equity-minded will be discussed.

Promoting Grassroots Entrepreneurship and Innovation as the Drivers of Economic Success

Mengsteab Tesfayohannes

State University of New York-Farmingdale

The paper will focus on critical inquiry and the diagnosis of anecdotal facts more broadly. Based on this backgrounder discourse, we will construct a conceptual Eco-system. The objective of the Eco-system is to serve as a helpful reference for the developing nation's developmental endeavors. Our paper will depend on the relevant secondary data extracted from a variety of sources for the construction of the Eco-system. Our discourse will emphasize the elements of the Eco-system to reflect the vital elements of the developmental process. We believe that our paper will make a marked contribution toward effective learning from the successful nation-building experience. The paper will focus on Eritrea as a case point. Eritrea is a small developing country located in the Horn of Africa. Eritrea, as a potentially endowed

country, can achieve faster and more sustainable development by learning from Singapore. Our paper will also attempt to provide helpful recommendations. The paper has a limited scope. Nation-building is a formidable task and requires dedicated efforts. We expect that our research will contribute to this noble objective by providing recommendations. There is proverbial saying: Those who make it best should enlighten you and those who made a mistake should advise you. Emerging nations like Eritrea should foster their commitment by building the ability to enhance their developmental process by learning from other successful nations.

Session 27: Room 107

10:55 am – 11:55 am

PEDAGOGY

Session Chair: Rhonda S. Clark, Slippery Rock University of Pennsylvania

Collaborative Learning Taxonomy: A Practical Guide for Higher Education

Natalie Dick
Sharon Melincavage

Slippery Rock University of Pennsylvania
Slippery Rock University of Pennsylvania

This presentation proposes a taxonomy for collaborative learning that transforms individual, siloed learners into interdependent teams. While Dick et. al. (2022) defined attributes and competencies essential for this transformation, there remains a need for practical guidance that defines learning outcomes for these attributes and competencies, along with instructor approaches for achieving each of these outcomes. The taxonomy for collaborative learning seeks to address this need and presents learning outcomes and instructor approaches for the three attributes of collaborative learning: Identity, Diversity, Interdisciplinarity and Heterogeneity; and the four competencies for collaborative learning: Professional communication, Problem-solving, Conflict resolution and Accountability. The taxonomy is organized into three levels. For attributes of collaborative learning, these levels are categorized as awareness, capacity building, and leadership. For competencies of collaborative learning, these levels are categorized as understanding, connecting and creating. Each of these levels correlates with progressing complexity, length, and integration of collaborative learning teams, working toward student learning outcomes that are self-managed, sustainable, and interconnected using a team mental model, co-regulation and team leadership.

Using the Superior Learning Design Model SLDM to Engage Students in an Online Business Management Class

Jennifer Nightingale
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In our effort of attempting to connect with students in a virtual setting, we are tempted to simply translate what we do in the classroom into an online medium, such as lecturing for 50 or 75 minutes via Zoom. Research shows that people are unable to maintain focus for more than 10 to 15 minutes at a time. Thus, we need to utilize best practices for online facilitation that create high-quality connections. This can be accomplished by using the Superior Learning Design Model (SLDM).

PEDAGOGY**Session Chair:** *Amit Mukherjee, Stockton University***L&T Tools for the “New Normal”: Learning and Teaching after COVID**Miguel R. Olivas-Lujan
Sergio Madero GómezPennWest University-Clarion
Tecnologico de Monterrey

While we cannot yet claim to be living post-COVID times, most universities and other institutions of learning in the United States have resumed face-to-face activities by the end of the 2021-22 academic year. But after more than two years of remote, hybrid, masked, and other modes forced by the COVID-19 pandemic, it is becoming increasingly clear that a new normal is emerging for learning and teaching. This research is about how the COVID-19 pandemic has affected learning and teaching in the business disciplines, at the university level. I will summarize findings through an andragogically-oriented presentation that includes Zoom-based and other strategies designed to serve university students, faculty members, and other relevant stakeholders during difficult and unexpected times such as the ones we have recently experienced. Findings from this investigation should prepare its audiences for future emergencies using an evidence-based grounding. The presentation will include (1) basics of business education we should not forget (e.g., active learning, backward design, compassionate teaching approaches), (2) recently popularized strategies (e.g., Zoom breakout rooms, Kahoots, Pecha-Kucha, virtual field trips, and other remote-learning technologies), and (3) imagining new possibilities (e.g., added flexibility for non-traditional students, for-credit inclusion of activities within business courses, new technologies including artificial intelligence, instant messaging, etc.).

