EMPIRICALLY-BASED RULES AND EXTENSIONS FOR IMPROVING BUSINESS PROCESS REENGINEERING PRACTICE

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ABSTRACT

This paper introduces a new approach to improve the effectiveness of Business Process Reengineering (BPR) practice. Operations environments in business practice are classified empirically into three main categories. Decision rules and conceptual extensions are developed for reengineering each of these categories, to match appropriately both the actual characteristics and needs of the underlying operations environment , while maximizing the value generated from BPR programs, simultaneously. Implementation Guidelines are provided as well, to assure BPR effectiveness in practice.

Key Words: Business Process Reengineering, Process Redesign, Process Transformation and Drastic Improvement.

INTRODUCTION

Empirical evidence shows that over 60% of Business Process Reengineering (BPR) programs fail in practice, and do not achieve their intended results. Business Process Reengineering aims at realizing drastic improvement in current processes and not only marginal ones. This would be translated into increased competitiveness and positive transformation of business performance. The importance of this study is triggered by the fact that typically, Business Process Reengineering projects involve high investments and intensive efforts over a long period of time.

This paper will introduce a set of decision rules; provide extensions and implementation guidelines that promote success of Business Process Reengineering projects in practice. These include identification of appropriate Business Process Reengineering targets for each type of operations environments, providing general principles and methodology for guiding Business Process Reengineering implementation programs in practice.

The plan of the study comprises <u>four parts</u>: Part I comprises a general background of Business Process Reengineering and empirical characterization of operating environments. In Part II, a set of decision rules and target identification for each operations environment category are developed. The rules proposed make use of geometric logic, and are triggered by both the actual characteristics of the underlying operations environment, and the desired outcome. Illustrative examples are used to verify each rule proposed. Part III discusses conceptual extensions and implementation guidelines that help assure effective results of Business Process Reengineering in practice. We then conclude in Part IV by a summary of the study results, recommendations, and suggested issues for future research.

Several definitions are used in theory and in practice for Business Process Reengineering (e.g. Hammer, et.al. (1993), (1999); Peppard, (1996) among others). In this paper Business Process Reengineering is defined as the "rethinking and radical redesign of business processes to achieve drastic improvement in performance measured in terms of cost, quality, responsiveness, throughput, service, value-added, and/or speed.

An empirically-based categorization of operating environments (denoted as the V.A.T. Classification) is used as a foundation for identifying Business Process Reengineering targets and approaches to achieve the desired outcome.

The contribution thought is <u>two-fold</u>:

<u>First</u>: a set of decision rules are developed to identify the most appropriate Business Process Reengineering targets for each operating environment category as encountered in practice. These proposed rules advance earlier business process reengineering approaches used in the literature.
<u>Second</u>: conceptual extensions and implementation guidelines are provided to advance Business Process Reengineering practical effectiveness.

Empirical practice show that actual operating environments fit one of three categories (Chase, 1995), denoted as V.A.T. The "V" category starts by one input raw-material and branches to many end outputs. In the "A" category, operations follow an opposite path. Operations and/or tasks in this category start by many inputs and end with one end output. In the "T" category, the operations process starts by parallel tasks/components, and branches to multiple end items, as illustrated in Figure 1, in the Appendix.

Decision rules are now proposed to identify objective Business Process Reengineering targets for each of the above three V.A.T categories.

DECISION RULES PROPOSED

We start by the following basic assumptions:

1. Each task has the same cost or relative complexity.
2. Each branch linking any 2 tasks incurs the same cost.
3. Based on the above two assumptions, we now use a geometric logic to reengineer, i.e., drastically improve each of the underlying operations structures.
4. The outcome achieved can be measured in different value dimensions and forms.
5. Further process improvement can be achieved using a modified version of the ESIA framework (Greasley, 2004; Peppard and Rowland, 1995). Tasks comprised in this framework are to eliminate, simplify, integrate, and/or automate.

Using the above assumptions, two main questions are now addressed:

1) Starting from the existing processes, which task if eliminated, simplified, merged with another task, and/or automated will result in the best outcome, i.e., would generate maximum savings, or value-added ?

A ***Bottom-Up*** approach focus is used here to carry on these initial investigative steps.

