

Overview of The Business Value of IT Literature

Scholars in many fields have sought to rationalize and explain how investments in IT resources and capabilities by the firm, can affect performance, and potentially serve as sources of competitive advantage. Studies exist in the fields of MIS, Accounting, Economics, Management, Sociology, Psychology, Engineering, and Science to explore the roles and relationships between IT and the organization. However, in this study we will focus on what we can learn from prior research in the Strategy and MIS domains. Work in the MIS area on this topic is quite prevalent, with more than 200 studies documented in recent review articles (Kohli and Devaraj, 2003; Melville, Kraemer, and Gurbaxani, 2004; Piccoli and Ives, 2005). This body of work has employed micro economic, industrial organization, sociological, and more recently RBV perspectives in which to ground its research (Melville et al., 2004). However, scholars have recently also has suggested the need for consideration of transaction cost economics (TCE) (Williamson, 1975), and dynamic capabilities (DC) (Teece et al., 1997) perspectives (Melville et al., 2004). This suggests a strong fit with related work in Strategic Management and calls to address the roles of resources and capabilities in the firm and its performance (i.e. Hoopes et al., 2003). However, research on this topic in an IT context in the Strategic Management literature has been extremely limited. Here, such work tends to view IT investments as merely a means of improving the firm's competitive position (Powell and Dent-Micallef, 1997; Miller, 2003; Zott, 2003), or avoiding a competitive disadvantage (Mata, Fuerst, and Barney, 1995). Therefore, in this paper, we seek first to understand what MIS scholars studying the "business value of IT" have been accomplished and what they still seek to discover, and then look to the Strategic Management literature to see how theory developed there can further inform work on this topic and context.

The definition of the "business value of IT," in MIS research, is "the organizational performance impacts of IT at both the intermediate process level and the organization-wide level, and comprising of both efficiency impacts and competitive impacts" (Melville et al., 2004, p. 287). Collectively, this body of research continues to struggle with the issue of an "IT value paradox" in regards to the relationship between IT investments and firm performance (Kohli and Devaraj, 2003; Melville et al., 2004; Piccoli and Ives, 2005). Some studies find mixed results for the IT investment – performance relationship (Barua et al., 1995; Francalanci and Galal, 1998), while others find negative relationships (Loveman, 1994; Lee and Barua, 1999). Yet other studies find that IT gains might be largely subject to implementation issues (Brynjolfsson and Hitt, 1998; Mooney, Gurbaxani, and Kraemer, 1996). Further, other work also suggests that many prior studies may also be subject to measurement issues of the IT artifact as well as level of analysis problems (Bharadwaj, 2000).

Numerous recent review and meta-analysis type studies have appeared which attempt to discern some of the potential reasons for the observations across this body of work (e.g., Kohli and Devaraj, 2003; Melville et al., 2004; Piccoli and Ives, 2005). While these types of studies correctly identify many of the weaknesses and limitations of prior work on the business value of IT, we are still lacking a clear and effective explanation as to where, when, and how IT can support the firm and its performance. For example, most studies (e.g., Melville et al., 2004; Piccoli and Ives, 2005), simply assume IT is a source of sustainable competitive advantage (based on vague support in the RBV), without clearly establishing theoretically, or articulating how to support empirically, why and how IT affects firm performance in a persistent manner. Collectively, this body of research has made some substantial contributions to research on the relationship between IT and firm performance. For example, these contributions include: 1) Clarifying the IT construct; 2) Defining the proper levels of analysis; 3) Identifying important performance mechanisms and mediating and moderating factors in the firm and its environment; 4) Suggesting the useful theoretical lenses for analysis; 5) Defining the performance constructs and potential measures; and 6) Developing the basis for conceptually modeling the business value of IT. These “central tenets” for studying the performance implications of IT for the firm are in the table below and discussed in further detail in the remainder of this section.