Politics, Polemics and Public Policy: Weaving Non-Market Strategy into the Business CurriculumAmit Mukherjee
Naz OnelStockton University
Stockton University

Businesses are increasingly affected by changing regulations, activist pressures, media scrutiny, and government policies. Thus, mastering solely markets and market situations are no longer enough. For large transnational companies, market success very often depends on how effectively they navigate their non-market environment of governments, interest groups, activists, and the public. And non-market strategy includes both benign (or ethical) corporate social responsibility/sustainability issues as well as the more instrumental (or amoral) corporate political activity issues in pursuit of the profit motive. In this paper, we contend that representative undergraduate curricula in Schools of Business pay inadequate attention to non-market strategy considerations. This underexposure leads to business graduates underestimating the role of non-market strategy. However, to be successful, these students must not only understand but also be equipped to apply non-market strategy considerations to the challenges businesses face today. They need to be more rigorously exposed to the relationship between business and its variety of non-market shareholders-including the government, social movements, media, and activists to prepare them to develop and implement non-market strategies. We believe business educators can serve students better by developing curricula that emphasize the importance of non-market strategy to market success. In the remainder of the paper, we 1) review representative curriculum content of 60+ AACSB-accredited undergraduate business programs, 2) discuss the educational goals that are met by integrating nonmarket strategy into the curriculum, and 3) provide recommendations on how to integrate non-market strategy considerations into the business curriculum.

FINANCE/SUSTAINABILITY*Session Chair: Lisa M. Walters, State University of New York-Fredonia***Of Course I Recycle: The Case of Dormitory Dwellers' Dirty Secret**

Lisa M. Walters

State University of New York-Fredonia

Taylor J. Lemiszko

State University of New York-Fredonia

Christopher A. Shepp

State University of New York-Fredonia

Linda A. Hall

State University of New York-Fredonia

As the world grapples with climate change and organizations institute efforts to reduce their negative impact on the environment, this case study provides insights into key causes that limit participation in recycling activities. Although this case explores recycling on a college campus, the findings suggest that these efforts can readily be evaluated and implemented in a variety of organizational settings. Because recycling tends to rely on individual behavior, the remediations suggested seek to modify behavior. This study's ultimate goal is to provide proposed remediation efforts to improve recycling in collegiate residential dormitory settings, with strategies readily applicable to other organizations. It begins by defining the problem of recycling efforts at the college under study and the goals of remedial actions. Quantitative and qualitative measures are taken to understand the current state of recycling efforts in on-campus housing. These measures are analyzed using statistical quality techniques to facilitate the identification of key causes undermining recycling efforts. Subsequent improvement actions and control features to improve recycling efforts are presented. A risk assessment of improvement actions is conducted, and mitigation strategies are identified.

More than Book Knowledge: Financial Literacy and Habits of College Students

J. Christian Ola

PennWest University – California

Ramin Hajave

Butler County Community College

Mark Zorn

Butler County Community College

Joshua Chicarelli

PennWest University-California

Mattie Sloneker

PennWest University-California

This paper analyzes the influences impacting college students' decisions related to banking accounts, investment accounts, and spending habits. Additionally, we measured students' perceived knowledge compared to actual financial literacy knowledge using FINRA's financial literacy assessment. Our results indicate that an overwhelming majority of college business students mirror their parents' behaviors when selecting a bank and bank products. Additionally, the majority of students are confident in their financial literacy, yet the results from the survey indicate that they are not familiar with the concepts of inflation, interest rates, and diversification. Using Welch's t-test for unequal variances, results from a basic finance or financial literacy class significantly improve scores for questions related to inflation and also for bond yields/prices for all student populations, suggesting that colleges should consider adoption of such programs for all students.

