

Association for Information Systems AIS Electronic Library (AISeL)

BLED 2007 Proceedings

BLED Proceedings

2007

A Model of IT-enabled Organizational Integration and Sustained Competitive Advantage

Lih-Bin Oh

Department of Information Systems, National University of Singapore, ohlb@comp.nus.edu.sg

Yi-Xing Leong

Department of Information Systems, National University of Singapore, leongyix@comp.nus.edu.sg

Hock-Hai Teo

Department of Information Systems, National University of Singapore, teohh@comp.nus.edu.sg

Follow this and additional works at: <http://aisel.aisnet.org/bled2007>

Recommended Citation

Oh, Lih-Bin; Leong, Yi-Xing; and Teo, Hock-Hai, "A Model of IT-enabled Organizational Integration and Sustained Competitive Advantage" (2007). *BLED 2007 Proceedings*. 1.

<http://aisel.aisnet.org/bled2007/1>

This material is brought to you by the BLED Proceedings at AIS Electronic Library (AISeL). It has been accepted for inclusion in BLED 2007 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

A Model of IT-enabled Organizational Integration and Sustained Competitive Advantage

Lih-Bin Oh, Yi-Xing Leong, Hock-Hai Teo

Department of Information Systems,
National University of Singapore, Singapore
[ohlb | leongyix | teohh]@comp.nus.edu.sg

Abstract

Organizational integration is a phenomenon occurring inexorably in recent years due to rapid advances in IT and intense competition. Past research has found organizational integration, between and within firms, to be positively-related to performance, with IT resources playing a pivotal role in facilitating this trend. In this paper, we argue that IT resources, comprising of IT assets and capabilities, are critical antecedents to organizational integration. We examine the role of service-oriented architecture (SOA) as an IT asset in enabling the integration of organizational resources. As an IT-dependent strategic initiative, IT-enabled organizational integration provides significant barriers to competition and gives rise to sustained competitive advantage. Drawing upon the resource-based theory, we develop a model by conceptualizing both IT assets and IT capabilities as higher-order constructs comprising of IT infrastructure and IT architecture, and IT technical skills and managerial skills respectively. Next, we explore the mediating effects of causal ambiguity to further elucidate the relationship between organizational integration and sustained competitive advantage. Our proposed model provides managers with invaluable insights regarding the nature and application of IT to achieve organizational integration and to sustain their competitive edge in the global marketplace.

Keywords: organizational integration, sustained competitive advantage, resource-based view theory of firm, causal ambiguity, service-oriented architecture

1 Introduction

Organizational integration has been occurring at an increasing scale in recent years due to the emergence of new information technologies. This trend is intensified by the spate of internal reorganizations, business process re-

engineering efforts, and multitude of mergers and acquisitions over the last few years. Organizations are engaging in hitherto unseen levels of integration in order to distinguish themselves and obtain competitive advantage (Markus 2001; Porter 2001). Driven by academic research that generally shows that a positive relationship between integration and performance exists (e.g., Ettie and Reza 2001; Truman 2000), organizations believe that it is imperative for them to achieve increasingly high degrees of organizational integration in order to attain sustained competitive advantage.

Ample past literature has attributed the declining competitiveness of the American industry to the fact that its competitors (particularly the Japanese) have attained competitive advantage by becoming more organizationally integrated than their American rivals (e.g., Lazonick and West 1998). Within the American industry itself, companies that have succeeded in being more integrated than their competitors have achieved above-normal profits, with a notable example being Dell, with its tight “virtual integration” business model and heavy use of information technology (IT) to enable coordination across company boundaries and deliver high velocity built-to-order computer systems (Magretta 1998). Another example is Wal-Mart Stores Inc, with its highly efficient supply chain integrated seamlessly into all aspects of its business, which is still unmatched by its multitude of competitors (Piccolo and Ives 2005). However, does increasing organizational integration really impact firm performance positively? There is demonstrably a genuine need for practitioners and academics alike to understand the exact nature of such integration efforts on the actual performance, or in business parlance, the “bottom-line” of the organization.

However, numerous difficulties exist. First, what exactly is meant by “organizational integration”? Past literature has defined the concept in diverse and non-specific terms which provide difficulty when attempts to operationalize the concept are made. The term remains vague, with varying meanings within different industry contexts and little attempt was made to reconcile them. Secondly, the question of “exactly how is this integration attained?” follows naturally from the previous question. Third, how do emerging technologies such as a service-oriented architecture enhance the organizational integration? Fourth, assuming an ideal organizational integration state has been achieved, how do we measure this integration in more objective terms, in order to advance our theoretical understanding of this concept? And finally and perhaps most importantly, how does integration actually impact the various organizational outcomes, most notably sustained competitive advantage? Does it have a direct effect or is the relationship mediated by another variable?

In this paper, we advance a model through synthesizing previous research from the fields of information systems and strategic management to explain how sustained competitive advantage could be attained through IT-enabled organizational integration. We develop a structural model linking a firm’s IT resources to the level of organizational integration it possesses drawing upon the resource-based theory and subsequently to the sustained competitive advantage resulting from it. We believe that our framework provides a much needed foundation to guide managerial decisions and future research in the increasingly

turbulent business environment where integration and inter-networking serve as the critical means for leapfrogging the competition.

