

DRNEVICH DISSERTATION - CHAPTER 2.

A STRATEGIC PERSPECTIVE OF IT

ABSTRACT

Information Technology (IT) related expenditures represent one of the largest recurring investments made by firms. Yet, attempts by scholars to empirically link these types of investments clearly and consistently to firm performance and competitive advantage have been elusive in both the Strategic Management and MIS literatures. We feel this is largely because much of the prior research has not effectively grounded the relationship between IT and firm performance in management theory. Drawing upon a review of prior work and related theory, this paper develops a conceptual model for the roles of IT in the firm and its performance for various contexts. From this model, we develop a taxonomy that offers a clear strategic perspective for how the roles of IT may vary in different firm and industry contexts. Through this “strategic perspective of IT,” research can benefit from an improved understanding of the relationship between Strategy and IT, and how this relationship may in part explain performance differences among firms. We conclude with a discussion of implications for future research on the roles of IT can play in the firm.

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1. INTRODUCTION

Investments in Information Technology average approximately \$125 million per year for a typical large U.S. firm (D'Antoni, 2005), and can often represent upwards of half of many firm's total resource investments each year. While firms generally expect these investments in IT to improve their performance, research has been unable to provide clear and consistent theoretical and empirical support for how such value accrues to the firm. In actuality, more than half of IT investments fail to deliver any measurable return to the firm (Benko and McFarlan, 2003). In many cases, this observation has historically been referred to as a paradox where firms invest in IT expecting positive performance benefits, yet scholars often find negative or neutral performance implications (Kohli and Devaraj; 2003; Melville et al. 2004). This IT investment puzzle has even caused some to ask if IT matters (Carr, 2004). Yet, as we observe firms continuing to invest heavily in IT, we are more inclined to believe that the issue lies with improving our research approaches, not with questioning observed firm behavior and investment practices. Specifically, much of the prior research, with few exceptions (Mata et. al. 1995; Ray et. al. 2004, 2005) appears to often be superficially grounded in theory, and therefore collectively fails to include the causal mechanisms through which firms create and capture value from IT investments.

This paper develops a conceptual framework for understanding the role and implications of IT-based capabilities for the firm. Through this "strategic perspective of IT," research can benefit from an improved understanding of the relationship between Strategy and IT, and how this relationship may in part explain performance differences among firms. As IT-related expenditures represent a large recurring investment for firms, understanding the role and use of IT in the firm is of importance to the field of Strategic Management. Such a clearer understanding of IT will give us new insights as to the role of IT resources and capabilities in the firm and its performance. Likewise, research on management information systems (MIS) can also benefit from an improved understanding of the role, use, application, and alignment of IT, as informed by a "strategic perspective," and how Strategic Management theories and their mechanisms for firm performance can be leveraged to explain the potential performance implications of IT for the firm. 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 to clarify the strategic role of IT in the firm.

This paper is structured as follows: In this section we introduced the conceptual and empirical puzzle, the theoretical phenomena, and context of interest to establish the domain, scope, and contribution of this

paper; In section 2, we review prior research to discern what is known and what is not known in the literature to date. In section 3, we review strategic management's major theoretical perspectives and discuss the necessary conditions for more effectively grounding the role of IT in the firm. In section 4, we develop a taxonomy for how the roles of IT may vary, from various theoretical perspectives, in different industry and firm contexts. We then use this taxonomy to explore the specific roles for IT-based capabilities in these contexts, and develop propositions for the performance implications of IT in each contexts; In section 5, we conclude with a discussion of the contributions and implications of this study for informing future research.

2. BACKGROUND LITERATURE

Scholars in many fields have sought to rationalize and explain how investments in IT can affect performance, and potentially serve as sources of competitive advantage to the firm. 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 focus on what we can learn from prior research in the MIS and Strategy domains. Work on this topic in the MIS area 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 firm level factors, such as resources and capabilities, as sources of firm performance and competitive advantage (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). Conversely, research on this subject in the MIS literature is more extensive, but has historically struggled 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). Several review and meta-analyses have appeared recently 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 (from arguments grounded in the resource-based view (RBV)), without clearly establishing theoretically, or articulating how to support empirically, why and how IT affects firm performance in a persistent manner.

Specifically, 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), such a relationship between IT resources and capabilities has yet to be clearly and effectively established theoretically (Priem and Butler, 2001; Barney, 2001), or conclusively supported empirically (Hoopes et al. 2003; Hoopes and Madsen, 2004) in the strategy literature. 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 theoretical grounding of topic may explain in part, the paradoxical historic relationship between IT and firm performance observed in much of the research on this topic (Berndt and Morrison, 1995; Orlikowski and Barley, 2001; Tippins and Sohi, 2003; Carr, 2004; Melville et al., 2004). 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.

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, 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 differences in different contexts.