ACCOUNTING/PEDAGOGY

Session Chair: *Mengsteab Tesfayohannes, State University of New York-Farmingdale*

Alternative Investments Regularity and Fund Performance

Kaveh Moradi Dezfouli

Merrimack College

We use mutual funds' portfolio disclosures to study how fund performance is affected by regular investment in alternative securities. Mutual fund managers have a variety of securities at their disposal to choose from when they devise their investment strategy. These securities are not limited to equities and bonds, rather they include securities such as options, futures, indices, and other funds. Fund managers who regularly choose to invest in investment alternatives may do so because they have superior information, investment capabilities, and knowledge. Furthermore, these investment alternatives can allow the fund manager to better manage risk and achieve the desired portfolio more efficiently. We find that only some fund managers regularly chose to invest in these investment alternatives as they report in their portfolio disclosures. Moreover, our results indicate that fund managers who regularly choose to invest in some alternative securities show superior performances. We attribute fund managers' choice to regularly invest in alternative investment options to fund managers' superior investment knowledge enabling them to successfully manage more complex investments options.

Codification Research and Memo Writing in a Financial Accounting and Reporting Course

Sean Andre

West Chester University of Pennsylvania

Joy Embree

West Chester University of Pennsylvania

The Association of International Certified Professional Accountants (AICPA) has a core competency framework that suggests skills important for all accounting majors entering the profession. However, accounting curriculum often requires inclusion of so much technical knowledge that it can be challenging to devote class time towards development of these other skills. The purpose of this paper is to provide an overview of a series of research assignments given to 165 students in the Intermediate Accounting course over three semesters and seven sections. The assignments required students to use the Codification to research an answer to a client's accounting questions and answer the questions by writing a memo. This assignment had the advantage of supplementing required content while taking little time away from lecture. Surveys distributed to students show that generally, students reported these assignments increased their confidence in writing memos, searching through the Codification, and summarizing their findings.

Special Treatment of Politically Connected: Evidence from China

Kaveh Moradi Dezfouli

Merrimack College

In this paper, we examine whether political connections can influence the performance of publicly traded Chinese firms. Specifically, we focus on so-called special status (ST) warnings that are imposed on firms after two consecutive years of losses, as well as the likelihood of being accused of fraud by the China Securities Regulatory Commission (CSRC). Our results show that political connections can help reduce a firm's risk of receiving an ST warning and can even increase its probability of reverting back to normal trading status. In addition, we find that politically linked enterprises are more likely to be accused of fraud. Our results highlight the importance of political connections in business activities and shed light on the potential dark side of this form of external support. While firms can greatly benefit from their relationship with the government, it does not necessarily mean that connected companies enjoy healthy operations or promising future development. These firms may recover after periods of negative earnings, but they also exhibit a greater likelihood of financial misconduct and/or related government investigations.

SPORTS MANAGEMENT/BUSINESS**Session Chair:** *Ronald Dick, Duquesne University***When Did We Go from Ha You Are a Scalper to Hello Partner?**

Ronald Dick

Duquesne University

The professional sports teams and in particular Major League Baseball (MLB) have changed their perception of the secondary market. Why has this occurred? If you price the primary market correctly, the secondary and third marketing should take care of itself. How did Stubhub and MLB relationship evolve? The team attitude of dealing with scalpers has gone from trying to limit them to encouraging them to sell on the secondary market. As Scott Loft Executive VP of Sales for the Oklahoma City Thunder said, “We not only allow our season ticketholders to sell their tickets on the secondary market, we encourage it.” We don’t expect a fan that buys a 41 home game season ticket to attend each and every game. The fans need an outlet to sell their tickets and the secondary market such as ticketmaster, StubHub, SeatGeek, and Tickpick provide it.