2 Conceptual Foundations

2.1 Overview of Organizational Integration

Organizational integration has been conceptualized in a multitude of ways since it first appeared in the academic literature. It is understood rather differently by the various fields, such as strategic management, information systems, and operations management, (e.g. Barki and Pinsonneault 2005; Chandra and Kumar 2001; Glouberman and Mintzberg 2001), with the reason being that each field focuses on its own area of organizational activities or components. In the strategic management literature, integration has been defined as “the process of achieving unity of effort among the various subsystems in the accomplishment of the organization’s tasks” (Lawrence and Lorsch 1969) and as “the coordination of activities and the management of the dependencies between them” (Glouberman and Mintzberg 2001). An oft-repeated theme in the literature has to do with organizations which have strong functional walls, in that they are frequently slower to adapt to fast changing environments, thus strengthening the case for integration (Bartlett 1995). In the field of logistics and operations, integration is perceived as the coordinated management of information, material flows, plant operations, and logistics through a common set of principles, strategies, policies, and performance metrics (Chandar and Kumar 2001; Lee and Billington 1993). Interdepartmental integration has also been defined as “the willingness of departments to work together, which emphasizes working together, having mutual understanding, having a common vision, sharing resources, and achieving collective goals.” (Kahn and Mentzer 1998). From an innovation management perspective, integration represents how well the activities of the innovation process are interconnected and tightly coordinated (Cooper and Kleinschmidt 1987; Dosi 1988).

In this information systems field, the concept of organizational integration has been understood in two ways. From a technical point of view, integration represents the extent to which different systems are interconnected and can talk to one another (Chiang et al. 2000; Goodhue et al. 1992). The other perspective views integration as the extent to which the business processes of two or more independent organizations are standardized and tightly coupled through computers and telecommunications technologies (Dan et al. 2001; Malone et al. 1999; Srinivasan et al. 1994; Truman 2000). Internet technologies, Enterprise Resource Planning (ERP) systems, mass customisation, and supply chain management, are clear portents of initiatives made in this area (Braganza 2002). Braganza (2002) also further delineated the various types of organizational integration along 3 attributes: i) characteristics, in which integration can be characterized as the co-operation between teams and functions (Millson and Wilemon 2002); ii) scope, referring to the extent of the functions to be integrated, and finally iii) elements, which refers to organizational elements which need to be integrated, such as strategy and culture (Fuchs et al. 2000). Regardless of the domain, however, it is clear that, through IT, an unprecedented degree of organizational integration can be attained.

Though the concept of integration varies widely across domains, they share some common characteristics. Hence, in this paper we adopt a definition of organizational integration consistent with that of Barki and Pinsonneault's (2005), defining organizational integration as the "extent to which distinct and interdependent organizational components constitute a unified whole". The term "component" denotes organizational units, departments, or partners including the business processes, people, and technology involved (Leavitt 1971). Barki and Pinsonneault (2005) further describe organizational integration in terms of the processes which are internal or external to an organization (Porter 1985; Williamson 1985). Thus the integration of internal processes within a firm is described as *internal organizational integration*, whereas the integration of processes between firms can be referred to as *external organizational integration*.

Additionally, internal and external processes can be further subdivided into those which pertain to primary (operational) or secondary activities (functional). Primary activities are those such as manufacturing processes, while secondary activities are represented by administrative functions like finance and human resources. Finally, adopting Williamson's (1985) framework, external operational processes can be categorised according to whether they are forward, backward, or laterally directed, with regard to their clients, suppliers, or partially assembled products.

2.2 Theoretical Mechanisms of Organizational Integration

The resource-based theory of the firm, a guiding theory in the field of strategic management (Sirmon and Hitt 2003) provides great efficacy in understanding the inherent value created when integration occurs. Barney's (1991) seminal article contends that all firms have resources (consisting of assets and capabilities), while successful firms possess a unique subset of resources which enables them to achieve competitive advantage, and a further subset which leads to superior long term performance (Wernerfelt 1984). Furthermore, Barney (1991) posits that resources help in attaining sustained competitive advantage when they fulfil requirements in four areas: value, rareness, imperfect imitability, and non-substitutability. Wade and Hulland (2004) have extended the resource-based view to render it more useful for information systems research. Recent literature has suggested that in highly turbulent and hypercompetitive settings (Teece et al. 1997), strategic advantages are gained by integrating and reconfiguring resources into bundles, which are then used in strategy formulation (Eisenhardt and Martin 2000; Sirmon and Hitt 2003). Though the resource-based view has come under attack from many quarters, for being non-generalizable and having constructs which are difficult to operationalize, amongst others, we agree with several authors that true competitive advantage does not accrue from a few resources or capabilities, but instead involves complex networks of interacting and evolving resources (Levitas and Nodofor 2006, Black and Boal 1994, Dierickx and Cool 1989, Lavie 2006).