3. THEORY AND DEVELOPMENT

Much of the research in strategic management focuses on sources of performance difference among firms. Specifically, why do persistent performance differences exist, and what are the sources of these differences among firms? Classical explanations of this phenomena draw upon economic explanations of economizing and governance (Williamson, 1975, 1985, 1991), or industry positioning (Porter, 1980). One of the dominant more recent explanations, the resource-based view (Wernerfelt, 1984; Barney, 1991), assumes these performance differences are attributable to variation in firm level factors of resources and capabilities. Yet, this assumption has been difficult to establish and support both conceptually (Priem and Butler, 2001; Barney, 2001) and empirically (Hoopes et al. 2003; Hoopes and Madsen, 2004). Alternative explanations have also advocated dynamic capabilities as a source of performance differences (Teece, Pisano, and Shuen, 1997; Eisenhardt and Martin, 2000; Winter, 2003), as well as the need to differentiate the roles of resources and capabilities (Amit and Schoemaker, 1993; Makadok, 2001; Winter, 2003; Hoopes et al., 2003). Through these multiple explanations, some common consensus exists that firm-level factors do contribute to interfirm performance differences, and that firm resources and capabilities can play a key role in explaining these differences (Barney, 1991; Peteraf, 1993; Hoopes et al., 2003).

However, research has been unable to clearly establish and empirically validate the precise roles resources and capabilities play in interfirm performance differences (Hoopes et al., 2003; Madsen and Hoopes, 2004; Leiblein and Madsen, 2004). This study addresses this gap in part, by exploring how differences in one major source of resource and capability investment (information technology), can contribute to such persistent systematic performance differences among firms. Thus, as a step in this direction, in the next section, we first provide a brief overview of some of strategic management's

prominent theoretical perspectives. Following this, we develop a taxonomy for how the roles of IT-based resources and capabilities may vary, from these theoretical perspectives, in different industry and firm contexts.

3.1 A Brief Overview of Strategic Management's Theoretical Perspectives

The theoretical perspectives and influences on strategic management are wide and varied and originated in multiple disciplines with key foundational contributions from economics, finance, sociology, and organizational areas of academic inquiry. Thus, the field of strategic management does not have a single unified theory, but is made up of evolving, overlapping, and often competing theoretical perspectives. Each of these perspectives attempt to address and explain elements of the fundamental questions of the field (i.e. how do firms create value; why do some firms succeed where others fail; why do persistent performance differences exist; and what are the sources of these differences among firms, etc.). Recent research by Makadok (2005) offers a useful approach for viewing these theoretical perspectives as a function of their underlying causal profit mechanisms (i.e. the means through which money moves from a customer to the firm in the face of competitive pressures that would normally drive firm profits to zero. This categorization approach classifies strategic management's theoretical perspectives as *collusion*, *competence*, *flexibility*, and *governance* (Makadok, 2005). The strength of this classification approach is that it forces one to focus on how any given factor (such as IT resources and capabilities), can actually create economic profit for the firm (Makadok, 2005). We utilize this categorization to frame a brief overview of strategy's theoretical perspectives (table 1 and subsequent discussion). Later, we leverage some of the core theories of strategic management in this framework (i.e. TCE, RBV, DC) to develop a taxonomy for how the roles of resources and capabilities may vary, from these various theoretical perspectives, in different industry and firm contexts.

Table # 1. An Overview of Strategic Management's Theoretical Perspectives

Causal Mechanism	Core Theory	Profit Mechanisms	Key Contributors
Collusion	Structure-Conduct-Performance, I/O Economics	Monopoly Power & Operational Efficiency Rents	Bain, 1956, 1959; Mason, 1939, 1949; and Porter, 1980, 1985.
Governance	Transaction Cost Economics, Agency Theory	Transactional Efficiency & Operational Efficiency Rents	Coase, 1937; Alchian and Demsetz, 1972; Williamson, 1975; and Jensen and Meckling, 1976.
Competence	Resource-based view, Knowledge-based view	Operational Efficiency, Transactional Efficiency, & Monopoly Power Rents	Ricardo, 1817; Penrose, 1959; Demsetz, 1973, 1974; Lippman and Rumelt, 1982; Wernerfelt, 1984; Barney, 1986, 1991; Kogut and Zander, 1992; and Peteraf, 1993.
Flexibility	Dynamic Capabilities, Real Options	Flexibility Rents	Schumpeter, 1934, 1950; Nelson and Winter, 1982; Teece et al., 1997; Dixit and Pindyck, 1994; Kogut, 1991; and McGrath, 1997.

See Makadok (2005) for more detail on this categorization approach

Collusion-based Theories

Collusion-based theories (Makadok, 2005), evolved from the Bain-Mason *Structural-Conduct-Performance* (S-C-P) paradigm (Bain, 1956, 1959; Mason, 1939, 1949), but are perhaps best known from more recent work (Porter, 1980, 1985) in terms of the “Five Forces” framework (rivalry, buyer power, supplier power, threat of new entrants, and threat of substitutes). This perspective is still commonly taught as one of the dominant strategy perspectives by business schools, and views strategy as a portfolio of businesses, and focuses on market positioning, optimizing strategy for an industry, and establishing and defending a monopoly or oligopoly position. Key concepts include industry attractiveness, physical asset bases, and leveraging market imperfections. The economic profit mechanisms for the firm in this perspective can include “Bainian” monopoly power rents (Bain, 1956, 1959), and “Ricardian” operational efficiency rents (Ricardo, 1817). Criticism of this perspective often revolves around the static nature of the perspectives as well as its limited applicability to less stable and fast cycle markets and industries.

