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An empirically derived model of the role of IS networks in business process improvement initiatives

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Abstract

During the past two decades both business managers and academic researchers have shown considerable interest in information system (IS) networks and their effect on business processes and performance. The present study builds on this interest to examine the nature of IS networks and business process improvement initiatives (BPII) and delineate the *process* by which IS networks influence BPII. Conceptually, both of these variables are considered multidimensional constructs, with IS networks comprising connectivity and flexibility dimensions and BPII involving process improvement initiatives and customer focus dimensions. We develop a model that elaborates on the interrelationships among these variables along with two key contextual antecedents (management support and information intensity) and pose a series of hypotheses. We then present the results of an empirical test of the model that involved structural equation modeling using data collected via a national mail survey from executives from 'Fortune 500' divisions. Overall, the results of the study found mixed support for our hypotheses. While network connectivity and network flexibility were found to be significantly related to process improvement initiatives, network flexibility did not have any significant effect on customer focus. The results of the study also indicate that top management support is significantly related to both IS network dimensions, which fully mediate top management support's influence on both BPII dimensions. Information intensity was also found to be significantly related to BPII and partially mediated by network flexibility with regard to process improvement initiatives. Implications of this study and directions for future research are also discussed. © 2000 Elsevier Science Ltd. All rights reserved.

Keywords: IS networks; Business process improvement initiatives; Customer focus; Information intensity of the industry

1. Introduction

For the last two decades both practitioners and academicians have shown considerable interest in information system (IS) networks and their effect on business processes and performance. The development of extensive communication networks and the increas-

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ing inter-connectivity arising from the adoption of standards and integrated services digital networks (ISDN) have affected businesses in many fundamental ways [67]. The use of IS networks to access and share relevant information from databases has been an instrumental means to eliminate duplicate activities, prevent errors, reduce cycle times in procurement and product development, improve customer service, and heighten customers' expectations of products and services. IS networks support businesses not merely by automating their activities, but also by reshaping and improving their business processes [12,45,108].

The coordination performed by IS networks enables more views to be shared, employee awareness to be broadened, and customer expectations to be tracked and met. Shared databases and communication systems are common enablers firms use to improve customer services. An example of both of these aspects is found with Xerox's Customer Satisfaction Measurement System (CSMS), which is a large and easily accessible shared database integrated with advanced communication systems that handles all of its customers' calls and automatically routes them to company personnel nearest to the customers' locations [33].

The ability to use real-time information is also critical in defect prevention, output counting, and performance optimization [21]. By providing real-time information about critical tasks, IS networks enable managers to monitor crucial information and disseminate it to interested parties who may be widely dispersed geographically.

Despite the general understanding of the many useful roles of IS networks in improving business processes, empirical studies examining such types of relationships are relatively scarce and, in fact, often report contradictory results [27]. As a result, many organizations still find themselves poised to make huge investments in IS, yet remain unsure of what all the benefits from such investments will be. This is especially true with respect to the expected impact on business productivity.

By examining the relationship between IS networks and business process improvement initiatives (BPPI), the present study contributes to the body of knowledge in the IS field by identifying and conceptualizing key variables associated with IS networks and BPPI, developing a model that explicates the inter-relationships between these variables, and providing the results of an empirical test of the model. Thus, this study investigates the process by which IS influences BPPI.

We begin by developing our conceptual model in the next section. We first describe key IS and BPPI constructs along with two key contextual antecedents, elaborate on the interrelationships among these variables, and pose a series of testable propositions. Next, we discuss methodological issues related to

developing and validating the measures of our constructs and data collection procedures. Thereafter, we present and discuss the results of our substantive tests that involved alternative structural equation models. We conclude by considering the limitations of our study and provide recommendations for broadening the scope of future research of IS networks and BPPI.

2. Conceptual model

2.1. The nature of information system networks

IS networks refer to the integrated technology that allows the sharing of information and applications [66,67]. These networks, through flexible standards such as fiber, optical cables, or satellites, allow organizations to easily transmit information from one place to another in audio, text, or visual forms [108].

Within individual organizations, it has become a competitive necessity to use IS networks in the coordination of interfunctional activities as a means of improving efficiency and effectiveness [67]. The dynamics of present day competitive environments also place increasing pressure on organizations to establish more efficient and tighter inter-organizational business relationships. Electronic inter-connectivity between two or more organizations has become a vital tool to reduce costs and improve services and initiate a variety of strategic initiatives such as total quality management (TQM), just-in-time (JIT) inventory practices, boundary-crossing infrastructure services, and quick response (QR) systems [13,14].

A critical aspect of IS networks is the extent to which different information systems can communicate with other networks to coordinate present and future activities. Such an infrastructure includes both technical and organizational capabilities that enable IS resources to be shared within and across the firm units [13]. For this sharing to occur, networks must provide both links among components and the ability for them to operate in unison. Thus, IS networks can be conceptualized as a multidimensional phenomenon that comprises of two important and interrelated dimensions, network connectivity and network flexibility. The former dimension focuses on the extent to which electronic linkages mediate communications and data access within and between firm units. The latter dimension focuses on the degree to which compatible standards and protocols exist to allow heterogeneous hardware and software to communicate and meet present and future business computing environments. Each of these dimensions are presented in detail below.

2.1.1. Network connectivity

There are a number of ways by which IS networks

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