2) Moving ***Top-Down***, i.e., starting from a desired standard or benchmark; what would be an ideal process design that would help maximize business performance, in terms of: increasing market share, return on investment, service-level, competitive position, and/or stakeholders' value.

We modify the ESIA approach introduced earlier (Peppard and Rowland, 1995, p.181) to be EISA, since the integration of 2 tasks or more, would typically result in a more drastic improvement than just a simplification of one task.

Now let us use EISA framework to answer the two questions above for each of the VAT operations environments.

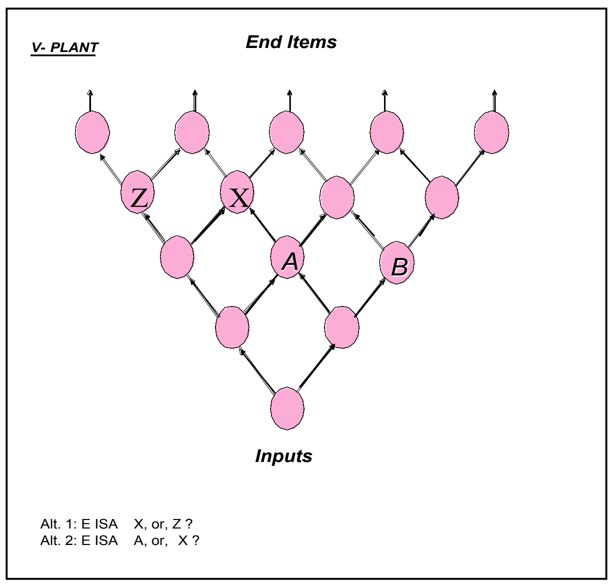
Consider a V-Plant or Facility; Let us compare 2 alternatives:

Alt. 1. Is it better to use EISA for task X or, for task Z?

Cleary task **X** is preferred as this is a core task, and is not on the peripheral as **Z**, notice that **X** is linked with much more tasks, so its improvement will result in a higher value added impact than if **Z** is eliminated.

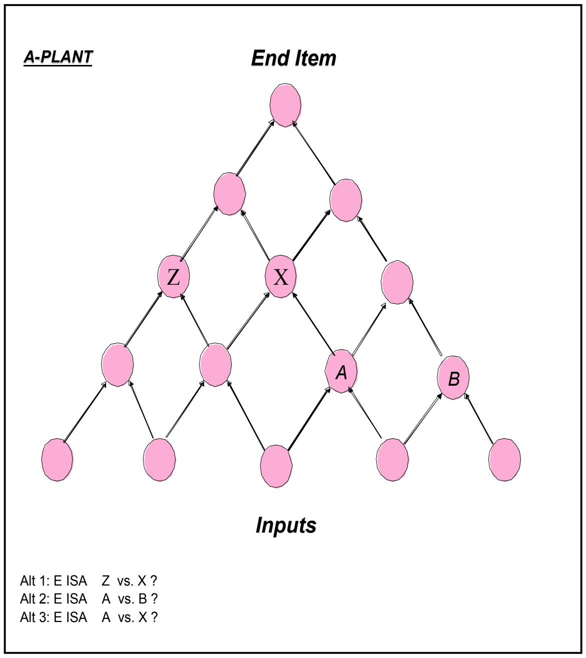
Alt. 2. Is it better to use ESIA for task A or, for task X?

Clearly, it is better to focus on task **A** as it is earlier in order of execution than **X**, i.e., it has a much more drastic impact on the overall **V** structure. This means that, it has a more intensive domino-effect on the whole operating system.



Now consider an '**A**' category facility, as illustrated in the graph that follows.

In this system of Operations, which task here is most appropriate to be eliminated first, improved, or examined for performing on it any of the ESIA possibilities?



Alt. 1: Comparing Z vs. X?

It is better to eliminate task X if possible, as this would have a higher total impact on the operating system. Similar logic can be used for **Alt. 2**, where task **A** is a better move than task **B**. in **Alt. 3,** eliminating task '**A**' is preferred to eliminating task **X** since task **A** is performed earlier than **X**, i.e., has a more intensive "domino-effect" on the overall structure performance, than that of **X**.