Governance-based Theories

Governance-based theories (Williamson, 1999; Makadok, 2003; 2005), evolved from the work of Coase (1937), and were built upon later by Alchian and Demsetz (1972), Williamson (1975), and Jensen and Meckling (1976). The perspective is based on issues of efficiency, which focus on issues of market versus hierarchy structures for coordinating a firm's activities. The economic profit mechanisms for the firm in

this perspective can include “Coaseian” transactional efficiency rents (Coase, 1937) and “Ricardian” operational efficiency rents (Ricardo, 1817). This perspective is perhaps best known through the transaction cost economics (TCE) (Williamson, 1975), and agency theory (Jensen and Meckling, 1976) perspectives. Governance perspectives are historically one of the most leveraged in traditional strategy research. However, substantial challenges may exist as well with operationalizing measures for governance constructs in certain research applications such as for IT.

Competence-based Theories

Competence-based theories (Williamson, 1999; Makadok, 2003; 2005), evolved fairly recently, but can trace their roots back to Ricardo’s (1817) arguments on resource scarcity, Penrose’s (1959) theory of firm growth, and Demsetz’s (1973; 1974) arguments against the Bain-Mason Structural-Conduct-Performance (S-C-P) paradigm (Bain, 1956, 1959; Mason, 1939, 1949) (Makadok, 2005). The perspective was developed in the 1980’s as the *Resource-based View* (RBV) of the firm (Lippman and Rumelt, 1982; Wernerfelt, 1984; Barney, 1986), but did not become popular until the 1990’s (Barney, 1991; Peteraf, 1993). RBV has become one of the dominant strategy perspectives taught by business schools and is currently perhaps the most popular, and heavily cited, among scholars within and beyond the strategy field. It is also the dominant perspective on which MIS scholars generally rely to ground and motivate most business value of IT research (Melville et al., 2004). Competence-based theories include the aforementioned resource-based view (RBV), as well as the knowledge-based view (KBV) (Kogut and Zander, 1992). The economic profit mechanisms for the firm in this perspective can include “Ricardian” operational efficiency rents (Ricardo, 1817), “Coaseian” transactional efficiency rents (Coase, 1937), and “Banian” monopoly power rents (Bain, 1956, 1959). Criticism often revolves around the static nature of the perspective and its lack of an empirical research tradition.

Flexibility-based Theories

“Strategic” flexibility-based theories (Makadok, 2005), evolved fairly recently from notions of Dynamic Capabilities (Teece et al., 1997) and Real Options (Dixit and Pindyck, 1994) approaches to responding to change. This perspective is based on Schumpeter’s (1934; 1950) classic concept of *creative destruction*. This perspective is made up of several diverse operationalizations in strategic management. These include evolutionary views of firm behavior and routines (Nelson and Winter, 1982), Dynamic Capabilities (Teece et al., 1997), and Real Options (Dixit and Pindyck, 1994). “Dynamic” capabilities are defined as firm processes for acquiring, integrating, reconfiguring, and/or releasing resources which produce a “first-order change” (Winter, 2003), to match or create market change (Eisenhardt and Martin, 2000). In this perspective, the economic profit mechanism for the firm is “Schumpeterian” flexibility rents

(Schumpeter, 1934, 1950), and the causal mechanism for superior profitability is to effectively allocate firm resources and capabilities to market opportunities on an ongoing basis to create temporary competitive advantages and superior profitability (Teece et al., 1997; Makadok, 2005). Challenges for the perspective are based in the underdevelopment of the underlying theory as well as potential problems with operationalizing flexibility constructs and measures for research applications.

Now that we have a brief overview of some of strategic management's prominent theoretical perspectives, in the next section we leverage some of the core theories in these perspectives to develop a taxonomy for how the application of resources and capabilities in these perspectives may vary in different industry and firm contexts. Following the development of the taxonomy, we'll examine how the roles of IT-based resources and capabilities, specifically, fit in these contexts to support a firm's competitive advantage.

4. A TAXONOMY FOR IT IN DIFFERENT CONTEXTS

In this section, we leverage some of the core theories from the overview of strategic management perspectives in the overview above to develop a taxonomy for how the application of resources and capabilities in these perspectives may vary in different industry and firm contexts. This approach is in line with the conclusions drawn from reviews of the business value IT research (e.g., Melville et al., 2004) that IT performance contributions can include *efficiency* (doing things right) and *effectiveness* (doing the right things) impacts. This dichotomy has been at the center of long standing debates in the strategic management literature (Barnard, 1938; Knight, 1941; Hayek, 1945; Williamson, 1991). Likewise, more recently, the MIS literature has also advocated the concept of the "agility" of the firm to use IT to operate both efficiently and effectively (Weill, Subramani, and Broadbent, 2002; Sambamurthy, Bharadwaj, and Grover, 2003). Therefore, as a means of theoretically grounding the role of firm resources and capabilities in these different conceptualizations of strategy, we develop a taxonomy for how the roles of resources and capabilities may vary in different industry and firm contexts. Following the development of the taxonomy, we will explore how IT applications may vary in the impact on efficiency and effectiveness, in these different industry and firm contexts.

4.1 Developing a Taxonomy for IT in Different Strategy and Market Contexts

We begin building this taxonomy by drawing upon the ideas of Williamson (1991), through adopting his approach of clustering strategy under two general headings of *Strategizing* and *Economizing*. His first category, *strategizing*, represents the more popular recent view of strategy and consists of approaches to effectively selecting the best industries and markets, attaining competitive positions in them, and exercising power within these industries and markets (Williamson, 1991). In this category competitive advantage can be achieved through obtaining monopoly positions through power or control of scarce resources, or through tacit collusion among an oligopoly of firms cooperating to control an industry or market. This approach may also include “first mover” type advantages attained through correctly identifying new opportunities and markets, and having the strategic flexibility pursue such opportunities before they become competitive.