The Future of Ethics at Work: A Comparative Analysis of MBA Students and Current Employee Perceptions

Tracie Dodson

West Virginia Wesleyan College

Josh Beck

West Virginia Wesleyan College

The study and research of ethics in the workplace have been ongoing for years. The changing ideas of morality, the evolution of employment laws, and society have influenced perspectives. Although business schools and faculty teach the art and science of ethics, identifying the potential future frameworks and morals of organizations and employees is fascinating and challenging to predict. The latest ethical developments are something that organizations, management, and society should be aware of and monitor. In an attempt to ascertain the direction of business ethics changes in the near term, this research sought to identify potential trends stemming from graduate students’ attitudes in the Master of Business Administration (MBA) program compared to existing employees. Students currently enrolled in an MBA program were surveyed to determine their perception of organizational culture, willingness to speak up about ethical issues, formal ethical programs, supportive ethical environments, and current and future ethical issues (including COVID-19 responses). This data was then compared to the Institute of Business Ethics 2021 Ethics at Work survey findings. Results of the data correlations will be presented and an opportunity for discussion and survey expansion will be provided.

TECHNOLOGY

Session Chair: Osman Suliman, Millersville University of Pennsylvania

Capital Accumulation Education and Innovation in China

Osman Suliman

Millersville University of Pennsylvania

This paper investigates the ability of human Capital (education) to innovate by substituting physical capital, and the extent of disposability of raw (un-skilled) labor in China. Little is known about how reliable and consistent estimates of the extent to which various Chinese regions have benefitted from macroeconomic growth, where China has moved toward a socialist market economy. China's transition to a socialist market economy has been, carefully designed where the gradual emergence of self-governance in rural China has been promoted by the state to regain the governability that it had lost during the economic reform. This paper shows that the effects of Chinese capital accumulation are consistent with predictions of the neoclassical growth model, except that China's human capital has a substantial role in raising productivity, unlike the neoclassical focus on physical capital accumulation.

Evaluating User Perceptions of Privacy for Internet of Things (IoT) Data

Adnan A. Chawdhry

PennWest University-California

Karen Paullet

Robert Morris University

Technology has become an integral part of our lives and users have increased adoption of internet-enabled devices. These devices track and record data that many users are unaware of the granularity of the data collected. This study evaluates the users' perceptions of data that is collected by smart devices and the responsibilities of organizations to safeguard this data from breaches and sale to third parties. Users were presented a survey and the results were analyzed in SPSS to determine the how important privacy is the participants and what conditions would result in the participants forgoing privacy for some perceived benefit. Overall, participants would forgo their privacy in favor of health-related benefits and those which would improve the user interface of applications. Additionally, participants were asked to identify their affiliations with social media sites and their active involvement with these social media platforms. Lastly, the researchers assessed different variables to find statistical correlation.

Explainable AI and the Neuroethical Determinants of Disease States in Sovereign Healthcare Accessibility: A Case of Southeast Asia

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University of Rhode Island

Gordon H Dash

University of Rhode Island

Miriam Dash

Wayne State University

For any nation, modeling healthcare accessibility involves a complex set of measures rooted in the ability of individuals of all ages to receive healthcare, especially for those with demonstrated anxiolytic effects. Over the past decade, nations in Southeast Asia have expressed a determined commitment to advancing healthcare equity. But the COVID-19 pandemic, among other factors, slowed and then disparaged advances in health outcomes. With a flattening of the COVID-19 curve, sovereign decision-makers now seek to accelerate and spread the ethical delivery of healthcare equities. Our study seeks to identify the determinants of chronic disease states and the ethical issues raised by the increased and improved brain modeling as the process relates to influencing healthy human behavior. The models presented in this study are globally generalizable, but the experimental data is obtained from the U.S. Center for Medicare and Medicaid Services (CMS). Accordingly, we invoke a multivariate radial basis function neural network with

regularization and Bayesian enhancements to estimate error-minimizing classification. AI model bias and trustworthiness are answered by applying explainable AI (XAI) SHAP values.

Conference Concluded

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