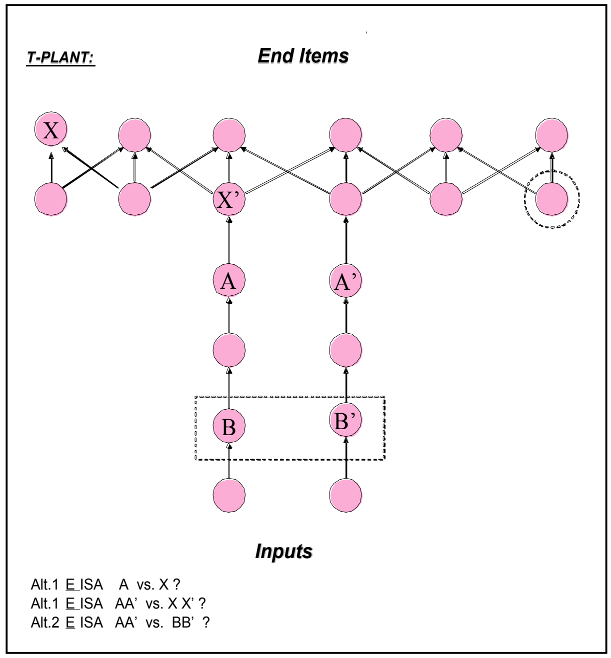
Therefore, based on the above analysis the rule proposed is to: ***Improve first, the internal, and the early, processes and branches as possible.***

Now let us consider a "**T**" shape operating environment as illustrated by the following graph:

For **Alt. 1: Comparing Z vs. X**

It is best to focus on eliminating task **A** as compared with task **X**. Notice that task **A** is earlier in execution than the execution of task **X,** and hence, has a more intensive impact on the performance of the whole system.

For **Alt. 2**: **Comparing AA' vs. XX'.** It is better to examine ESIA possibilities on **AA'** first. This is because **AA'** are both parallel, and earlier, in order of execution than **XX'**, and **XX'** are not parallel, either.



Similar logic is used for **Alt. 3**: **Comparing AA' vs. BB'**.

It is much better to eliminate **BB'** instead of **AA'** if possible, since they are both earlier than **AA'**, and therefore would have much more impact on the overall system's performance.

We can also examine the impact of the branches to be eliminated or shortened, with similar argument as the branching nodes, or tasks. This means the focus should be on earlier and more core branches than those which are on the peripheral.

Therefore, the main rules to follow using EISA approach on each of the VAT categories are:

(1) Focus on the *early* nodes in the order of execution.
(2) Account for the impact of *Node Dependency,* as possible..
(3) Improve first, the *internal* and the *early* processes and branches, as possible.

Let us relax assumption **1,** i.e., now consider the case where:

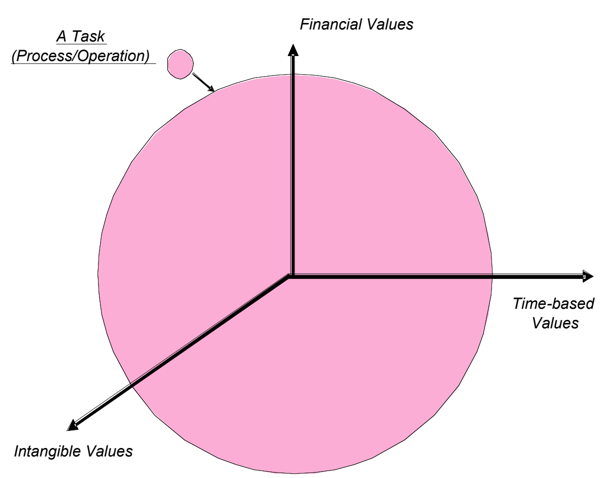
- The different tasks have different costs, revenues and/or different value per dollar spent.

- Additionally, it should be noted that, the relative value achieved can, and should be assessed for each stakeholder, whether producers or customers.

Further, the assessment must include the different dimensions and attributes of the outcome desired, and the implications resulting from this change in assumption?

At least three main dimensions of Business Process Reengineering outcome, or value may be considered. These include: financial values, time-based values, and intangible values. Such values can be assessed for each task, as illustrated in Figure 2.

Figure 2 -Outcome Dimensions



Note that:

- The financial Values generated, can and should be evaluated quantitatively in monetary terms.