Conversely, the second category, *economizing*, is the more classical strategic perspective and is concerned with notions of efficiency in governing and operating the firm (Williamson, 1991). In this category, firms achieve competitive advantage through efficiently governing the firm’s resources, operations, and transactions. Types of “efficiency” approaches to business strategy include transaction cost economics, RBV, and dynamic capabilities (Williamson, 1991). However, these and other strategic perspectives may overlap and offer useful insights for strategizing as well as economizing. While, arguments have been made (Williamson, 1991) that overall, economizing is likely the best strategy, it is not our intention in this study to render judgments as to the relative strengths or weaknesses of either approach, merely to use the dichotomy between the two to support the framing of our taxonomy.

Next, to complete the framing of our taxonomy we consider the role of the firm’s environment. It is generally accepted in both the strategy and MIS domains that environment can substantially affect the firm and its strategy (Schumpeter, 1934,1950; Nelson and Winter, 1982; Teece et al., 1997; Melville et al., 2004; Piccoli and Ives, 2005). Therefore, we consider the role the nature and characteristics of the industry or market a firm operates in as the second dimension of our taxonomy. While a simple distinction for the environment would be to use a dichotomy between static and dynamic environments, such a categorization would be unrealistic given the actual environmental conditions in which most firms exist, as well as inconsistent with prior research. Thus we will make an assumption that all environments are dynamic to some extent. Therefore, along the lines of prior research (e.g., Eisenhardt, 1989; Eisenhardt and Martin, 2000), we make a simple distinction between *Moderately-dynamic* and *High-velocity* market environments.

Moderately dynamic markets consist of an environment where change is frequent, but usually linear and predictable, the market boundaries and industry structures are fairly stable, and the firms, competitors, and customers are well known and all have an ample amount of knowledge about the marketplace (Eisenhardt and Martin, 2000). Conversely high-velocity markets (Eisenhardt, 1989), are typified by high rates of nonlinear and often unpredictable change and relative instability in market boundaries and industry structures, and the firms, competitors, and customers are not well established and little is known about the marketplace (Eisenhardt, 1989; Eisenhardt and Martin, 2000). Therefore, by combining this environmental distinction (Moderately-dynamic vs. High-velocity), with the distinction made previously regarding two general categories of a firm's strategic behavior (strategizing vs. economizing); we are able to create a taxonomy for the various roles strategy may play in these situations. We depict this taxonomy in the table below.

Table # 2. Taxonomy of IT in Different Strategy and Market Contexts

Firm Behavior	Environment	Characteristics
	Moderately-dynamic	High-velocity
Strategizing	<p><i>Moderately-dynamic Strategizing</i></p> <ul style="list-style-type: none"> • Theory Perspective: Collusion • Firm Focus: Position & Power • Role of IT: Structure 	<p><i>High-velocity Strategizing</i></p> <ul style="list-style-type: none"> • Theory Perspective: Flexibility • Firm Focus: Exploration for Opportunities • Role of IT: Flexibility
Economizing	<p><i>Moderately-dynamic Economizing</i></p> <ul style="list-style-type: none"> • Theory Perspective: Governance and/or Competence • Firm Focus: Efficiency & Exploitation of Resources and Capabilities • Role of IT: Efficiency 	<p><i>High-velocity Economizing</i></p> <ul style="list-style-type: none"> • Theory Perspective: Flexibility, Governance, and/or Competence • Firm Focus: Selection & allocation of Resources and Capabilities • Role of IT: Scope

The taxonomy depicted in the table consists of a simple 2 by 2 matrix, which categorizes firm strategic behavior in general terms of strategizing or economizing, and differentiates the firms operating environment as moderately-dynamic or high-velocity. These combinations produce four general

operational contexts for firms which consist of: *Moderately-dynamic Strategizing; High-velocity Strategizing; Moderately-dynamic Economizing; and High-velocity Economizing*. We describe these general operational contexts by illustrating sample strategy mechanisms through describing the firm's focus and priorities that may typify each respective context. Here the focus of the firm may include activities such as position and power, efficiency and exploitation, exploration, and/or selection and allocation. Likewise, examples of firm priorities could include issues such as cost, quality, speed, and innovation.

Next, we add IT to this general taxonomy for how strategy can vary in different firm and environment contexts. It is clear that the roles IT investments can play in the firm, and the performance mechanisms they can affect, can vary widely in different industry and firm contexts. For example, IT investments can be made in the hopes of reducing a firm's costs through improving operational and transactional efficiency. Investments in IT can also be used to attempt to improve the quality of a firm's processes and products. IT investments can also be used to improve the speed at which a firm operates and responds to changes in its environment. Finally, IT investments can be used to support innovation activities by a firm and serve as a basis for new processes, products, and even markets. These are just a few of the prominent roles IT may support in an organization. For this reason it is important to have a clear understanding of how organizational capabilities attributable to IT investments, can affect the firm and its performance in different contexts.