Table 1. Central Tenets for Studying the Performance Implications of IT

<p>1) Correctly identify, define, and measure the IT construct:</p> <ul style="list-style-type: none"> • Construct should be limited to tool, proxy, ensemble, and/or nominal conceptualizations (Orlikowski and Iacono, 2001). • Ensemble view is likely the most appropriate conceptualization for examining the roles of IT resources and capabilities in performance (Melville et al., 2004). <p>2) Distinguish between the process and firm levels:</p> <ul style="list-style-type: none"> • IT affects firm performance through intermediate business processes (Barua et al., 1995; Mukhopadhyay et al., 1995; Melville et al., 2004). <p>3) Consider the role of mediating and moderating endogenous and exogenous factors:</p> <ul style="list-style-type: none"> • IT will interact with, and be mediated through or moderated by, other resources and capabilities existing within the firm (Devaraj and Kohli, 2003; Melville et al., 2004; Piccoli and Ives, 2005). • Relationships among IT, existing resources and capabilities, and a firm's business processes, with performance, will be affected by the external environment (Melville et al., 2004; Piccoli and Ives, 2005). <p>4) Establish theoretical mechanisms for the relationships among the elements of IT business value:</p> <ul style="list-style-type: none"> • Most assume the value of IT to be based upon the resource-based view (RBV) (Mata et al., 1995; Hitt and Brynjolfsson, 1996; Dewan et al., 1998; Melville et al., 2004; Piccoli and Ives, 2005; Ray et al., 2005). • Need for consideration of TCE, and dynamic capabilities perspectives, in addition to RBV to better inform our understanding of the IT - performance relationship (Melville et al., 2004; Drnevich et al., 2005; 2006). <p>5) Differentiate measures of performance between efficiency and effectiveness:</p> <ul style="list-style-type: none"> • IT can influence firm efficiency and effectiveness (Melville et al., 2004). • Creating operational efficiencies for the firm is an important role of IT, but IT can also be a source of flexibility, structure, and scope, which hold implications for effectiveness (Drnevich et al., 2005; 2006). <p>6) Choose a model and research design that will accurately depict, measure, and test the role of IT in the firm and its performance:</p> <ul style="list-style-type: none"> • Include the means for IT contributions to accrue to the level of the firm (Drnevich et al., 2005; 2006), such as two stage models, which take into account first and second order effects of IT (Barua et al., 1995; Melville et al., 2004). • Take into consideration the exogenous effects of the external environment on the process-level performance to firm-level performance relationship (Melville et al., 2004; Piccoli and Ives, 2005; Drnevich et al., 2005; 2006).

2.1 Clarifying the IT Construct

The construct of "IT" may be operationalized in many ways. Fortunately, there appears to be some consensus (Melville et al., 2004), that the construct should be limited to tool, proxy, ensemble, and/or nominal conceptualizations (see Orlikowski and Iacono, 2001) for IT business value research. Thus, most prior studies operationalize IT as a "tool" leading to a specific intended outcome, as a "proxy" through aggregate variables (i.e. IT \$), as a factor which may mediate or moderate value as part of an "ensemble" of other organizational factors, or simply as a "nominal" abstract concept (Melville et al., 2004). Of these conceptualizations, it appears that while the tool view may lend itself most applicably to empirical

research, and the nominal view may work best for modeling purposes, the ensemble view is likely the most appropriate conceptualization for examining the role of IT acting through a firm's resources and capabilities to affect performance. Thus, to be consistent with this usage, and with prior theory (Dosi, Nelson, and Winter, 2000; Winter, 2003), as alluded to earlier we view the IT artifact in this study as two distinct constructs based upon its usage in the firm. These uses correspond to "zero-order" "resource" uses of IT and "first-order" "capability" uses of IT.

2.2 Defining the Levels of Analysis

Levels of analysis for IT business value research appear equally of concern in both the Strategy and MIS fields (Barua et al., 1995; Ray et al., 2004; Drnevich and Shanley, 2005). Given the size and distance differentials between IT and performance measures at the firm level of analysis, most recent research indicates the study of IT value should focus on the IT – business process relationship (Barua et al., 1995; Mukhopadhyay, Kekre, and Kalathur, 1995; Melville et al., 2004). Therefore the literature offers some consensus that IT is a process-level construct that affects firm performance through intermediate business processes (Barua et al., 1995; Mukhopadhyay et al., 1995; Melville et al., 2004). For example, while firm-level IT investments do exist (i.e. ERP systems, Enterprise software suites, etc.) most IT investments are made with the intention of supporting and/or improving many of a firm's functional business processes (i.e. accounting, HR, manufacturing, supply chain, etc.). Further, IT will interact with other resources and capabilities existing within the firm, and these relationships among IT, a firm's existing resources and capabilities, and a firm's business processes and performance, are affected by the firm's internal and external environment (Devaraj and Kohli, 2003; Melville et al., 2004; Piccoli and Ives, 2005).

