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Propositions

We could find no research depicting trinary linkages between the constructs. However, we did find some research depicting binary relationships between TQM and BPR, and TQM to empowerment.

Some researchers have examined the link between empowerment and TQM. Harrington (1991) advocates formation of process work teams to establish a culture of quality. Blackburn and Rosen (1993) examined the link between human resource management and TQM. Zultner (1993) explored the link between software development (IS project) teams and TQM. Finally, Lawler (1994) contrasted TQM and employee involvement. In all of these studies, the evidence was anecdotal at best. We therefore aim to examine the following proposition:

Proposition 1: There is a positive association between employee empowerment and the successful implementation of TQM initiatives.

Harrington (1991) provides a link between BPR and TQM. He advocates BPR as a systematic approach of streamlining business processes in support of total quality initiatives. BPR and TQM share a focus on processes and customers (Hammer and Champy, 1993). Most of the literature on re-engineering focuses on process and outcome gains with no direct reference to TQM (Hammer, 1990; Davenport and Short, 1990; Hammer and Champy, 1993). This leads to the following proposition:

Proposition 2: There is a positive association between redesign of ineffective work flows and the successful implementation of TQM initiatives.

American industries are placing greater emphasis on quality to establish a stronger competitive position in a global economy (Parisi, 1991). However, to implement TQM, companies must commit to a "zero defects" philosophy (Zultner, 1993). They must continuously search for ways of making sure that defects and errors never happen. This leads to the following proposition:

Proposition 3: There is a negative association between product defects and the successful implementation of TQM initiatives.

Classification

Given that BPR, TQM, and empowerment are innovative management techniques, innovation theory seemed an ideal research stream to help with classification as it gives us clues about potential obstacles and facilitators of innovative projects. Innovation theory has been built upon empirical studies relating innovation success with various factors. Results from these studies have consistently shown that project management, user involvement, IT infrastructure design, organizational factors, environmental factors, and appropriate resource commitments strongly influence system success or failure (Kimberly and Evanisko, 1981; Sanders and Courtney, 1985; Kwon and Zmud, 1987; Rosner, 1968; Zultner, 1993). Moreover, the literature on BPR, TQM, and empowerment agree that these same factors are critical to success.

Table 1 classifies each organization against salient variables identified in the literature as enablers of innovation success. Variables were divided into six categories -- project management, user involvement, IT

configuration, organizational factors, environmental factors, and resource commitments. Classification was made for the properties of each category. Rows 1-3 are project management properties - managed empowerment, zero-defects management (TQM), and process engineering management (BPR). Rows 4-6 are user involvement properties - autonomy, championship, and Decision Making (DM) involvement. Rows 7 and 8 are IT infrastructure design properties - IT configurations and data integration. Rows 9 and 10 are organizational properties - organizational inertia and corporate evolution. Rows 11 and 12 are environmental properties - customer satisfaction and customer involvement. Rows 13 and 14 are resource commitment properties. Future plans are to generate trinary propositions.

Table 1. Classification of Organizations in terms of TQM, BPR, and empowerment factors.

	Qualitech	SGI	IBM
Managed Empowerment	Supportive Training important Moderate delegation	Very supportive No training High delegation	Supportive No training Delegation
Zero-defect Mechanisms	No mechanisms Rely on individuals	Informal mechanisms Rely on teams	Formal mechanisms Rely on structure
PE activities	Organic Fire fighting	Organic Fire fighting	Constructed BSP methodology
Autonomy	Moderate accountable Slightly controlled Training important Open communication Cross-functional team	Highly accountable Slightly controlled Low training Open communication Cross-functional team	Accountable Controlled Low training Communication fair Cross-functional team
Championship	Access to IT resources Politics minimal Work with IS team Important for success	Access to IT resources Little political clout Work closely with IS Important for success	Access to IT resources Have political clout Work with IS team Important for success
DM involvement	Very high	Moderate	Low
IT Configurations	Distributed C/S	Distributed C/S	Centralized mainframe
Data Integration	Partially integrated	Partially integrated	Partially integrated
Organizational Inertia	Flexible	Moderate	Inflexible
Corporate Evolution	Small and stable	Rapid growth	Downsizing
Customer Satisfaction	Highest priority	High priority	High priority
Customer Involvement	High involvement	Moderate involvement	Moderate involvement
Top-level commitment	Very high	Very high	High

	Integrated	Partially integrated	Fragmented
Revenue	$2 million no slack resources	$1.5 billion available resources	$4.5 billion available resources