- Both the Time-based advantages, and the Intangible values generated are mainly qualitative in nature, i.e., they may not be assessed in dollar value, but may be given a ranked order (e.g. high, med., low), or assessed using a scale (e.g., from 1, 2, …,9).

As to the impact of the change in assumption 1 above:

- In principle, no impact on the conclusions reached earlier. Still, one has to evaluate the total value resulting from each move, and select the appropriate change in tasks and branching links accordingly.

- The only difference is that the simple geometric logic (area saved as a result of any EISA move) may not prevail, and thus, cannot be used as a short-cut evaluation of the outcome achieved in this case.

CONCEPTUAL EXTENSIONS AND IMPLEMENTATION GUIDELINES

To help maximize the value generated form Business Process Reengineering implementation, the following guidelines are proposed:

Conceptually:

1. All the decision rules and concepts proposed in the section II above, should be applied both "*intra-firm*" wise and "*inter-firm*" wise across the supply chain. Such generalization of the application of the rules proposed across all supply chain partners is highly significant. This is due to the fact that the performance of any supply chain is determined by the weakest link in the chain.

2. For task elimination; integration with others; simplification; or, automation, apply the main decision rules and concepts introduced earlier, should be used for each category of the V.A.T structure, as illustrated in section II above.

3. In addition to pursing the decision rules proposed on manufacturing tasks, management should pursue minimization of cycle time from order-to-shipment, for each item and subcomponent produced. This can be effectively carried out through: task splitting, parallel and/or concurrent processing, as feasible.

4. Consider and assess the expected outcome for the different parties and stakeholders at each of the Business Process Reengineering project's at both the planning, and execution phases.

5. Define the process scope and contents efficiently and effectively. This would be realized by serious consideration of.
    a. The project budget, its time frame and how to maximize the value added per dollar of cost spent. This implies that the best reengineering project to undertake will be different for different budget levels, and for different planning horizons.

    b. Use 'Pareto logic' in identifying the project scope. This means to focus only on the few significant projects that result in the highest value added, and neglect the remaining many insignificant, yet feasible ones.

6. As conflicting interests may exist among the different stakeholders, different priority and weighting schemes should be examined, and select the ones generating the most sustainable outcomes for all supply chain partners and stakeholders. This would help yielding a larger pie size, and a larger portion for each supply chain partner, i.e., a win-win outcome for all parties.

7. Use appropriate modeling tools, as deemed relevant and feasible, e.g., Visio, I-Grafx flow charting, Oracle 9i; Developer Suite, Workflow Modeler. These would allow examining different alternative configuration of tasks, and assess accurately the impact of each, on the overall system's performance, and its value-added outcome.

Practically:

8. Account for intangible outcomes by using a relevant scale, or scoring scheme, and do not neglect these type of outcomes, under the excuse of the difficulty associated with measuring them. Considering these with less than accurate evaluation is better than overlooking them completely. While it might be difficult to assess them accurately, being half blind is certainly much better than being fully blind.

    Additionally, the intangible results, may prove very significant in the long run.

9. Avoid the 'silo' organizational practice and mode of operation. This would involve substituting independently-based divisions and organization units by well integrated, organic structure and *self-directed* teams. The classical '*silo*' structure results in isolation, territorial emphasis, redundancies, rigidity and sub-optimization. This must be replaced by:

    a. Integrated Product Team (IPT) organization that features: synergetic team orientation, parallel processing, flexibility and optimization. Such IPTs result in smoothing operations and in drastic reduction in the number of design changes and costs associated with them.

    b. Emphasize schemes of Coordination, Cooperation and Collaboration, "*intra-firm*" wise, i.e., within each firm units and functional areas; and "*inter-firm*" wise, i.e., among all different firms in the supply chain.. For instance, "intra-firm" wise would mean using one team for design, manufacturing, quality, and support or science, and not four units working independently for these functional areas. Several collaborative arrangements among producers and their suppliers can help both achieve much higher performance, and boost significantly the total Supply Chain Surplus. Such increase in total SC surplus cannot be achieved if every firm focuses only on its own profit, i.e., sub-optimize.

10. Assure top management support and involvement during all phases of Business Process Reengineering project's implementation. This is essential for the project's implementation success.