2.3 Identifying Mediating and Moderating Relationships

With respect to studying the role and value of IT investments in the firm, both process-level and firm-level measures have been used in the literature to measure the performance implications of IT (Barua et al., 1995; Melville et al., 2004; Piccoli and Ives, 2005). This is potentially problematic if research designs do not include the means for IT contributions (which are largely at the process level and act through an ensemble of other resources and capabilities) to accrue to the level of the firm. For these reasons, two stage models, which take into account first and second order effects of IT, are likely required (Barua et al., 1995). Further, research on this topic and context should also take into consideration the exogenous effects of the external environment on this process-level performance to firm-level performance relationship (Melville et al., 2004; Piccoli and Ives, 2005).

2.4 Theoretically Grounding the Role of IT in Firm Performance

Most recent business value of IT research studies (e.g., Dewan, Michael, and Min, 1998; Hitt and Brynjolfsson, 1996; Melville et al., 2004; Piccoli and Ives, 2005), generally assume the value of IT to be based upon the resource-based view (RBV) (Wernerfelt, 1984; Barney, 1991). However, while reviews of the literature on this topic generally assume that IT plays some role in performance at either the process or firm level (Kohli and Devaraj, 2003; Melville et al., 2004; Piccoli and Ives, 2005), as we mentioned earlier, such a relationship between IT resources and capabilities has yet to be clearly and effectively established theoretically, or conclusively supported empirically. This is likely due in part to study designs which over rely on limited and often incomplete operationalizations of single theory explanations (i.e. RBV), and/or fail to consider the process, firm, and industry level mechanisms, which can mediate or moderate the IT - performance relationship.

This is important as it appears likely that it is the capability to manage IT (Mata, Fuerst, and Barney, 1995), not the ability to “pick” the correct (IT) resources (e.g. Makadok, 2001), that may lead to sustainable competitive advantage (Carr, 2004). This would indicate that grounding “*Business Value of IT*” research in RBV assumptions alone, to the exclusion of alternative theories and their considerations, as has generally been the case, is potentially problematic. Such incomplete and/or incorrect theoretical grounding of topic may explain in part, the paradoxical relationship between IT and firm performance observed in much of the research on this topic (Berndt and Morrison, 1995; Carr, 2004; Melville et al., 2004; Orlikowski and Barley, 2001; Tippins and Sohi, 2003). We therefore agree with the conclusions of Melville et al. (2004), that suggest the need for consideration of transaction cost economics (Williamson, 1975, 1985, 1991), and dynamic capabilities (Teece et al., 1997; Eisenhardt and Martin, 2000) perspectives, in addition to RBV to better inform our understanding of the IT - performance relationship.

2.5 Effectively Measuring the Performance Implications of IT

The business value of IT literature commonly uses two conceptual formulations for measuring the performance implications of IT (Melville et al., 2004). These conceptualizations are analogous to the classic *efficiency* (doing things right) vs. *effectiveness* (doing the right things) debate from the strategic management literature (Barnard, 1938; Knight, 1941; Hayek, 1945; Williamson, 1991). These potential performance implications also are theoretically consistent with distinctions in a firm’s strategic objectives between “economizing” and “strategizing” (Williamson, 1991).

However, while we accept that IT can improve efficiency, most prior studies do not appear to clearly establish or model the relationship between efficiency and effectiveness. Further, prior research does not appear to account for the theoretical mechanisms through which efficiency improvements at the process-level should translate to effectiveness improvements at the firm-level. Specifically, while reviews of the body of work on the business value of IT (Kohli and Devaraj, 2003; Melville et al., 2004; Piccoli and Ives, 2005) correctly observes the need to: 1) distinguish between the process and firm levels; 2) differentiate measures of performance between efficiency and effectiveness; and 3) consider the role of mediating and moderating endogenous and exogenous factors; the theoretical mechanisms for the relationships among these elements of IT business value are left largely unaccounted for. For example, a central research question arising from this body of work is “How does the IT resource generate operational efficiencies and competitive advantage,” (Melville et al., 2004, p. 298). For a variety of reasons, the views of the IT - performance relationship expressed through this type of question are somewhat assumptive and theoretically incomplete.