Table 1. Classification of Organizations in terms of TQM, BPR, and empowerment factors.Project management is divided into three management properties - managed empowerment, zero-defects management (TQM), and process engineering management (BPR). Managed empowerment refers to the ability of the IS project management team to facilitate employee empowerment and involvement in major project decisions. Zero-defects management refers to a specific strategy to increase total quality in products and services. A key strategy for zero-defects management is to place mechanisms along the process path to facilitate low defect rates. Process engineering management refers to an organization's strategic view of BPR. An organic view conceives BPR as a piecemeal improvement method to be activated as problems surface. A constructed view envisions BPR as a enterprise-wide strategy to improve quality and better serve customers.

User involvement is divided into three properties - championship, autonomy, and decision making involvement. Project championship is the influence the champion has on the success of the project. Team autonomy refers to the extent team members are empowered to carry out their jobs. Decision making involvement is the extent that individual teams members have input into the decision making process.

IT infrastructure design is divided into two properties - IT configuration and data integration. IT configuration is the type of hardware environment an organization possesses. We divide hardware environment into centralized mainframe, partially distributed, and distributed client/server. Centralized mainframe environments have a centralized processor with little or no distributed or localized data processing. Partially distributed environments are not completely centralized or distributed. Mainframes still process bulk data production jobs, but users can process smaller jobs locally. Distributed client/server environments focus on local data processing. Users have access to powerful workstations to handle most, if not all, of their data processing needs. Data integration is the degree that data is shared by all organizational constituents. We divide data integration into integrated data, partially integrated data, and fragmented data. Integrated data means that users have access to the same data on an enterprise-wide level. Applications and data are shared because the company's legacy systems talk freely with one another with little data conversion problems. In addition, data is independently stored in a centralized repository to increase access, security, and accuracy. Partially integrated means that the goal of the organization is to integrate data, but data and application sharing is not ideal. Fragmented data means that data and application sharing is not a priority and/or legacy systems cannot easily talk with each other.

Organizational factors is divided into two properties - organizational inertia and corporate evolution. Organizational inertia describes the basic organizational attitude toward change. We divided organizational inertia into three categories - inflexible, moderate, and flexible. Inflexible means the corporate environment is not conducive to change. Top reacts to the competitive environment, that is, they do not rate development and implementation of change strategies as a priority. Moderate means the top management understands that dealing with change is important, but planning for change is not rated as a high priority. Flexible means that top management believes change is inevitable so they proactively develop plans to deal with change. The corporate environment is conducive to change because employees are encouraged to be innovative and become more involved in decisions. Corporate evolution is the growth pattern and direction of the company.

Environmental factors is divided into two properties - customer satisfaction and customer involvement. Customer satisfaction is the goal of most change strategies. Making the customer happy is the best way to deal with competitors because the customer is the judge of product quality and suitability. Customer involvement is the degree that customers are involved in decision making related to the customer's product.

Resource commitments is divided into top-level commitment and revenue. Top management commitment is the degree that the top management team supports the project. Revenue is the amount of gross sales generated by the company. Organizations with greater size tend to have available slack resources (deep pockets) to be better able to afford innovations (Kimberly and Evanisko, 1981). Slack resources enable a firm to purchase innovations, absorb losses, and explore with R&D expenditures (Rosner, 1968).

Discussion

Data analysis reenforced the importance of top-level commitment, customer intimacy, user involvement, management flexibility, and championship to quality and process improvement initiatives. Each organization interviewed reported that these factors appear to facilitate success. However, slack resources, bureaucracy, politics, budgetary constraints, and other obstacles limit what can be done. For instance, all three organizations believe that training is important, but may not be able to commit the appropriate resources. In addition, top management commitment is critical to success, but fragmented decision making may buffer management from the project.

Classification shows that the organizations blend TQM, BPR, and empowerment into their change management projects. It also shows that they view empowerment differently, enforce quality in different ways, and improve processes by different methods. It does not show which technique, management style or technology configuration is better, but this was not the goal. Although classification sheds limited light on contrasting the three constructs, it offers a basic set of properties which can be measured for future research.

In sum, IBM, SGI, and Qualitech have a common goal, that is, to produce quality products and services, with zero defects, at competitive prices, in a timely manner, and to the satisfaction of the customer. However, they different in their view of how to plan, design, and implement TQM, empowerment, and BPR.

References Available Upon Request Table 1. Classification of Organizations in terms of TQM, BPR, and empowerment factors.