11. Additionally, it is important to align each Business Process Reengineering project and /or effort with both the corporate vision and strategy. (e.g. Greasley (2004); Lapre's Wassenhove (2002); McAdam and Bailie (2002); Majed and Zairi (2000); Peppard and Rowland (1995)). Empirical evidence shows that such an alignment is a main driver of Business Process Reengineering

implementation success in both service and manufacturing decision environments.

SUMMARY AND CONCLUSIONS

This paper has introduced a set of decision rules and conceptual extensions that advance Business Process Reengineering projects, and promote their implementation success. The rules proposed are designed in a way that fits the characteristics of the underlying operating environment, while fulfilling its most desired goals and outcomes, simultaneously.

Appropriate Business Process Reengineering rules and target have been identified for each category of operations environments, and their pertinent logic explained, along with illustrative examples. Conceptual and practical guidelines for implementation have been discussed. These would maximize the chances of success of actual Business Process Reengineering projects, and help solve the currently faced problem of high failure rate of Business Process Reengineering projects in practice.

A logical next step for managers and practitioners in the field is to make use of the rules and guidelines proposed in their Business Process Reengineering projects, in both manufacturing and service organizations. Since the scope of implementation of these rules may vary from one company to another; it is always advisable to start by a pilot project first, gain enough insights and feedback for assuring success before generalizing the scope of implementation to include the whole organization, and/or several of its units. It is also worth noting that the different units in the same organization may refine the implementation mode as dictated by their own decision environment specifics.

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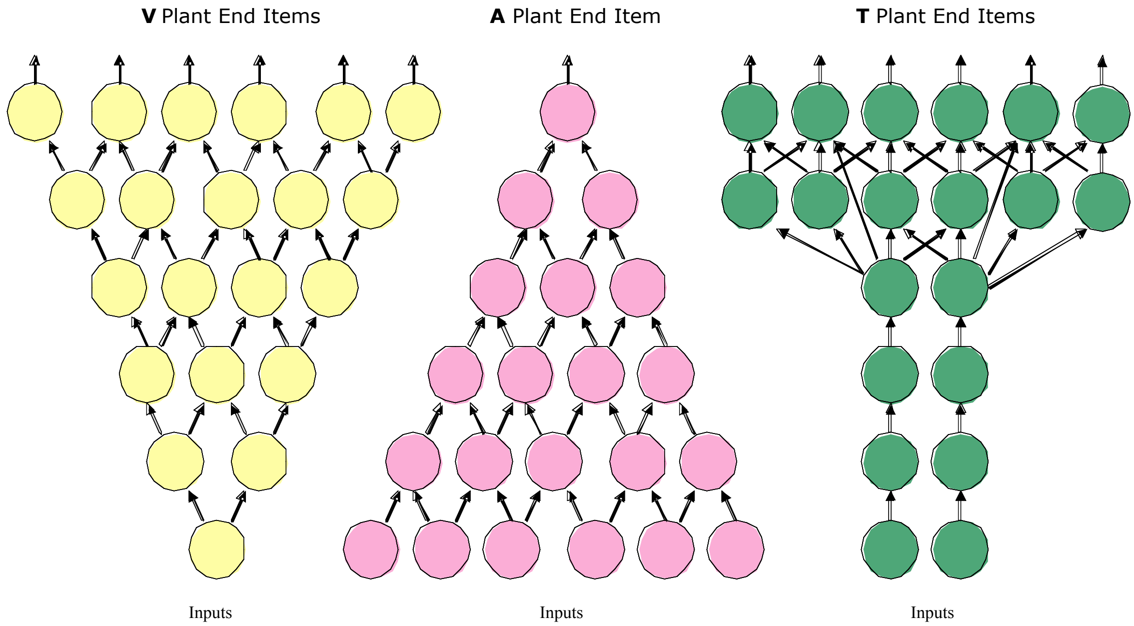
APPENDIX

Figure 1- VAT Classifications of Firms



Examples

PROCESSES
- Textiles
- Oil
- Steel
- Chemicals

AEROSPACE
- Planes
- Jet Engines
- Automotive
- Capital

CONSUMER PRODUCTS
- Appliances
- Valves