By looking at the role of IT, from a strategic perspective, we can seek to understand the roles IT resources and capabilities may play, in such different contexts, to affect the firm and its competitive performance. We apply this taxonomy to the IT context, to understand the roles IT resources and capabilities may play, in different industry and firm contexts, to affect the firm and its competitive performance. We begin this task by first defining the IT construct and level of analysis. For these purposes, we adopt an "Ensemble" view of IT, as a process-level phenomena affecting the organization and its performance through IT's interaction with the firm's other existing resources and capabilities (Orlikowski and Iacono, 2001). As the IT to business process-level relationship is where IT investments most directly impact the firm (Barua et al., 1995), we next consider the mechanisms through which IT could interact with the firm. It is widely accepted in the Business value of IT literature, that IT can help to improve the efficiency of organizations (Melville et al., 2004), however, as the firm may focus on strategies other than efficiency, we need to also consider alternative mechanisms which IT may affect. These can include assisting the firm in processing information about opportunities for exploration, as well as providing them with the strategic and/or tactical flexibility mechanisms to respond to opportunities. IT can also provide the firm with scale and

scope economies to support economizing strategies in both moderately-dynamic and high-velocity environments. Finally, IT can also help the firm through serving in a structural role to facilitate the firm's relationships with (and potential control over) its buyers and suppliers, as well as serving as barriers to market entry for firm's not possessing the requisite IT investments. These types of roles for IT, in different firm and industry contexts, are discussed in the remainder of this section.

Moderately-dynamic Strategizing and the Role of IT

Moderately-dynamic markets tend to be linear and predictable with market boundaries and industry structures that are relatively stable with competitors and customers that are well established. Therefore, firms adopting a strategizing focus in such moderately-dynamic environments (*moderately-dynamic strategizers*), could compete through a collusion perspective by establishing and defending an advantageous position within an industry, likely through exercising power to ensure low levels of competitive rivalry, high barriers to entry, and power over buyers and suppliers (Porter, 1980). In this context, the focus of the firm would include activities such as position and power, and examples of firm priorities could include issues of cost or quality only to the extent to which they support the basis of the firm's competitive position. Specifically, cost would be a firm priority if the firm's position and power are based upon low cost leadership. Likewise, quality would be a firm priority if the firm's position and power are based upon its ability to differentiate on quality. If such a collusion-based strategies were not effective, firms may be forced to shift to economizing behavior in that industry to compete, or to explore new less competitive industries or markets where they may be able to compete for a period of time without the need to focus on economizing strategies.

For firms adopting a strategizing focus in moderately-dynamic market environments, a role of IT is to support the firm's position and power through enhancing and/or enabling: industry/market entry and exit barriers; firm power over its buyers and suppliers; and low levels of competitive rivalry (Porter, 1980). An alternate role for IT would be to support, or as the basis for cost or quality initiatives, where these factors represent the basis of the firm's competitive position and power. In terms of IT's role to enhance and/or enable industry/market entry and exit barriers, IT investments at various levels, or across levels, can serve as barriers to entry or exit for an industry. Specifically, if an industry requires a substantial investment in IT resources, and a substantial ongoing investment to build and maintain IT capabilities, this can serve as a barrier to entry, preventing other firms from entering the industry. Likewise, if an incumbent firm has a substantial investment in industry necessitated, asset-specific IT resources and capabilities; this can serve as an impediment to exiting an industry. For example, a firm in the telecommunications industry may have an extensive IT investment to develop the technology

infrastructure on which to base its product and service offerings. The size of such a required IT investment can prevent others from entering the market, and as well as serve as a basis for power and position over buyers, suppliers, and competitors in the market. However, the size and scale of these types of asset specific infrastructure IT investments often prevents the firm from being able to utilize the asset for other purposes. The firms in the industry are therefore often unable to leave the industry, and as such, unwilling to create rivalry with other firms which could undermine their collective profitability. In terms of IT's role to enhance and/or enable firm power over its buyers and suppliers and low levels of competitive rivalry, IT can serve in a structural role to facilitate the firm's relationships with (and potential control over) its buyers and suppliers. For example, in this context, IT can also serve in the role as the infrastructure for the marketplace and/or exchange mechanism for sourcing, outsourcing, and distribution for the firm (as is the case with the internet, B2B exchanges, etc.). Additionally, IT could help the firm obtain and process information on the buyers, suppliers, and competitors in its industries and markets. Finally, in this context, IT can also serve as a source of differentiation for the firm's products and services, which can allow the firm to price above its rivals and earn larger margins. Therefore, based upon these collective roles for IT in a moderately-dynamic strategizing context, we offer the following proposition:

Proposition 1 – IT resources and usage which support a firm's *position and power* will be more effective in supporting performance for firms operating with a *strategizing focus in moderately-dynamic environments*, than other types of IT resources and usage.

Moderately-dynamic Economizing and the Role of IT

Firms adopting an economizing focus in moderately-dynamic environments (*moderately-dynamic economizers*), compete from governance and/or competence perspectives through efficiently governing the firm's resources, operations, and transactions, in competitive environments. Here competitive advantage may be obtained through efficient governance of the firm's operations and transactions (Williamson, 1975, 1985, 1991). and/or from possession of valuable, rare, and inimitable resources and capabilities (Lippman and Rumelt, 1982; Wernerfelt, 1984; Barney, 1986, 1991; Peteraf, 1993). In this context, the focus of the firm would be on efficiency and exploitation of resources and capabilities. Examples of firm priorities could include cost and/or the exploitation of quality or innovation capabilities to the extent to which they support the basis of the firm's competitive position. If such economizing approaches from a governance or competence perspective were no longer required, say due to a decrease in competition, firms could consider adopting strategizing behavior in that industry to increase their competitive advantages. Conversely, (and perhaps more likely) if competition increased to the extent that

firms were unable to capture sufficient value through economizing, they may be forced to explore new industries or markets where they may be able to compete for a period of time through a focus on either strategizing (if limited competition exists), or economizing (if competition exists). For firms adopting an economizing focus in moderately-dynamic environments, a major role of IT is to improve the efficiency of the firm. This can include providing the firm with scale economies and their related cost benefits to support economizing strategies in moderately-dynamic environments. In this role, IT can help the firm to operate at lower costs than its rivals. This can in turn serve as a source of advantage for the firm, which, at competitive pricing levels, would allow them to maintain a larger margin than their rivals.