Extending this, we believe that complementing the resource-based view with a configurational perspective would further enrich our understanding of organizational integration. The configuration theory suggests that the configuration of the firm can be assessed as the degree to which an organization's elements are orchestrated, closely aligned, reinforcing each other and all

connected by a single theme (Miller 1996). A high degree of configuration also delivers many valuable benefits, such as synergy, clarity of direction and coordination, difficulty of imitation, and distinctive competence, amongst others (Black and Boal 1994; Miller 1993; Porter 1985; Whitney 1995). This dovetails with the resource-based view, where dynamic capabilities within the firm are configured in a network of connected assets, which in itself allows the firm to gain competitive advantage (Black and Boal 1994). Lavie (2006) makes a useful distinction between shared and non-shared resources, and illustrates how various internal and external factors influence the composition of rents extracted by the focal firm in an alliance. In summary, the levels of integration attained by the firm derive from the twin effect of network and configurational factors providing the organizing context for its resources. We expound on these concepts later in the explication of our model.

The above leads us logically to the concept of causal ambiguity. Causal ambiguity has been defined variously, as a barrier which makes imitation difficult, and thus provides competitive advantage that “resists erosion by competitor behavior” (Porter 1985). It has also been defined as “the phenomenon surrounding business actions and outcomes that makes it difficult for competitors to imitate strategies” (Lippman and Rumelt 1982). With regard to the resource-based view, causal ambiguity has been conceptualized as a dimension of imperfect imitability, or “inimitability”, a trait which certain resources (or networks/configurations of resources) possess which allows their owner to achieve sustained competitive advantage. This concept of inimitability in terms of causal ambiguity has been operationalized by strategy researchers (e.g. King and Zeithaml 2001).

2.3 Role of IT Resources in Enabling Organizational Integration

IT resources can be defined in terms of *assets* (tangible or intangible) for e.g. information systems hardware, network infrastructure, and *capabilities*, which refers to skills for e.g. technical/managerial ability which transform inputs to outputs of greater worth (Amit and Schoemaker 1993; Wade and Hulland 2004). Several scholars support this division, including Ravichandran and Lertwongsatien (2005), who state that the IS capability of a firm depends on the human, technology, and relationship resources of the IS department.

In this paper, we conceptualize IT assets as a second-order construct comprising of IT infrastructure resources and IT application architecture resources. IT infrastructure refers to the foundation for the delivery of business applications and services (Broadbent and Weill 1997), referring primarily to the hardware, software and network assets of the firm. It can vary according to reach and range (Keen 1991). On the other hand, IT application architecture primarily refers to the use of architectural software approaches, namely the service-oriented architecture (e.g. XML, WSDL, SOAP etc) examined in this paper. IT application architecture in this study refers primarily to the extent to which an organization has designed its architecture in line with the service-oriented architecture/computing paradigm. Service-oriented architecture is concerned primarily with the design and deployment of modular services to better support modular use and organizational integration. Applications use these services by composing them together. Such architecture has three main parts: a provider, a consumer, and a registry (Huhns and Singh 2005). Current web service standards and techniques in use by many

organizations support the service-oriented model incidentally, with the basic standards employed similar to the key concepts of service-oriented architecture.

Next, IT capabilities are also conceptualized as second-order constructs made up of IT management skills and IT technical skills. The former refers to the ability to provide leadership for the IS function, manage IT projects, and evaluate technology options (Mata et al. 1995). Managerial IT skills are also believed to significantly reduce the costs and lead times associated with IT development (Bharadwaj 2000), and assist in envisioning creative and feasible technical solutions to business problems, thus enhancing the overall technological capability of an organization (Feeny and Willcocks 1998). Technical skills refer to the ability to design and develop effective information systems. This is inclusive of being proficient in system analysis and design, infrastructure design, and programming, amongst others (McKenney et al. 1995). While some may contend that technical IT skills are easily obtainable in the labour market (Mata et al. 1995), the mainstream IT adoption literature suggests that such skills are in fact subject to organizational learning dynamics (Fichman 2000), similar to how IT management skills are accrued. Thus a pre-existing IT skill-set or knowledge base can allow firms to more easily adopt and utilize IT.

We regard organizational integration as an IT-dependent strategic initiative, consisting of identifiable competitive moves that depend of the use of IT to be enacted, and are designed to lead to sustained improvements in a firm's competitive position. It refers to a configuration of IT resources into an activity system, dependent on IT at its core, which fosters the creation and appropriation of economic value (Piccoli and Ives 2005). Hence, both IT assets and IT capabilities are complementary resources in enabling organizational integration. Accordingly, we define *IT-enabled organizational integration* as the "extent to which distinct and interdependent organizational components constitute a unified whole, facilitated though the configuration of an organizational activity system with IT at its core, and reliant upon the availability of information technology infrastructure, open application architecture, and the support of IT management and technical skills." As such, IT-enabled organizational integration is an IT-dependent strategic initiative which cannot be feasibly executed without the enabling technological resources mentioned above.

