CALCULATING RISK OF FAILURE OF STRATEGIC IT PROJECTS
WHAT IS PROJECT SUCCESS AND FAILURE?

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ABSTRACT

Information technology (IT) has shown itself to be both essential to business and a potential bankrupter of business. While research originally showed no relationship between IT spending and business profitability or productivity, subsequent research clearly shows a positive relationship since the advent of the Internet. However, the statistics regarding IT project success are still abysmal, with less than 20% of IT projects achieving their objectives within the original budget and timeline. Several studies have tried to quantify the return on IT projects, but so far all proposals have major problems that prevent them from being used in a practical setting. I propose a more experiential mathematical model, applicable in a practical setting, to assess the success or failure risk of any IT project prior to major expenditure.

INTRODUCTION

The success or failure of a business can be caused by many things. Those who study leadership identify leadership as the essential ingredient. Those who study planning identify strategy and tactics as the key issues. Those who study financial management feel that proper financial management is critical, and those who study sales and marketing would say that these are the fundamental issues. Those who manage information technology will cite its imperative. Risk management experts will say that risks of failure in any of these domains can be quantified. Project managers will state that high quality project management is the vital ingredient. Decision science authorities will cite the decision process as the crucial concern.

To the authors of this document, the real imperative is not any one aspect of these issues, but rather the necessary integration of all of these issues. We feel that an interdisciplinary approach is imperative in finding the truly critical factors in the success or failure of a business project, and by its extension, the business itself. Furthermore, while ground-breaking work in recent years has done a tremendous job of uncovering the seeds that distinguish businesses that have been "built to last" and transformed themselves from "good to great"(J. Collins, 2001; J. C. Collins & Porras, 1994) there is still a paucity of research for those one level down from the senior leader level on exactly how to ensure successful strategic projects within a company. Furthermore, almost all strategic projects involve some kind of information technology - a relatively new discipline necessary in business today, often the cause of complicating complexity.

No one can propose that all this convolution can be represented and simply solved within a mathematical equation. Nonetheless, the introduction of a calculated index that can increase the chances that any particular business endeavor will be successful rather than a failure - that would be a valuable addition to the overarching domain of knowledge.

Mathematical Representation of Other Fuzzy Domains

There have been many different domains of "fuzzy" knowledge, (called fuzzy because of the integrated human element), that have been usefully represented within mathematical formulas. In many cases, the domain is very specific and limited. A formula to calculate the chances of success that dangerous goods will be successfully transported on a railroad has been developed (Gheorghe, Birchmeier, Vamanu, Papazoglou, & Kröger, 2005). A heuristic has been developed that will identify how to allocate graduate assistantships or how to make sure kids get a fair chance to play baseball (Vasko, 2001; Vasko, 2003).

But mathematics can also deal with life and death. In 1759, Jonathan Dickinson and Gilbert Tennent established the Corporation for Relief of Poor and Distressed Widows and Children of Presbyterian Ministers, the first life insurance company. Life insurance must accommodate dozens of difficult contingencies such as employment, health, marriage, retirement, lifestyle (Keyfitz & Rogers, 1982). Yet, an entire industry and field has arisen out of the continued attempt to mathematically

quantify human life events such as disability and death (Jones, 1948).

In 1958, engineer Bill Fair and mathematician Earl Isaac invested $400 (each) in a new company, Fair Isaac, which would mathematically calculate the likelihood that any individual person would pay back a loan(Wozniacka & Sen, 2005). Today, the FICO credit rating score is calculated and published on billions of people and used by millions of companies every day.

The credit score is designed to measure default risk over long investment horizons(Altman & Rijken, 2005). Research on the credit score and how it is used in business continues today (Cantor, 2004). Probably the domain that is closest to the problem of success or failure of a business project is the FICO credit scoring. Some researchers claim that credit risk is actually dependent upon the economy (Elizalde, 2005). Some claim that personality is the dominant dimension in credit and financial planning behavior (Camp, 2006). Individual scores combine into portfolios that are then - also - managed mathematically (Rösch & Scheule, 2005). Furthermore, credit scoring can be altered to adjust to a changing environment (Tsaih, Liu, Liu, & Lien, 2004). Their predictive abilities can be improved by including non-financial factors as well as financial factors (Grunert, Norden, & Weber, 2005). Various software tools have been developed to calculate them to support the credit officers making credit decisions and managing credit portfolios (Ranson, 2005). And when the Federal Trade Commission proposed that credit score calculation methods be made public, it caused an uproar in the industry - especially by the credit bureaus that felt the calculation methods should be private and proprietary (Fickenscher, 1994).

