8-15-1997

Exploring the Role of Information System Functions and the Success of Business Process Re-engineering

Vincent S. Lai
The Chinese University of Hong Kong

Radha Mahapatra
The University of Alabama in Huntsville

Exploring the Role of Information System Functions and the Success of Business Process Re-engineering

Vincent S. Lai
Department of Decision Sciences and Managerial Economic
Faculty of Business Administration
The Chinese University of Hong Kong
Hong Kong

Radha Mahapatra
Department of Accounting & Information Systems
College of Administrative Science
The University of Alabama in Huntsville
Huntsville, Al 35899

Introduction

Business Process Re-engineering (BPR) is a powerful change phenomenon and an approach that has made radical and fundamental changes to the way organizations conduct business [Davenportand Stoddard 1994]. The purpose of these changes is to redesign the existing business processes and implement new ones with the objective of cost reduction and improved efficiency and effectiveness, including profitability, customer satisfaction, return on assets, growth, and market share. [Grover et al., 1994]. Because of the pervasiveness of changes, organizations undertaking BPR must redesign not only their business processes, but also their products, assets, culture, thought patterns, behaviors, and/or technology spanning across functional areas [Stoddard and Jarvenpaa, 1995]. Many researchers even contended that the larger the scope of process change, the greater the potential for radical performance improvement [Grover et al. 1994]. Thus, process changes at the interorganizational dimension (across organizations) would augment organizational productivity and competitiveness better than process changes at the inter-functional (across functional areas) and intra-functional (within a functional area) dimensions.

IS function, which includes all IS groups and departments within the organization [Saunders and Jones 1992], has served an increasingly important role in many organizations to proactively shape new competitive strategies to improve the operational or managerial work processes. The successful management of IS function in such endeavors is inextricably linked with the effective management of a number of processes associated with the planning, development, acquisition, implementation, and control of an organization's IT and IS. Due to the importance of an effective IS function on the organization's performance, the management of IS function has received close scrutiny from MIS scholars and practicing managers [such as Brown and Magill 1994]. In fact, many research studies have even indicated that the assessment of IS function performance is a critical issue facing today's IS executives [Saunder and Jones 1992].

In the current context of the increasing recognition of IT as a strategic resource, the leadership of the IS function in an organization could be viewed as a powerful, and perhaps critical, element in affecting the success of BPR. Clearly, the purpose of BPR is the transformation of business process; and the strategic application of IT by IS function can make a powerful impact on a business as it is transformed [Talwar 1993]. Achieving the benefits of reengineering demands active commitment and participation from the IS function. The BPR process needs careful planning as there are risks inherent in undertaking the far reaching and fundamental changes associated with reengineering. To address these risks and enable the strategic values of IT, the strategic role of IS function in BPR must be recognized. Thus, evaluating the link between the role of IS function and its impact on BPR has become an important issue in MIS research.

Research Hypotheses

Improve strategic IS planning

Planning at the strategic level by senior executives has been confirmed in several studies to be a critical success factor of BPR [Dixon et al. 1994]. This top-level vision for BPR provides guidance and motivation for management and project team as well as promoting shared commitment throughout the organization [Drew 1994]. In the context of BPR, the characteristics of IS planning, which includes the quality of planning, planning time horizon [Premkumar and King 1994], and IS-business strategy integration [Grover et al, 1994], are significant to create a conducive environment for the success of BPR implementation. In other words, it can be expected that the quality of strategic IS planning will contribute significantly to the success of BPR. Based on these concepts, three hypotheses were postulated:

H_{1a}: IS function with higher IS planning quality will achieve greater BPR success

H_{1b}: IS function that plans strategically will contribute more to the success of BPR

H_{1c}: IS function that advocates greater extent of IS-business strategy integration will more likely achieve BPR success.

Enhance support mechanism

BPR is synonymous with change or transformation as its objective is to radically overhaul business processes and thereby achieve dramatic improvements in performance. In general, BPR creates change on two fronts: designing new processes to transform the way business is conducted and then implementing the processes to attain business goals. Any of these change fronts requires varied degree of cultural shifts in beliefs, values, and norms, depending on the extent of change involved. Radical change typically is more traumatic than incremental change as it requires a longer and more extensive implementation program, accompanied with successive rounds of reengineering and/or continuous improvement. Therefore, an organization must establish a strategy for change that anticipates likely obstacles to effective reengineering and balance forces in favor of change over forces of resistance. Benjamin and Levinson [1993] recognizes the importance of change management and proposes eight principles that managers need to consider as they make complex IT-enabled changes. In fact, as suggested by many, any

approach to BPR that does not have an integrated approach to change management will have a lower probability of success.

Given the preceding considerations, the theoretical existence of a link between the support from IS function (management involvement and change management support) and BPR success should be maintained, and are expressed in the following hypotheses:
H_{2a}: Change management support by IS function in BPR projects is positively related to its success.
H_{2b}: Continuous top IS management support in BPR projects is positively related to BPR success.
H_{2c}: The extent of IS function involvement in BPR projects is positively related to BPR success.