2.4 Sustained Competitive Advantage

Sustained competitive advantage (SCA) accrued through IT-dependent strategic initiatives has remained a point of contention among strategy and information systems researchers. Competitive advantage is created "when value produced in an economic exchange in which the firm partakes is greater than the value that could be created were the firm not to participate in the exchange" (Brandenburger and Stuart 1996). Sustainability, on the other hand, is not quite so easy to define. Porter (1985) has defined it as a condition where "a firm's competitive advantage resists erosion by a competitor's behaviour", and which requires that the firm possesses barriers which makes imitation of the strategy difficult. Barney (1991) in explicating the resource-based view, went on to say that "a competitive advantage is sustained only if it continues to exist after efforts to duplicate that advantage have ceased", a definition which faces obvious problems when one attempts to operationalize it (Wiggins and Ruefli 2002), as it implies the notion

that sustained competitive advantage is any competitive advantage which lasts forever, which is clearly impossible. Some academics, adopting a philosophical view, have even stated that competitive advantage is not a necessary and sufficient condition for superior returns, and that competitive advantage is but a metaphor (Powell 2001). There are obvious difficulties to measuring sustained competitive advantage when it has been conceptualized in such nebulous terms. We thus adopt a more pragmatic formulation of sustained competitive advantage, consistent with that of Mata et al. (1995) and Piccoli and Ives (2005), in that it accrues when “competitors face significant challenges in acquiring, developing, and using” the resources underlying the value creating strategy. In doing so we acknowledge the role of barriers to erosion and response lag drivers in creating sustained competitive advantage. According to Piccoli and Ives (2005), four barriers to erosion exist which allow IT-dependent strategic initiatives to sustain their performance: the IT resources barrier (consisting of IT infrastructure, information repositories, technical skills, IT management skills, and relationship assets), complementary resources barrier, IT project barrier (consisting of technology characteristics such as visibility, uniqueness and complexity, and the implementation process), and pre-emption barrier (switching costs and value system structural characteristics between firms).

3 Model of Sustained Competitive Advantage

Figure 1 depicts our proposed model, where IT-enabled organizational integration is represented by OI and sustained competitive advantage is denoted by SCA.

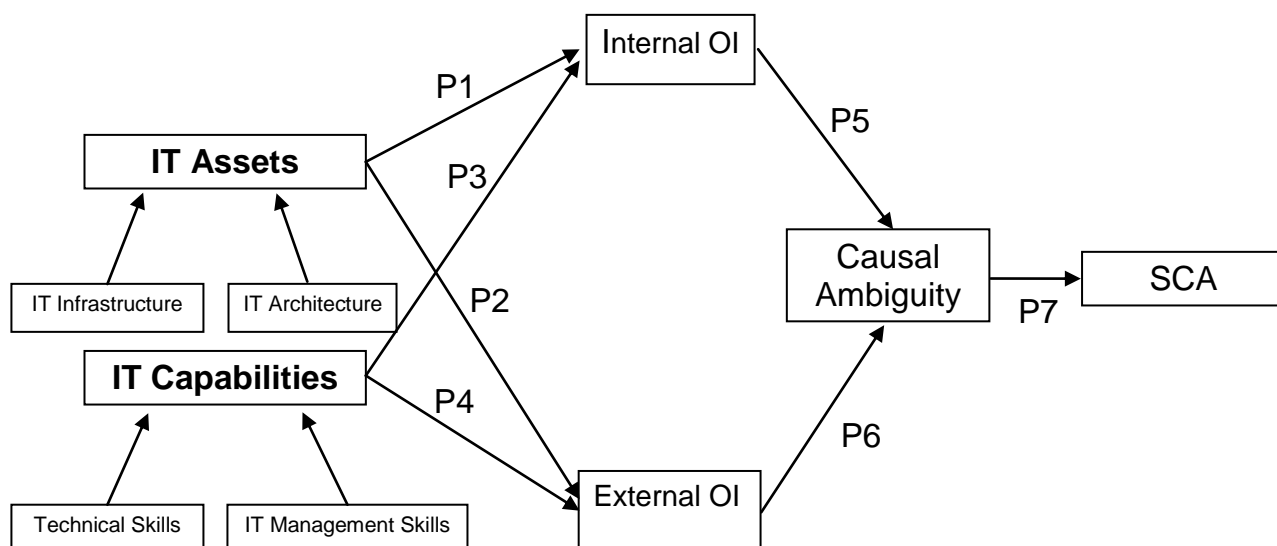


Figure 1: Model of IT-enabled Organizational Integration and SCA

3.1 IT Resources as Antecedents of Organizational Integration

Within a firm, IT resources are mandatory when it comes to achieving internal organizational integration. IT capabilities can comprise both IT infrastructure and human resource capability (Bharadwaj 2000). Human, business, and IT resources within the firm are recognised as drivers of performance when they are integrated across these categories (Powell and Dent-Micallef 1997; Walton 1989). These

internal IT resources parallel the Inside-Out IS resources as described by Wade and Hulland (2004), and consist of resources such as IS infrastructure, IS technical skills, IS development, and cost-effective IS operations. In the context of net-enabled retail organizations, IT infrastructure was found to be a critical antecedent for firms to achieve organizational integration (Oh and Teo 2006).

The quality of the IT resource also plays a defining role in facilitating external organizational integration. Dell, Toys R US, and Wal-mart use sophisticated inventory management technologies to link up with their suppliers to improve operational efficiencies and services (Powell and Dent-Micallef 1997). Without IT, many of the integration initiatives which have taken place in recent years would never have materialised. These external IT resources are analogous to the Outside-In resources described by Wade and Hulland (2004), and consist of external relationship management and market responsiveness, amongst others.