While the detailed mathematical calculation for your credit rating is a proprietary secret of the Fair Isaac company, a simplification of the equation is described in Figure 5.

35Payment History +15Length of Credit History + 10New Credit + 10Types of Credit Used + 30Amounts Owed = Credit Risk Index

Figure 5. FICO Score formula - paraphrased

Like the FICO score, the risk of any particular technology project can be calculated by identifying the primary factors that influence project success. There are two underlying questions that must be answered to accomplish this. What is project success? What are the factors that determine that success? Once those questions are answered, the next task would be to identify a way to validate the model. This paper is designed to address the first question.

What Is Project Success?

While this question may sound simple, delving into the research on information technology projects and their success or failure in the context of business is like dipping a toe into a maelstrom of differing opinions and assumptions.
We've organized the research on the definition of project success and project failure first by splitting externally derived measurements from internally derived measurements.

1. Internal Measures of Success/Failure
    a. Project Manager Assessment
    b. Working Product/Service
    c. On-Time/On-Budget
    d. Meeting Project Objectives
2. External Measures of Success/Failure
    a. Senior Leader Assessment
    b. ROI (Return On Investment)
    c. EVA (Economic Value Added)
    d. Users use product/service, Customers buy product/service

Considering the different measurements of success/failure to define our dependent variable, project success, allows us to look at each of these in detail. Based upon our goal of determining the future success of a project from all perspectives, we determined that the measurement should be external rather than internal. Furthermore, if at all possible, based on this perspective, we should also focus on objective rather than subjective measurements.

Of the externally measures, Senior Leader Assessment is highly subjective, which leaves us with ROI, EVA, and Users use of the project or service.

One of the goals is to identify a measurement that is unambiguously calculated.

Many finance professionals will indicate that ROI is not ambiguous. Further research shows numerous problems with ROI when applied to any project involving information technology. Furthermore, EVA is not easily accessible, and cannot be calculated at the project level.

The final candidate for project success measurement, then, is **Users use product/service**.

REFERENCES

Altman, E. I., & Rijken, H. A. (2005). The impact of the rating agencies' through-the-cycle methodology on rating dynamics. *Economic Notes, 34*(2), 127-154.

Camp, P., L. (2006). *Dominant dimensions in an attributional model predicting financial planning behavior.*

Cantor, R. (2004). An introduction to recent research on credit ratings. *Journal of Banking & Finance, 28*(11), 2565-2573.

Collins, J. (2001). *Good to great: Why some companies make the leap... and others don't.* New York, NY: HarperCollins Publishers.

Collins, J. C., & Porras, J. I. (1994). *Built to last : Successful habits of visionary companies* (1st ed.). New York: HarperBusiness.

Elizalde, A. (2005). Do we need to worry about credit risk correlation? *Journal of Fixed Income, 15*(3), 42-59.

Fickenscher, L. (1994). Credit bureaus dismayed by FTC disclosure plan. *American Banker, 159*(128), 12.

Gheorghe, A. V., Birchmeier, J., Vamanu, D., Papazoglou, I., & Kröger, W. (2005). Comprehensive risk assessment for rail transportation of dangerous goods: A validated platform for decision support. *Reliability Engineering & System Safety, 88*(3), 247-272.

Grunert, J., Norden, L., & Weber, M. (2005). The role of non-financial factors in internal credit ratings. *Journal of Banking & Finance, 29*(2), 509-531.

Jones, H. W. (1948). THE ACTUARY'S FIELD IN LIFE INSURANCE. *Journal of the American Society of Chartered Life Underwriters, 2*(3), 240-247.

Keyfitz, N., & Rogers, A. (1982). Simplified multiple contingency calculations. *Journal of Risk & Insurance, 49*(1), 59-72.

Ranson, B. J. (2005). Helping the CEO's sleep patterns. *RMA Journal, 88*(1), 96-100.

Rösch, D., & Scheule, H. (2005). A multifactor approach for systematic default and recovery risk. *Journal of Fixed Income, 15*(2), 63-75.

Tsaih, R., Liu, Y., Liu, W., & Lien, Y. (2004). Credit scoring system for small business loans. *Decision Support Systems, 38*(1), 91-99.

Vasko, F. J. (2003). Play Ball—Equally: Math programming lends a hand to little league baseball. *OR Insight, 16*(2), 16--19.

Vasko, F. J. (2001). My fair share: A simple multiple attribute decision making approach to graduate assistantship allocation. *OR Insight, 14*(3), 26--31.

Wozniacka, M., & Sen, S. (2005). *Secret history of the credit card: Credit scores - what you should know about your own*. Retrieved 5/27, May 2006 from http://www.pbs.org/wgbh/pages/frontline/shows/credit/more/scores.html

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