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Introduction

Total quality management (TQM), and business process reengineering (BPR) are 90s' management buzzword. As a management technique, both TQM and BPR are considered offering firms unique advantages in the market by reducing defects in products, shortening product development cycle time, and increasing customer responsiveness. The general understanding is that management identify, analyze, and redesign processes before automating them with IT. A growing community of managers is, however, finding that unless they strategically leverage information technology (IT) to eliminate redundant processes, coordinate different task operations, and integrate disparate functions, they would be not able to realize the full potential of process improvement. These above contradictory facts are explained by Henderson and Venkatraman (1993) through a comprehensive framework linking IT and business processes. The kinds of configurations in the linkage can lead to different types of transformations, i.e., strategic execution, competitive potential, service level, and technological potential. Strategic execution uses business strategy as the anchor domain, organizational infrastructure as pivot domain, and IT infrastructure as the impact domain. Competitive potential guides how technology could enable and influence business strategy, thus creating competitive advantage. Service level perspective focuses on how IT can better deliver products and services to support business processes. Technological potential perspective is driven by business strategy. Value management is the mechanism for ensuring that maximum benefits are realized with IT.

In this study, our main aim is to explore the effect of IT on quality management in the manufacturing sector. For measurement purposes, operation management is defined into error prevention, process improvement, product development, and customer focus.

The Effect of IT on Quality Management

Teng and Kettinger (1995) have provided a detailed overview of the effect of IT on quality management. According to them traditional approach of systems development was based on a functional view of organizations in which same data were captured at several applications, resulting redundancy, inflexibility, and inconsistency. The major problem with this approach was that it ignored the interrelationships between many seemingly separate files, as in real-world of businesses, most processes are related to each other rather than being independent as captured in the application-specific file. The present approach of systems development is, however, rooted to the sharing of pools of data among a number of interrelated applications.

Broadly IT can support business processes in multiple ways, as classified by Davenport (1993) into as automational, informational, sequential, tracking, analytical, geographical, integrative, disintermediating, and intellectual categories. Automational category relates to elimination of human with IT. Informational category relates to augment human judgment. Sequential category relates to transforming sequential processes to parallel in order to achieve process cycle time reductions. Tracking category relates to monitoring and tracking the progress of the process. Analytical category relates to bringing an array of sophisticated information tools to make routine decisions. Geographical category relates to reducing the barrier of geographical separation. Integrative category relates to combining segmented processes. Disintermediating category relates to elimination of intermediaries for matching sellers and customers. Intellectual category relates to distributing and exploiting organization wide knowledge throughout the corporation.

Data Collection

A total of 335 questionnaires from "Fortune 500" database were mailed to top managers in manufacturing firms. The "Fortune 500" database with 350 names and addresses were supplied by a vendor. 335 questionnaires were mailed. After a week reminders were sent for the follow up. A total of 66 responses were received, and 62 questionnaires were completely filled out. Thus, effective response rate is about 19%.

Data Analysis

For estimating the reliability of empirical measures, the items measuring each set of variables were assessed for their reliability. The estimate was conducted using Cronbach alpha. The Cronbach alpha for the items measuring error prevention, process improvement, product development, and customer focus ranged between .85 to .92.

To analyze construct validity, a factor analysis using principal axis solution with varimax rotation for assessing the unidimensionality of the properties for each constructs was employed. The extracted factors exhibited a congruent structure with theoretically construed properties, thus, confirming the construct validity of the theoretical constructs.

Results

From the results of this study, it was found that IT measures are significantly related to operational quality management measures. This type of thinking is consistent with the traditional research that focusses on operational efficiency. Technology has always been a key mover for the operational efficiency.

Conclusion

The study provides a set of operational variables and items affected by IT. Although numerous case studies show the effect of IT on business processes, especially at the operational level, this is perhaps the first study providing the validated measures of quality management, which are affected by IT.

Innovations and incremental changes are necessary for the performance of organizations that are set from the application of new technologies. It is, therefore, no surprising that IT can provide many opportunities to businesses to set new standards for carrying out innovations and improving performances.

The results of this study provided support for the effect of IT on operational quality. Using IT, businesses are not only able to provide low cost to customers but are also taking customers' direct feedback into consideration to meet their expectation.

Despite usual controversies on the deterministic role of technology in changing social structures of the organization, the truth that technology by far has the most direct influence on changing the roles of the employees, altering the flow of communication and processes, and integrating the diverse elements of material and machines for innovation. The social structure has equally important role in influencing technology, but several critical social elements would not be changed unless the underlying technology is changed.

Limitations

Though the scope of the present study is limited to manufacturing firms, the future studies can be focussed to services to offer a broader perspective of the quality management variables that are affected by IT.

This study was conducted with Fortune 500 Firms. Many of these firms are presumed to have enough resources for bringing the new technology into their working places, it is, however, not clear to what extent technology directly contributed to the quality improvements and to what extent quality management influenced the strengthening of IT infrastructures.

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