Rockart and Short (1989) have argued that IT serves primarily to manage organizational interdependence and solve coordination problems among departments and strategic business units. Consistent with the resource-based and configurational views, IT resources, like other resources, are sources of competitive advantages when configured in a network and when they complement each other (Wade and Hulland 2004). Melville et al. (2004) acknowledge that in order to contribute to organizational performance, IT resources, consisting of technology and human resources (analogous to assets and capabilities) and complementary organizational resources have to be bundled and configured, with industry and country characteristics playing a role as part of the external environment. Hence, we posit that:

Proposition 1 (P1): The quality of IT assets in an organization is positively related to its degree of internal organizational integration.

Proposition 2 (P2): The quality of IT assets in an organization is positively related to its degree of external organizational integration.

Proposition 3 (P3): The quality of IT capabilities in an organization is positively related to its degree of internal organizational integration.

Proposition 4 (P4): The quality of IT capabilities in an organization is positively related to its degree of external organizational integration.

3.2 Organizational Integration, Causal Ambiguity and SCA

Internal organizational integration creates sustained competitive advantage which can be understood primarily through two mechanisms: the resource-based view, and through dynamic capabilities. Barney (1992) expounds on the resource-based view through the VRIO (value, rareness, inimitability and organizational orientation) framework, attempting to address the economic implications of resource characteristics, and which takes into account the limitations of his earlier work. However, in this framework the interaction between resources is still largely ignored (Black and Boal 1994). More recent expositions of the resource-based view explain that competitive advantage is accrued through judicious resource-picking, which provides the accumulation of resources which work in concert with and complement each other (Makadok 2001). Melville et al. (2004) and Powell and Dent-Micallef (1996) also state that synergies exist between IT

resources and complementary organizational resources within a firm, enable superior organizational performance. This is consistent with Piccoli and Ives' (2005) IT Resources Barrier and Complementary Resources Barrier to erosion.

Amit and Schoemaker (1993) have defined capabilities as "a firm's capacity to deploy resources, usually in combination with organizational processes, to achieve a desired end". He also goes on to state that such capabilities are firm specific and embedded in the organization, and that its' primary purpose would be to enhance the productivity of other resources. Capabilities, unlike other resources, affect economic profit only after the acquisition of other resources and can not do so if such acquisition does not materialise (Makadok 2001). Dynamic capabilities have the capacity to create barriers to erosion of competitive advantage such as the IT Project Barrier mentioned by Piccoli and Ives (2005). Thus it is clear that such capabilities and resources are contained within the firm and it is only through internal organizational integration that competitive advantage can be derived.

External organizational integration emphasizes the synthesis of the resource-based view and the notion of complex networks or configurations. When integration occurs at the firm level, the network resources of interconnected firms, divided into nonshared focal firm resources, shared resources, and nonshared partner resources, allow the firm to extract different kinds of economic rents (Lavie 2006). The combination of nonshared focal firm resources and shared resources create internal and outbound spillover rents, shared resources alone produce appropriated relational rent, and the combination of nonshared partner resources and shared resources create inbound spillover rent. This definition overcomes the problems inherent in the traditional resource-based view, which favors the assumptions of resource immobility and control (Amit and Schoemaker 1993; Barney 1991), both of which are unsuitable for explaining the role of network resources and advantage accrued from network alliances. Dyer and Singh (1998) have put forward the relational view, which complements the resource-based view by arguing that critical resources may span firm boundaries and that firms earn relational rents, jointly generated with alliance partners, in addition to Ricardian and quasi-rents. These rents are amassed when firms dedicate resources to alliance relationships, and when complementarities between their resources and their partners' resources exist.

Consistent with the above, Black and Boal's (1994) perception of the value which external integration accumulates is expressed in the form of contained resources, comprising of simple networks of resource factors which can be monetarily valued, and system resources, consisting of complex networks of firm resource factors. Networks consist of two types: local and structural (Berkowitz 1982; McCallister and Fischer 1983). Synthesizing network theory and the resource-based view, local networks are the configurations of relationships within a level of analysis among the factors, and where the entire network results in a resource. A structural network is the configuration of relationships between local networks and between a factor of a local network and other networks and factors. Local networks usually refer to the configuration of the internal resources of an organization (McCallister and Fischer 1983), while external configuration of resources outside of its local network constitutes its structural network (Berkowitz 1982). When conceptualized in this way, a strategic system resource is a socially

created complex network comprised of tradable and non-tradable factor stocks and flows (resources) and their relationships, which with local network dimensions of tradability, acquisition, network types, substitutability, and cogency, provides complexity which competitor firms cannot imitate and exploit. This is in line with Piccoli and Ives's (1995) notion of Pre-emption barriers to erosion; as such networks of factors often provide impediments for competitors to attain competitive advantage even if they have amassed the individual resources comprising the network itself.

Despite the above, external and internal integration do not in themselves lead directly to sustained competitive advantage. Causal ambiguity is a useful intermediate construct to examine. Causal ambiguity represents a continuum that describes the degree to which decision makers understand the relationships between organizational inputs and results (Lippman and Rumelt 1982). Because strategic issues are intrinsically messy and managers boundedly rational, almost all conclusions regarding strategic resources and their outcomes are causally ambiguous (King 2007). Causal ambiguity about key competencies of a firm generates strategically significant consequences. Causal ambiguity has been linked to interfirm differences in profitability (Lippman and Rumelt 1982), amongst others. Hence, more complex networks of resources created through organizational integration would create higher levels of sustained competitive advantage. This is attained through higher levels of causal ambiguity, as competitors are unable to fully comprehend the factors behind an organization's success because of the configuration of integration of organizational resources. In fact, King (2007) states that "the greater the interconnectedness of a firm's competencies, the greater the level of interfirm causal ambiguity." Hence, we expect that:

Proposition 5 (P5): The degree of internal organizational integration in an organization is positively related to the degree of causal ambiguity.