For firms operating from governance perspectives, such as Transaction Cost Economics (TCE) (Williamson, 1975) the role of IT is to enhance or enable the firm to reduce transaction costs within and between firms, suppliers, and customers. For example, Williamson's (1975) general arguments of the advantages of the intrafirm transfer of "know-how" by avoiding the need for repeated negotiations and the hazards of opportunism could likely be facilitated through IT-enabled interfirm relationships. Specifically, IT can enable a firm to more efficiently source inputs required for its operations (human resources, raw materials, knowledge, etc.). IT can also be used to enhance current or enable new monitoring and processing capabilities within the organization. For example, by moving such activities "on-line," this can also enable the firm to contract for these capabilities from the market (outsourcing) (Drnevich and Brush, 2005). Further, IT can also enhance or enable the firm's ability to monitor and govern its operations (i.e., as in the case of modern financial systems, enterprise resource planning systems, HRM systems, workflow management systems, etc.). The value of IT from governance perspectives may also be based in its ability to help alleviate the "delegation problem" (March and Simon, 1958). This problem is based on the argument that efficiency benefits in the firm come from a division of labor, but this division of labor creates an "Agency" problem that may negate the benefits of efficiency, and traditionally we expect agency problems increase as the division of labor increases (March and Simon, 1958; Jensen and Meckling, 1976). Theoretically, one solution to this problem is to improve operationalization (i.e. measure more and measure it better) (March and Simon, 1958). Such a solution can clearly be provided by IT investments by both easing the firm's division of labor, and the firm's ability to measure and monitor its division of labor to reduce agency problems and their costs. A second solution to the delegation problem is to create "superordinate goals" (March and Simon, 1958). IT can also support this solution through helping the firm support activity-based costing, linking data across the organization, monitor progress towards goals, etc. With the proper IT investments and usage, firms may be able to both lower their strategic costs (through better operationalization) and raise the benefits to the

organization (through facilitating integrative goal programs). Therefore, based upon these governance-based roles for IT in a moderately-dynamic economizing context, we offer the following proposition:

Proposition 2a – IT resources and usage which support a firm’s *efficiency* will be more effective in supporting performance for firms operating with an *economizing focus in moderately-dynamic environments*, than other types of IT resources and usage.

An alternate role for IT would be to support, or as the basis for a valuable, rare, and inimitable firm resources or capabilities (i.e. to exploit quality or innovation capabilities). While the ability of the firm to “pick” such an IT-based resource is increasingly less likely (Carr, 2004), IT can still serve as the basis for such capabilities (Piccoli and Ives, 2005; Ray et al., 2004, 2005). Therefore, for firms operating from competence perspectives, such as the resource-based view (RBV) (Wernerfelt, 1984; Barney, 1991) and knowledge-based views (KBV) (Kogut and Zander, 1992; Grant, 1996; Spender, 1996), IT can also support efficiency profit mechanisms. In this context, IT can play a role as a resource and/or as a capability enhancer or enabler. In such a role, IT may serve as a resource input which merely supports or enhances a business process (i.e. zero-order capability), or as the means of enabling a new business process (i.e. first-order capability) for the firm (Dosi, Nelson, and Winter, 2000; Winter, 2003). In these types of roles, if IT is effectively implemented and integrated with the firm’s other existing resources, capabilities, and business processes, it can improve the firm’s process-level performance, and depending upon the relationship of the specific process in the firm’s profit mechanism(s), potentially improve firm-level performance. Therefore, these implications indicate that a clearer distinction between IT resources and IT-enhanced or -enabled capabilities is still needed for competency-based perspectives to understand and explain the role of IT in the firm and its performance. This approach is consistent with prior theory development (Makadok, 2001; Winter, 2003; Hoopes et. al., 2003). Further, this view is also supported by recent work, which advocates that the contribution potential of external resources is likely limited to their ability to enrich or reconfigure a firm’s preexisting internal resources and capabilities (Montealegre, 2002; Schroeder, Bates, and Junttila, 2002; Branzei and Thornhill, 2004). Therefore, based upon these competence-based roles for IT in a moderately-dynamic economizing context, we offer the following proposition:

Proposition 2b – IT resources and usage which supports a firm’s *exploitation* of its resources and capabilities will be more effective in supporting performance for firms operating with an *economizing focus in moderately-dynamic environments*, than other types of IT resources and usage.