First, while creating operational efficiencies and reducing costs for the firm is an important role of IT, this is an incomplete conceptualization of IT as it is not the only role IT can play in the firm. For example, IT can also be a source of flexibility, structure, and scope, all of which hold implication for effectiveness. These effectiveness factors can hold substantial implications for firm competitive priorities such as quality, speed, and innovation - all of which can affect a firm’s performance and competitive advantage. Second, this type of efficiency focused question is assumptive of the process-level to firm-level performance relationship, and further, does not offer or establish any conceptualization of this relationship (Melville et al., 2004; Piccoli and Ives, 2005). Specifically, while operational efficiency at the process-level can be an important source of competitive advantage, the mechanism(s) through which operational efficiency benefits at this level accrue to competitive advantage benefits at the firm-level do not appear to be effectively established theoretically in the literature. For example, while research may establish that IT can offer operational efficiency improvements at the process-level which are valuable and even inimitable, if that process is not a part of the mechanisms through which the firm creates and captures value, it cannot be a source of competitive heterogeneity for the firm (Hoopes et al., 2003).

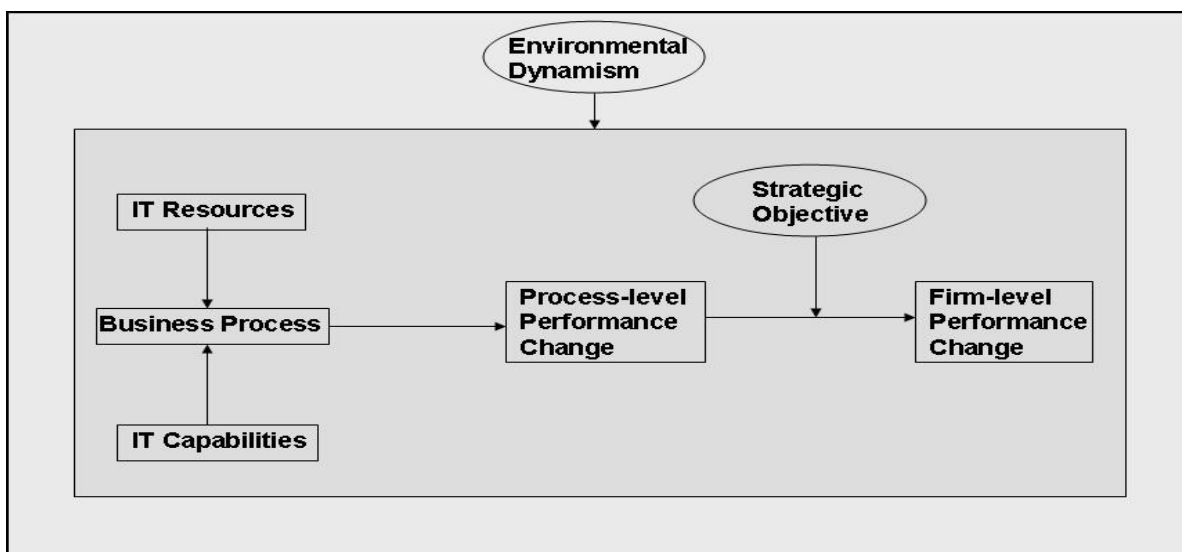
Further, this type of efficiency focused question offers an incomplete conceptualization of competitive advantage. For example, while operational efficiency is important, it is not the only means through which a firm may gain and sustain competitive advantage. Competitive advantage is attributable to a wide variety of factors and mechanisms including efficiency (Williamson, 1975, 1985, 1991), position and power (Porter, 1980), resource endowments (Wernerfelt, 1984; Barney, 1991), knowledge (Kogut and

Zander, 1992; Grant 1996; Spender 1996), and dynamic capabilities (Teece et al., 1997; Eisenhardt and Martin, 2000). Therefore, beyond efficiency factors and firm cost benefits, effectiveness factors such as quality, speed, and innovation can all potentially affect a firm's performance and the sustainability of any competitive advantages it enjoys. Thus, we need a more comprehensive conceptual model to understand and measure the role of IT in firm performance.