Proposition 6 (P6): The degree of external organizational integration in an organization is positively related to the degree of causal ambiguity.

Proposition 7 (P7): The degree of causal ambiguity that a firm possesses is positively related to its degree of sustained competitive advantage.

4 Discussion and Implications

Our proposed model has numerous managerial implications. We posit that, *ceteris paribus*, that IT does matter, in the sense that an organization with a higher level of IT resources, in terms of the expertise and quality available, will benefit from higher levels of organizational integration. We have introduced the impact of service-oriented computing into the examination of organizational integration. This emerging technology possesses immense potential to facilitate both internal and external integration, and will certainly be one of the most promising initiatives that deserves our attention. However, it must be noted that not all integration initiatives are equally important and contribute equally to achieving results (Braganza 2002), hence when face with resource constraints, managers would need to exercise their strategic choice in deciding which of the IT assets or

capabilities to invest in. Managers should also be mindful that organizational integration is definitely an IT-dependent strategic initiative that is also industry specific and dependent on the external business environment.

In this article, we advance the resource-based view (RBV) theory of the firm to include the concept of IT-enabled organizational integration and its effects on sustained competitive advantage. More specifically, our framework provides two important contributions to research. Firstly, it formally reconciles the concepts of organizational integration with that of the resource-based view by infusing network and configurational perspectives. Next, it elucidates the process through which IT can enable organizations to attain sustained competitive advantage. We propose that IT assets and resources are critical in enhancing the levels of both internal and external organizational integration. Next, the increased level of organizational integration results in causal ambiguity that provides strong barriers to erosion of competitive advantage. In other words, it is clear that the configurations of resources, not the resources themselves, are sources of above-normal economic rent. In stating this, we also advance Wade and Hulland's (2004) proposition that IS resources influence competitive position indirectly through interactions with other constructs, including resources. Much has been said of the limitations of the resource-based view and many remedies have been offered to address them. The resource-based view is generally acknowledged to be insufficient in tackling the challenges which strategy scholars face (Levitas 2006). The model can be tested through empirical operationalizations of the constructs proposed in this paper. Results would certainly make significant contributions both to the fields of strategic management and information systems.

References

- Amit, R., Schoemaker P. J. H., (1993): Strategic Assets and Organizational Rent, *Strategic Management Journal*, Vol. 14, pp. 33-46.
- Barki, H., Pinsonneault, A., (2005): A Model of Organizational Integration, Implementation Effort, and Performance, *Organization Science*, March-April 2005, Vol. 16, No. 2, pp. 165-179.
- Barney, J.B., (1991): Firm Resources and Sustained Competitive Advantage, *Journal of Management*, Vol. 17, pp. 99-120.
- Barney, J.B., (1992): Integrating Organizational Behavior and Strategy Formulation Research: A Resource-based Analysis, in Shrivastava, P., Huff, A., Dutton, J. (Eds), *Advances in Strategic Management*, JAI Press, Greenwich, CT, Vol. Vol. 8, pp.39-61.
- Bartlett, C. A., (1995): The New Global Challenge Implementing Third-Generation Strategy through Second-Generation Management, in Ready, D.C. (Ed), *In Charge of Change: Insights into Next-Generation Organizations*, International Consortium for Executive Development Research, Lexington, MA pp. 19-33.
- Berkowitz, S. D., (1982): *An Introduction to Structural Analysis: The Network Approach to Social Research*, Butterworth and Co., Ltd, Toronto, Canada.
- Bharadwaj, A. S., (2000): A Resource-Based Perspective on Information Technology Capability and Firm Performance: An Empirical Investigation, *MIS Quarterly*, Vol. 24, No. 1, pp. 169-196.
- Black, J. A., Boal, K. B., (1994): Strategic Resources: Traits, Configurations, and Paths to Sustainable Competitive Advantage, *Strategic Management Journal*, Vol. 15, Special Issue, pp. 131-148.
- Braganza, A., (2002): Enterprise Integration: Creating Competitive Capabilities, *Integrated Manufacturing Systems*, Vol. 13, No. 8, pp. 562-572.