High-velocity Strategizing and the Role of IT

High-velocity markets have high rates of nonlinear and often unpredictable change and relative instability in market boundaries and industry structures, where the firms, competitors, and customers are not well established and little is known about the marketplace (Eisenhardt, 1989; Eisenhardt and Martin, 2000). Therefore, firms adopting a strategizing focus in such high-velocity environments (*high-velocity strategizers*), could compete from a flexibility perspective through exploration behavior to identify industry or market opportunities where they may achieve temporary competitive advantages and superior profitability without the need (in the short run) for economizing behavior (Teece et al., 1997; Eisenhardt and Martin, 2000). In this context, the focus of the firm would be on exploration for opportunities. Examples of firm priorities could include speed and/or innovation capabilities to the extent to which they support the basis of the firm's competitive position. If such a flexibility perspective becomes ineffective, the firm would be forced to explore further to identify other new industry or market opportunities where they may achieve temporary competitive advantages, or to adopt an economizing behavior to stay in the existing market as competition increases. For firms adopting a strategizing focus in high-velocity environments, a major role of IT is to assist the firm in processing information about opportunities for exploration. Here, firm priorities could include speed and/or innovation. Specifically, IT can enhance or enable the firm to monitor and quickly respond through innovation and strategic adaptation to changes in its environment. For example, this could include information services to provide the firm with market and competitor intelligence, as well as IT systems for processing and analyzing such information.

Additionally, IT can also provide firms with the *strategic flexibility* mechanisms to respond to opportunities in their environment. Such a flexibility perspective of IT can also allow a firm to re-align its strategy and quickly innovate processes and products to reconfigure its activities to apply to new competitive opportunities. At an industry level, this can also include IT mechanisms for forming alliances and networks, as well as communicating. Concerns for operating from a flexibility perspective are that firms may run the risk of sub-optimizing for current conditions (i.e. under exploitation as the environment becomes more moderate), potentially placing them at a competitive disadvantage in relation to firms not making these types of IT investments and using IT to support strategic flexibility. Therefore, based upon these strategic flexibility-based roles for IT in a high-velocity strategizing context, we offer the following proposition:

Proposition 3 – IT resources and their usage which support a firm's *exploration for opportunities* will be more effective in supporting performance for firms operating with a *strategizing focus in high-velocity*

environments, than other types of IT resources and usage. However, firms relying on these types of IT investments will not perform as well in less high-velocity environments.

High-velocity Economizing and the Role of IT

Firms adopting an economizing focus in high-velocity environments (*high-velocity economizers*), can compete through a combination of Flexibility, Governance, and/or Competence perspectives by first effectively allocating firm resources and capabilities to market opportunities to create temporary competitive advantages, and then leveraging efficiency advantages of economizing from the firm's operations, resources, and capabilities (i.e. scale and scope), that allow them to remain in a market as competition increases. In this context, the focus of the firm would be on the selection and allocation of resources and capabilities. Examples of firm priorities could include innovation, speed, and/or cost capabilities to the extent to which they support the basis of the firm's competitive position. If such economizing approaches from a governance or competence perspective were no longer required, say due to a decrease in competition as the market stabilizes, matures, and/or consolidates, firms could consider adopting strategizing behavior in that market to increase their competitive advantages. Conversely, (and perhaps more likely) if competition increased to the extent that firms were no longer able to effectively capture value through economizing, they may be forced to explore new industries or markets where they can effectively allocate firm resources and capabilities to market opportunities to create temporary competitive advantages, and then leverage their efficiencies to again extend the advantage temporally.

Here, a major role of IT is to provide firms with the *tactical flexibility* mechanisms to select and allocate resources to respond to opportunities in their environment. Alternatively, from a real options perspective, high-velocity economizing could also include the firm maintaining positions in new technologies and markets as well as options to access related resources and capabilities in the future should they be required. For example, this type of IT usage may include scope economies which to support economizing strategies in high-velocity environments. Further, IT can also serve as a source of both "zero-order" capabilities and "first-order" dynamic capabilities (Winter, 2003), which allow the firm to layer, align, and manage its resources to adapt to changes in the marketplace (Galunic and Rodan, 1998). Therefore, based upon these tactical flexibility-based roles for IT in a high-velocity economizing context, we offer the following proposition:

Proposition 4 – IT resources and their usage which support a firm's *selection and allocation* of resources and capabilities will be more effective in supporting performance for firms operating with an *economizing focus in high-velocity environments*, than other types of IT resources and usage.

In this section, we developed and applied a taxonomy to explore the specific roles for IT-based resources and capabilities, and offered propositions for the performance implications of IT roles in different strategy and market contexts. Through doing so, we are better able to understand the roles IT resources and capabilities can play, in different industry and firm contexts, to affect the firm and its competitive performance. In the next section, we conclude with a discussion of the contributions and implications from this study to inform and guide future research.

5. DISCUSSION, IMPLICATIONS, AND CONCLUSIONS

In the previous sections we introduced the context of the study (investment in IT-based resources and capabilities), the conceptual and empirical puzzle (extensive investment in IT without empirical support for its value), and the theoretical phenomena of interest (competitive heterogeneity) to establish the domain, scope, and contribution of this paper (a strategic taxonomy to theoretically ground and guide empirical research to measure the value of IT-based resources and capability investments). We began by reviewing prior research to discern what is known and what is not known in the literature to date as a means of guiding and informing research. Next we developed a taxonomy for how the roles of resources and capabilities may vary, from various theoretical perspectives, in different industry and firm contexts and used this taxonomy to explore the specific roles for IT-based resources and capabilities, and offered propositions for the performance implications of IT in each the contexts of our taxonomy. Now, in this final section, we conclude with a discussion of the contributions and implications of this study for informing future research.