2.6 Establishing a Conceptual Model for the Roles of IT in Firm Performance

Based upon these collective lessons and observations from the business value of IT literature, we next develop a general conceptual model of the role of IT resources and capabilities in the firm and its performance. We begin by leveraging a basic conceptual model developed from a recent review of the literature (Melville et al., 2004), and add to it the lessons and observations raised in this section. Our model takes an ensemble view of the IT construct and begins with IT resource investments interacting with IT capabilities and a firm's business processes. The measurement of the effects of these IT investments are in terms of efficiency and/or effectiveness, and can affect the organization at the process-level, and the firm-level through process-level effects. The relationship between process-level and firm-level performance is moderated by the firm's strategy (i.e. the role the business process plays in the firm's profit mechanisms) and the external environment. This general conceptual model of the role of IT resources and capabilities in the firm and its performance is in the figure below. General Hypotheses for the model are in the section following the model.

Figure 1. General Conceptual Model of the Role of IT in the Firm



The overview of the business value of IT literature offered in this section demonstrates that collectively, this literature offers extensive contributions to the study of the roles IT can play in the firm and its performance. Further, this body of research can offer much to inform related research in other disciplines such as strategic management. Finally, as we have argued in this section, there is a need for more extensive theoretical grounding of the research on this topic, to effectively model the roles IT can play in the firm, and how these roles may affect process-level and firm-level performance, as well as interfirm performance variance in different contexts.

REFERENCES

- Barnard, C. (1938). *The Functions of the Executive*. Harvard University Press, Cambridge, MA (fifteenth printing, 1962).
- Barney, J. B. (1986). "Organizational Culture: Can it be a Source of Sustained Competitive Advantage?" *Academy of Management Review*, 11(3), pp. 656-665.
- Barney, J. B. (1991). "Firm Resources and Sustained Competitive Advantage". *Journal of Management*, 17(1), pp. 99-120.
- Barney, J. B. (2001). Is the Resource-Based View a Useful Perspective for Strategic Management Research? Yes. *Academy of Management Review*, 26(1), pp. 40-56.
- Barua, A., Kriebel, C. H. and Mukhopadhyay, T. (1995). "Information Technologies and Business Value: An Analytic and Empirical Investigation". *Information Systems Research*, 6(1), pp. 3-23.
- Benko, C. and McFarlan, W. (2003). *Connecting the Dots: Aligning Projects with Objectives in Unpredictable Times*. Boston, MA: Harvard Business School Press.
- Berndt, E. R. and Morrison, C. J. (1995). "High-Tech Capital Formation and Economic Performance in U.S. Manufacturing Industries: An Exploratory Analysis". *Journal of Econometrics*, 65(1), pp. 9-43.
- Bharadwaj, A. S. (2000). "A Resource-Based Perspective on Information Technology Capability and Firm Performance: An Empirical Investigation". *MIS Quarterly*, 24(1), pp. 169-196.
- Brynjolfsson, E. and Hitt, L. M. (1998). "Beyond the Productivity Paradox". *Communications of the ACM*, 41(8), pp. 49-55.
- Carr, N.G. (2004). *Does IT Matter? Information Technology and the Corrosion of Competitive Advantage*. Cambridge, MA: Harvard Business School Press.
- Coase, R. H. (1937). "The Nature of the Firm". *Economica, New Series*, 4(16), pp. 386-405.
- D'Antoni, H. (2005). "Tech Investments Take Time To Thrive." *Information Week*, February 28th issue (online).