- Brandenburger, A. M., Stuart, H. W., (1996): Value-Based Business Strategy, *Journal of Economics and Management Strategy*, Vol. 5, No. 1, pp. 5-24.
- Broadbent, M., Weill, P., (1997): Management by Maxim: How Business and IT Managers Can Create IT Infrastructures, *Sloan Management Review*, Vol. 38, No. 3, pp. 77-92.
- Chandra, C., S. Kumar, (2001): Enterprise Architectural Framework for Supply Chain Integration, *Industrial Management Data Systems*, Vol. 101, No. 6, pp. 290-303.
- Chiang, R. H. L., Lim, E., Storey, V. C., (2000): A Framework for Acquiring Domain Semantics and Knowledge for Database Integration, *Data Base*, Vol. 31, No. 2, pp. 46-64.
- Cooper, R. G., E. J. Kleinschmidt, (1987): An Investigation into the New Product Process: Steps, Deficiencies, and Impact. *Journal Product Innovation Management*, Vol. 3, No. 2, pp. 71-85.
- Dan, A., D. M. Dias, R. Kearney, T.C. Lau, T.N. Nguyen, F. N. Parr, M.W. Sachs, H. H. Shaikh, (2001): Business-to-business Integration with tpaML and a Business-to-business Protocol Framework, *IBM Systems Journal*, Vol. 40, No. 1, pp. 68-90.
- Dierickx, I., Cool, K., (1989): Asset Stock Accumulation and Sustainability of Competitive Advantage, *Management Science*, Vol. 35, pp. 1504-1511.
- Dosi, G., (1988): Sources, Procedures, and Microeconomic Effects of Innovation. *Journal of Economics Literature*, Vol. 26, No. 3, pp. 1120-1171.
- Dyer, J. H., Singh, H., (1998): The Relational View: Cooperative Strategies and Sources of Inter-organizational Competitive Advantage, *Academy of Management Review*, Vol. 23, pp. 660-679.
- Eisenhardt, K. M., Martin, J. A., (2000): Dynamic Capabilities: What Are They?, *Strategic Management Journal*, Vol. 21, pp. 1105-1121.
- Ettie, J. E., E. M. Reza., (2001): Organizational Integration and Process Innovation, *Academy of Management Journal*, Vol. 35, No. 4, pp. 795-827.
- Feeny, D. F., Willcocks, L. P., (1998): Core is Capabilities for Exploiting Information Technology, *Sloan Management Review*, Vol. 39, No. 3, pp. 9-21.
- Fichman, R. G., (2000): The Diffusion and Assimilation of Information Technology Innovations, in *Framing the Domains of IT Management: Projecting the Future through the Past*, R. W. Zmud (Ed), Pinnaflex, Cincinnati, OH, pp. 105-127.
- Fuchs, P. H., Mifflin, K. E., Whitney, J.O., (2000): Strategic Integration: Competing in the Age of Capabilities, *California Management Review*, Vol. 42, No. 3, pp. 118-147.
- Glouberman, S., H. Mintzberg., (2001): Managing the Care of Health and the Cure of Disease – Part II: Integration, *Health Care Management Review*, Vol. 26, No. 1, pp. 70-84.
- Goldhue, D. L., Wybo, M. D., Kirsch, L. J., (1992): The Impact of Data Integration on the Costs and Benefits of Information Systems, *MIS Quarterly*, Vol. 16, No. 3, pp. 293-311.
- Huhns, M., Singh, M. P., (2005): Service-Oriented Computing: Key Concepts and Principles published by the *IEEE Computer Society*, pp. 75-81.
- Kahn, K. B., Mentzer, J. T., (1998): Marketing's Integration with other Departments, *Journal of Business Research*, Vol. 42, pp. 53-62.
- Keen, P. G. W., (1991): Shaping the Future: Business Design through Information Technology, *Harvard Business School Press*, Boston.
- King, A. W., (2007): Disentangling Interfirm and Intrafirm Causal Ambiguity: A Conceptual Model of Causal Ambiguity and Sustainable Competitive Advantage, *Academy of Management Review*, Vol. 32, No. 1, pp. 156-178.
- King, A.W., Zeithaml, C. P. (2001): Competencies and Firm Performance: Examining the Causal Ambiguity Paradox, *Strategic Management Journal*, Vol. 22, No. 1, pp. 75-99.
- Lavie, D., (2006): The Competitive Advantage of Interconnected Firms: An Extension of the Resource-Based View, *Academy of Management Review*, Vol. 31, No. 3, pp. 638-658.