Develop information architecture

The relationship between IA and BPR has just been conceptually examined by a few researchers. No empirical evidence has been reported in the literature to support the correlation of IA and BPR. Current studies seem to agree that IA can facilitate a variety of BPR endeavors ranging from incremental improvement of existing processes to radical reengineering for new process design [Teng and Kettinger, 1995]. The research results reported by Davenport [1991] indicates that cross-functional IA, as compared to single-function IA, contributes more to the success of BPR as it facilitates the ability of the firm to achieve significant process improvement as demanded by the organization's strategic objectives. Kim [1994] also argued that a cross-functional data-oriented IA should be the primary approach for implementing BPR, due to its ability to focus on strategic goals and maintain stability during the drastic change of BPR. Teng and Kettinger [1995] also initiates a proposition that IA can facilitate BPR to the extent that process definitions in IA are based on the firm's strategic goals and objectives. They believed that neglecting IA that requires data sharing or are cross-functional, will be dysfunctional for future BPR projects. Following the guidance of the above researchers, two hypotheses are postulated:
H_{3a}: IA that are cross-functional contributes more to the success of BPR
H_{3b}: IA that are based on the organization's strategic goals contributes more to the success of BPR

Operationalization of Variables

Data for this study were collected by using five-point Likert scale items, based on the extent of agreement or disagreement with specific issues related to the variables being measured. Aggregation of scores over all questions provided the composite score of that variable.

BPR success was measured by an aggregated average of two proxy variables: user satisfaction [Grover et al. 94] and organizational performance. *IS planning quality* was assessed in terms of the extent of detailed analysis devoted to planning activities in these three major areas: technology trends, information architecture, and planning practices [Premkumar and King 93; Boynton and Zmud 87, King 88]. *Extent of strategic planning*

was assessed by four items adapted from Grover [1993]. *IS-Business strategy integration*, which measures the extent to which IS strategy is integrated into the overall organizational strategy, was assessed using four items based on guidelines provided by Fielder et al.[95] and Premkumar and King [93].

Change management strategy was measured using Nadler's [81] multi-item scales, which capture the two components of change management: resistance management and transition management. Resistance management is measured by the extent of user participation in change, adequacy of training provision, and existence of reward systems; while the transition management is measured by the effectiveness of communication systems, consistence of management, effectiveness of the feedback systems, and the existence of interim structure. *Management support* was measured by using a four-item scale to determine the vision, leadership, commitment, and support of IS top management [Premkumar and Ramamurthy 95]. *Extent of involvement*, which measures the extent to which IS function is involved in BPR projects, was assessed using 5 items based on [Lai 93]. IA sophistication was captured using the construct developed by Raymond and Pare [92]. This construct is multi-dimensional and includes aspects related to technological support, information content, functional support, and management practices. This construct was later adapted by Raymond, Pare and Bergeron [1994] to study the performance of the organizations.

Conclusion

We are in the early stage of getting this empirical study done. The questionnaire to test the hypotheses has already been validated by the MIS directors and BPR management with the local Fortune 500 companies. In fact we are in the process of data collection, and expect to have the initial results presented in the AIS conference.

References

Benjamin, R.I., and Levinson, E. A framework for managing IT-enable change. *Sloan Management Review*, (Summer 1993), 23-33.

Boynton, A.C. and Zmud, R.W. Information technology planning in the 1990's: directions for practice and research. *MIS Quarterly*, 11, 1(March 1987), 59-71.

Brown C.V; and Magill, S.L. Alignement of the IS functions with the enterprise: toward a model of antecedents. *MIS Quarterly, 18*, 4(December 1994), 371-404.

Davenport, T.H. Rand Xerox U.K. *Harvard Business School Case* 9-192-071 (Part A) and 9-192-072 (Part B), 1991.

Davenport, T.H. and Stoddard, D.B. Reengineering: business change of mythic proportions? *MIS Quarterly*, (June 1994), 121-127.

Dixon, J.R., Arnold P., Heineke, J., Kim, J.S., and Mulligan, P. Business process

reengineering: improving in new strategic directions. *California Management Review*, (Summer 1994), 93-108.

Drew, S. BPR in financial services: factors for success. *Long Range Planning, 27,* 5(1994), 25-41.

Grover, V. An empirically derived model for the adoption of customer-based interorganizational systems. *Decision Science, 24,* 3(1993), 603-640.

Grover, V., Fiedler, K.D., and Teng, J.T. Exploring the success of information technology enabled business process reengineering. *IEEE Transactions on Engineering Management, 41,* 3(August 1994), 276-284.

Kim, B.O. Business process reengineering: building a cross-functional information architecture. *Journal of Systems Management*, (December 1994), 30-35.

King, W.R. Evaluating an information systems planning process. *Long Range Planning,* 2, 5(October 1988), 103-112.

Nadler, D.A. Managing organizational change: an integrative perspective. *The Journal of Applied Behavioral Science,* 17, 2(1981), 191-211.

Premkumar G. and King, W.R. An empirical assessment of information systems planning and the role of information systems in organizations. *Journal of Management Information Systems,* 9, 2(Fall 1992), 99-125.

Premkumar G. and Ramamurthy K. The role of interorganizational and organizational factors on the decision mode for adoption of interorganizational systems. *Decision Sciences, 26,* 9(1995), 303-336.

Raymond, L. and Pare, G. Measurement of information technology sophistication in small manufacturing business. *Information Resource Management Journal,* (Spring 1992), 4-16.

Raymond, L., Pare, G., and Bergeron, F. Matching information technology and organizational structure: an empirical study with implictions for performance. *Europen Journal of Informtion Systems,* 4, (1994), 3-16.

Saunders, C.S. and Jones, J.W. Measuring performance of the information systems function. *Journal of Management Information Systems, 8,* 4(Spring 1992), 63-82.

Stoddard, D.B. and Jarvenpaa, S.L. Business process redesign: tactics for managing radical change. *Journal of Management Information Systems, 12,* 1(Summer 1995), 81-107.

Talwar, R. Business re-engineering -- a strategy-driven approach. *Long Range Planning,*

26, 6(1993), 22-40.

Teng, J.T.C. and Kettinger, W.J. Business process redesign and information architecture: exploring the relationships. *Data Base*, *26*, 1(February 1995), 30-42.