- Demsetz, H. L. (1973). "Industry Structure, Market Rivalry, and Public Policy". *Journal of Law and Economics*, 16(1), pp. 1-9.
- Demsetz, H. L. (1974). "Two Systems of Belief About Monopoly". In H. J. Goldschmid & H. M. Mann & J. F. Weston (Eds.), *Industrial Concentration: The New Learning* (pp. 164-184). Boston, MA: Little-Brown.
- Dewan, S., Michael, S. C. and Min, C. K. (1998). "Firm Characteristics and Investments in Information Technology: Scale and Scope Effects". *Information Systems Research*, 9(3), pp. 219-232.
- Dixit, A. K. and Pindyck, R. S. (1994). *Investment Under Uncertainty*. Princeton, NJ: Princeton University Press.
- Dosi, G., Nelson, R. and Winter, S.G. (2000). Introduction: The Nature and Dynamics of Organizational Capabilities. In G. Dosi, R. Nelson, and S.G. Winter (Eds.), *Nature and Dynamics of Organizational Capabilities*: 1-21. New York: Oxford University Press.
- Eisenhardt, K. (1989). Making Fast Strategic Decisions in High Velocity Environments. *Academy of Management Journal*, 32(3), pp. 543-576.
- Eisenhardt, K. and Martin, J. (2000). Dynamic Capabilities: What Are They? *Strategic Management Journal*, 21, pp. 1105-1121.
- Francalanci, C. and Galal, H. (1998). "Information Technology and Worker Composition: Determinants of Productivity in the Life Insurance Industry". *MIS Quarterly*, 22(2), pp. 227-241.
- Galunic, D. C. and Rodan, S. (1998). "Resource Recombinations in the Firm: Knowledge Structures and the Potential for Schumpeterian Innovation". *Strategic Management Journal*, 19(12), pp. 1193-1201.
- Grant, R. M. (1996). "Toward a Knowledge-Based Theory of the Firm". *Strategic Management Journal*, 17(Winter Special Issue), pp. 109-122.
- Hayek, (1945). The Use of Knowledge in Society, *American Economic Review*, 35 (September), pp. 519-530.
- Hitt, L. M. and Brynjolfsson, E. (1996). "Productivity, Profit and Consumer Welfare: Three Different Measures of Information Technology's Value". *MIS Quarterly*, 20(2), pp. 197-224.
- Jensen, M. C. and Meckling, W. H. (1976). "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure". *Journal of Financial Economics*, 3(4), pp. 305-360.
- Knight, F. (1941). Review of Melville J. Herskovits Economic Anthology, *Journal of Political Economy*, 49 (April), pp. 247-258.
- Kogut, B. and Zander, U. (1992). "Knowledge of the Firm, Combinative Capabilities and the Replication of Technology". *Organization Science*, 3(3), pp. 383-397.

- Kohli, R. and Devaraj, S. (2003). Measuring Information Technology Payoff: A Meta-Analysis of Structural Variables in Firm-Level Empirical Research, *Information Systems Research*, 14(2), pp. 127-145.
- Lee, B. and Barua, A. (1999). "An Integrated Assessment of Productivity and Efficiency Impacts of Information Technology Investments: Old Data, New Analysis, and Evidence". *Journal of Productivity Analysis*, 12(1), pp. 21-43.
- Lippman, S. A. and Rumelt, R. P. (1982). "Uncertain Imitability: An Analysis of Interfirm Differences in Efficiency Under Competition". *Bell Journal of Economics*, 13(2), pp. 418-438.
- Lippman, S. A. and Rumelt, R. P. (2003). "The Payments Perspective, Micro-Foundations of Resource Analysis". *Strategic Management Journal*, 24(10), pp. 903-927.
- Loveman, G. W. (1994). *An Assessment of the Productivity Impact of Information Technologies*. New York: NY: Oxford University Press.
- March, J. and Simon, H. (1958). *Organizations*. John Wiley, New York.
- Mason, E. S. (1939). "Price and Production Policies of Large-Scale Enterprise". *American Economic Review*, 29(1, Supplement), pp. 61-74.
- Mason, E. S. (1949). "The Current State of the Monopoly Problem in the United States". *Harvard Law Review*, 62(8), pp. 1265-1285.
- Mata, F. J., Fuerst, W. L. and Barney, J. B. (1995). "Information Technology and Sustained Competitive Advantage". *MIS Quarterly*, 19(4), pp. 487-505.
- Melville, N., Kraemer, K. and Gurbaxani, V. (2004). "Review: Information Technology and Organizational Performance: An Integrative Model of IT Business Value". *MIS Quarterly*, 28(2), pp. 283-322.
- Miller, D. (2003). "An Asymmetry-Based View of Advantage: Towards an Attainable Sustainability". *Strategic Management Journal*(24), pp. 10.
- Montealegre, R. (2002). "A Process Model of Capability Development: Lessons from the Electronic Commerce strategy at Bolsa de Valores de Guayaquil". *Organization Science*, 13(5), pp. 514-531.
- Mooney, J., Gurbaxani, V. and Kraemer, K. (1996). "A Process Oriented Framework for Assessing the Business Value of Information Technology". *DATABASE for Advances in Information Systems*, 27(2), pp. 68-81.
- Mukhopadhyay, T., Kekre, S. and Kalathur, S. (1995). "Business Value of Information Technology: A Study of Electronic Data Interchange". *MIS Quarterly*, 19(2), pp. 137-156.
- Nelson, R. R. and Winter, S. G. (1982). *An Evolutionary Theory of Economic Change*. Cambridge, MA: Belknap Press of Harvard University.