- Lawrence, P. J. Lorsch., (1969): *Organization and Environment*, Harvard Business School Press, Boston, MA.
- Lazonick, W., West, J., (1998): Organizational Integration and Competitive Advantage, *Industrial and Corporate Change*, Vol. 4, pp. 229-270.
- Leavitt, H. J., (1971): Change in Industry: Structural, Technical and Human Approaches, in V.H. Vroom, E.L. Deci (Eds), *Management and Motivation*, Penguin Books, New York.
- Lee, H. L., C. Billington., (1993): Material Management in Decentralized Supply Chains, *Operations Research*, Vol. 41, No. 5, pp. 835-847.
- Levitas, E., Ndofor, H. A., (2006): What to Do with the Resource-Based View: A Few Suggestions for What Ails the RBV that Supporters and Opponents Might Accept, *Journal of Management Inquiry*, Vol. 15, No. 2, pp. 135-144.
- Lippman, S., Rumelt, R., (1982): Uncertain Imitability: An Analysis of Interfirm Differences in Efficiency under Competition, *Bell Journal of Economics*, Vol. 13, pp. 418-438.
- Magretta, Joan., (1998): The Power of Virtual Integration: An Interview with Dell Computer's Michael Dell, *Harvard Business Review*, Mar-Apr 1998, pp. 73-84.
- Malone, T.W., K. Crowston L. Lee, B. Pentland, C. Dellacorras, G. Wyner, J. Quimby, C. S. Osborn, A. Bernstein, G. Herman, M. Klein, E. O'Donnell., (1999): Tools for Inventing Organizations: Toward a Handbook of Organizational Processes, *Management Science* Vol. 45, No. 3, pp. 425-443.
- Markus, L. M., (2001): Reflections on the System Integration Enterprise, *Business Process Management Journal*, Vol. 7, No. 3, pp. 1-9.
- Mata, F. J., Fuerst, W. L., Barney, J. B., (1995): Information Technology and Sustained Competitive Advantage: A Resource-Based Analysis, *MIS Quarterly*, Vol. 19, No. 4, pp. 487-505.
- McCallister, L., C.S. Fisher, (1983): A Procedure for Surveying Personal Networks, in R.S. Burt and M. J. Minor (Eds), *Applied Network Analysis: A Methodological Introduction*. Sage Publications, Beverly Hills, CA pp. 75-88.
- McKenny, J. L., Copeland, D. C., Mason, R. O., (1995): Waves of Change: Business Evolution through Information Technology, *Harvard Business School Press*, Boston.
- Melville, N., Kraemer, K., and Gurbaxani, V., (2004): Review: Information Technology and Organizational Performance: An Integrative Model of IT Business Value, *MIS Quarterly*, Vol. 28, No. 2, pp. 283-322.
- Miller, D., (1996): Configurations Revisited, *Strategic Management Journal*, Vol. 17, No. 7, pp. 505-512.
- Miller, D., (1993): The Architecture of Simplicity, *Academy of Management Review*, Vol. 18, pp. 116-138.
- Millson, M. R., Wilemon, D., (2002): The Impact of Organizational Integration and Product Development Proficiency on Market Success, *Industrial Marketing Management*, Vol. 31, pp. 1-23.
- Oh, L.B., Teo, H.H., (2006): Building Ambidextrous Competences through Resource Integration: A Fitness Landscape Approach, Presented at the 66th *Academy of Management Annual Meeting*, Atlanta, Georgia, USA, 11-16 August 2006.
- Piccolo, G., Ives, B., (2005): Review: IT-Dependent Strategic Initiatives and Sustained Competitive Advantage: A Review and Synthesis of the Literature, *MIS Quarterly*, Vol. 29, No. 4, pp. 747-776.
- Porter, M. E., (1985): *Competitive Advantage: Creating and Sustaining Superior Performance*, The Free Press, New York.
- Porter, M. E., (2001), Strategy and the Internet, *Harvard Business Review*, Vol. 79 (March) pp. 63-78.
- Powell, T. C., Dent-Micallef, A., (1997): Information Technology as Competitive Advantage: The Role of Human, Business, and Technology Resources, *Strategic Management Journal*, Vol. 18, No. 5, pp. 375-405.

- Powell, T. C., (2001): Competitive Advantage: Logical and Philosophical Considerations, *Strategic Management Journal*, Vol. 22, pp. 875-888.
- Ravichandran, T., Lertwongsatien, C., (2005): Effect of Information Systems Resources and Capabilities on Firm Performance: A Resource-based Perspective,” *Journal of Management Information Systems*, Vol. 21, No. 4, pp. 339-358.
- Rockart, J., J. Short, (1989): IT in the 1990s: Managing Organizational Interdependence, *Sloan Management Review*, Winter pp. 7-17.
- Sirmon, D. G., Hitt, M. A., (2003): Managing Resources: Linking Unique Resources, Management, and Wealth Creation in Family Firms, *Entrepreneurship Theory and Practice*, pp. 339-358.
- Srinivasan, K., S. Kekre, T. Mukhopadhyay., (1994): Impact of Electronic Data Interchange Technology on JIT shipments, *Management Science*, Vol. 40, No. 10, pp. 1291-1304.
- Teece, D. J., Pisano, G., Shuen, A., (1997): Dynamic Capabilities and Strategic Management, *Strategic Management Journal*, Vol. 18, No. 7, pp. 509-533.
- Thompson, J. D., (1967): *Organizations in Action*, McGraw-Hill, pp. 1-65
- Truman, G., (2000): Integration in Electronic Exchange Environments, *Journal of Management Information Systems*, Vol. 17, No. 1, pp. 209-244.
- Walton, R., (1989): Up and Running: Integrating Information Technology and the Organization, *Harvard Business School Press*, Boston, MA.
- Wade, M., Hulland, J., (2004): Review: The Resource-Based View and Information Systems Research: Review, Extension, and Suggestions for Future Research, *MIS Quarterly*, Vol. 28, No. 1, pp. 107-142.
- Wernerfelt, B., (1984): A Resource-Based View of the Firm, *Strategic Management Journal*, Vol. 5, pp. 171-180.
- Whitney, J. O., (1996): Strategic Renewal for Business Units, *Harvard Business Review*, July 1996.
- Wiggins, R. R., Ruefli, T. W., (2002): Sustained Competitive Advantage: Temporal Dynamics and the Incidence and Persistence of Superior Economic Performance, *Organization Science*, Vol. 13, No. 1, pp. 82-105.
- Williamson, O. E., (1985): *The Economic Institutions of Capitalism*, The Free Press, New York.