5.1 Discussion and Implications

So how is IT strategic? We have observed in this paper how IT contributions to the firm have been measured in the past, how strategy plays a significant role in the relationship between resources, capabilities, and performance, and how strategy and IT may vary in different contexts. Therefore, can we now conclude that IT has a strategic role to play in the firm? Debates in the popular business press and practitioner literature, often grounded in extensive anecdotal evidence, currently assume that only proprietary technologies can serve as sources of competitive advantage for firms, and that conversely, most technologies are moving in the opposite direction, towards open infrastructures (Carr, 2004). This would indicate that while we have argued that specialized roles for IT in certain contexts may hold

strategic implications for the firm, the ability of the firm to simply “pick” these types of IT investments are becoming scarcer and will likely eventually be nonexistent (Carr, 2004).

However, another closely-related trend observed by the popular business press is that firms are moving away from complicated proprietary IT systems acquired during the “technology bubble era” and making large scale moves to simple, “off-the-shelf” commodity software, such as enterprise resource planning (ERP) packages (Carr, 2004). While such ERP systems are customizable, the trend seems to be for firms to stick with simplicity, or have limited customization done by outside consultants. However, such consultants often standardize and share their knowledge across clients, which would limit the heterogeneity of these types of IT investments (Carr, 2004). Such observations as these, while largely anecdotal, indicate an increasing commoditization of IT, and are potentially problematic from a theory stand point for the roles IT could play in the firm to support interfirm performance variance. Specifically, while these observations support IT’s strategic role from governance perspectives in economizing contexts for improving efficiency benefits and reducing agency costs, they may be problematic for competence and flexibility perspectives. For example, such an increasing trend of commoditization, standardization, and simplicity of IT, while clearly valuable from an operational and transaction efficiency standpoint, suggest conditions of low uniqueness and inimitability. These conditions question IT’s ability to play a strategic role in the firm as a “zero-order” resource from competence perspectives such as the RBV (Carr, 2004), unless it is supporting “first-order” capabilities (Mata et al., 1995; Piccoli and Ives, 2005).

However, this observed trend towards commoditization, standardization, and simplicity of IT is also problematic for supporting a strategic role for IT in flexibility perspectives such as dynamic capabilities (Teece et al., 1997; Eisenhardt and Martin, 2000). Specifically, the strategic performance benefits of dynamic capabilities are based upon the existence and role of first-order capabilities (Dosi, Nelson, and Winter, 2000; Winter, 2003). Unfortunately, the current trend in IT, quite conversely appears to be constrained more and more to the role of a zero-order capability (based upon the observed trends). Therefore, this issue also questions IT’s ability to play a strategic role in the firm from flexibility perspectives such as dynamic capabilities.

Therefore this indicates a new *IT paradox* between the *roles IT can play* in the firm from different theory perspectives in various contexts, and the apparent actual *roles IT does play* in practice, raise a number of interesting issues for future research. These are based upon: 1) The effects of *zero-order homogeneous IT capabilities* to improve efficiency and reduce agency costs as sources of operational and transactional

efficiency rents for the firm (i.e. Governance perspectives); 2) The effects of *zero-order heterogeneous IT capabilities* as sources of operational efficiency and/or monopoly rents for the firm (i.e. Competence and/or Collusion perspectives); 3) The effects of *first-order homogeneous IT capabilities* as sources of tactical flexibility and/or operational and transactional efficiency rents for the firm (i.e. Flexibility and/or Governance perspectives); and 4) The effects of *first-order heterogeneous IT capabilities* as sources of strategic flexibility and/or operational efficiency rents for the firm (i.e. Flexibility and/or Competence perspectives).

Questions of interest for future research could examine if the relationship between zero-order and first-order IT capabilities affects interfirm performance variance? Specifically, there is a need to test for differences among the major theoretical perspectives for the role of IT. These questions include: First, can homogeneity in zero-order capabilities serve as a source of interfirm performance variance without heterogeneity in first-order capabilities; and secondly, can heterogeneity in zero-order capabilities serve as a source of interfirm performance variance with homogeneity in first-order capabilities?

5.2 Conclusions

This paper introduced a conceptual and empirical puzzle, the inability of scholars to clearly link theoretically or empirically IT resource and capability investments to firm performance and competitive advantage. We reviewed some of the major literature on this phenomenon to discern what is known and what is not known, as a means of guiding and informing this study. From this review, we developed an argument for the need to craft study designs that show a clear strategic rationale for the role of IT resources and capabilities in the firm. We then developed a framework that presents such a clear strategic rationale, to understand how the role of IT resources and capabilities can vary in different industry and firm contexts. We conclude that IT resource and capability investments can likely serve in a strategic role for the firm as sources of “zero-order” ordinary resources and capabilities and “first-order” dynamic capabilities (Winter, 2003), and developed a number of propositions and questions for future research. Through this “strategic perspective of IT,” research can benefit from an improved understanding of the relationship between Strategy and IT, and how this relationship can in part explain performance differences among firms.

Clarification and significant further work is clearly in need to measure and examine the relationships among IT and firm performance, as well as the other related issues and implications IT holds for the firm. Future research needs to be explicit about the underlying theoretical mechanisms when conducting business value of IT research. This paper can serve as one potential “yard-stick” for assessing the validity

of such research. Essentially, empirical research on the business value of IT should make sure it takes into account, and is aligned with, the firm's strategic perspective and environmental context, and the underlying causal and profit mechanism(s) in order to examine how, where, when, and under what circumstances IT affects the firm. We hope that this paper can serve as an initial contribution to motivate and more effectively ground such work.

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