- Orlikowski, W. J. and Iacono, C.S. (2001). Research Commentary: Desperately Seeking the "IT" in IT Research - A Call to Theorizing the IT Artifact, *Information Systems Research*, 12(2), pp. 121-134.
- Orlikowski, W. J. and Barley, S. R. (2001). "Technology and Institutions: What Can Research on Information Technology and Research on Organizations Learn from Each Other?" *MIS Quarterly*, 25(2), pp. 145-165.
- Piccoli, G. and Ives, B. (2005). IT-Dependent Strategic Initiatives and Sustained Competitive Advantage: A Review and Synthesis of the Literature. *MIS Quarterly*, 29(4).
- Powell, T. C. and Dent-Micallef, A. (1997). "Information Technology as Competitive Advantage: The Role of Human, Business, and Technology Resources". *Strategic Management Journal*, 18(5), pp. 375-405.
- Priem, R. and Butler, J. (2001). Is the Resource-Based View a Useful Perspective for Strategic Management Research? *Academy of Management Review*, 26(1), pp. 22-40.
- Ray, G., Barney, J. B. and Muhanna, W. A. (2004). "Capabilities, Business Process, and Competitive Advantage: Choosing the Dependent Variable in Empirical Tests of the Resource-Based View". *Strategic Management Journal*, 25(1), pp. 23-37.
- Ray, G., Muhanna, W. A., and Barney, J. B. (2005). Information Technology and Performance of The Customer Service Process: A Resource-Based Analysis. *MIS Quarterly*, 29(4).
- Ruefli TW, Wiggins RR. 2003. Industry, corporate and business-segment effects and business performance: a non-parametric approach. *Strategic Management Journal* 24(9): 861-879.
- Rumelt, R. P. (1995). "Inertia and Transformation". In C. A. Montgomery (Ed.), *Resource-Based and Evolutionary Theories of the Firm* (pp. 101-132). Boston, MA: Kluwer Academic Publishers.
- Sambamurthy, V., Bharadwaj, A., and Grover, V. (2003). Shaping Firm Agility through Digital Options: Reconceptualizing the Role of IT in Contemporary Firms. *MIS Quarterly*, 27(2), pp. 237-263.
- Schroeder, R. G., Bates, K. A. and Junttila, M. A. (2002). "A Resource-Based View of Manufacturing Strategy and the Relationship to Manufacturing Performance". *Strategic Management Journal*, 23(2), pp. 105-117.
- Spender, J.C. (1996). Making knowledge the basis of a dynamic theory of the firm. *Strategic Management Journal*, 17(Winter Special Issue): 45-62.
- Teece, D. J., Pisano, G. P. and Shuen, A. (1997). "Dynamic Capabilities and Strategic Management". *Strategic Management Journal*, 18(7), pp. 509-533.
- Tippins, M. and Sohi, R. (2003). "IT Competency and Firm Performance: Is Organizational Learning a Missing Link?" *Strategic Management Journal*, 24(8), pp. 745-761.

- Weill, P., Subramani, M., and Broadbent, M. (2002). Building IT Infrastructure for Strategic Agility. *Sloan Management Review*, 44(1), pp. 57-65.
- Wernerfelt, B. (1984). "The Resource Based View of the Firm". *Strategic Management Journal*, 5(2), pp. 171-180.
- Williamson, O. E. (1975). *Markets and Hierarchies: Analysis and Antitrust Implications*. Free Press, New York.
- Williamson, O. E. (1985). *The Economic Institutions of Capitalism*. Free Press, New York.
- Williamson, O. E. (1991). Strategizing, Economizing, and Economic Organization. *Strategic Management Journal*, Winter Special Issue 12, pp. 75-94.
- Williamson, O. E. (1999). Strategy Research: Governance and Competence Perspectives. *Strategic Management Journal*, 20(12), pp1087-1108.
- Winter, S.G. (2003). Understanding Dynamic Capabilities. *Strategic Management Journal*, 24(10), pp. 991-996.
- Zott, C. (2003). "Dynamic Capabilities and the Emergence of Intraindustry Differential Firm Performance: Insights from a Simulation Study". *Strategic Management Journal*, 24(2), pp. 97-125.