Conceptualization of Emerging Digital Value Domain and Its Implications for the Formulation of IS Strategy

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ABSTRACT

This paper describes the dynamic business environment through the conceptualization of the emerging process of a digital value domain using digital value proposition as the key construct. The intention is to better understand the characteristics of an IT-business fused environment and its implications for IS strategy formulation. A framework for IS strategy formulation is proposed to guide the development of IS strategy that has the dynamic capabilities to discover and drive customer value propositions, and to learn and integrate knowledge in the digital value domain.

Keywords: digital domain, digital value, IS strategy formulation

INTRODUCTION

Digital technology in combination with globalization has triggered fundamental changes in the way business is conducted and the context in which businesses operate. Today, products are embedded with digital technology and information systems; services are provided by digital technology in whole or in part; business functions and processes are enabled and more efficient as a result of digital technology; and organizational capabilities and resources are enhanced by digital technology (El Sawy, 2003; Orlikowski, 2009; Lubin&Esty, 2010; Ward, 2010). Consequently, a firm's IS/IT has morphed into something that plays a multi-dimensional role that involves new product design, development and delivery, information support for products and customers, and internal support for operations and processes. Digital technology has also reduced the time required to reach new customers and to react to intensified competition worldwide. While globalization has forced firms to expand into offshore markets, competitive advantage and firm performance will increasingly depend upon the ability of firms to operate in a digital and global business context.

Traditionally, management information systems (MIS) have played an important but supporting role in facilitating functions and transactions within and between organizations. The main purpose of MIS from the perspective of MIS alignment perspective is to support business strategy (Broadbent & Weill, 1993; Copeland, McKenney&Omason, 1995; Lederera&Sethi, 1996; Henderson &Venkatraman, 1999; Chan, Sabherwal& Thatcher, 2006; Luftman, Kempaiah& Nash, 2006; Chan & Reich, 2007; Avison, Dwivedi, Fitzgerald & Powell, 2008; Chen, Mocker, Preston &Teubner, 2010). The new role of IS attracts the attention of a group of researchers who suggested that aligning a firm's IS strategy with its business strategy is no longer adequate (Tomasz, 2001; Britt, 2002; Evans, 2003; Evans, 2004a, 2004b; Evans &Hoole, 2005; Lam & Black, 2008; Hinssen, 2009). In their view, IS strategy should not be treated as a component of business that aligns with business strategy; rather, it needs to be fused with business strategy to address competition in a rapidly changing business environment. However, due to the lack of understanding and formalization of the new digital business environment, it is difficult to devise an effective way to do so(El Sawy, 2003). This paper try to address this gap by conceptualize the new digital business environment as a digital value domain and describe the characteristics of this domain.

With IS playing an increasingly important strategic role in a firm, it is critical to understand the implications of this new digital value domain for IS strategy formulation. Given the emerging, complex and dynamic nature of the digital value domain, the traditional approach for IS strategic formulation would benefit from the fundamental principles for strategic formulation in the emerging environment, which is widely discussed in the strategic management discipline. This paper proposes a conceptual framework that broadens the traditional IS strategic formulation by drawing from the literature discussing MIS strategy formulation in the MIS discipline and business strategy formulation in the strategic management discipline.

To this end, this paper will describe and conceptualize the emerging new digital value domain by identifying the main characteristics of this domain; examine the strategic value of IS in the digital value domain and discuss the implications of the emerging digital domain for a firm's IS strategy, and propose a conceptual framework for formulating IS strategy in the emerging digital value domain.

Key terms used in this paper are information technology, information systems and management information systems. *Information technology* (IT) relates to any computer-based tool that people use to work with information and to support the information and information-processing needs of an organization (Rainer,Cegielski&Splettstoesser-Hogeterp, 2009). The *information systems* (IS) of an organization consist of the information technology infrastructure, data, application systems, and personnel that employ IT to deliver information and communications services in an organization (Davis, 2000). IS has long been considered as an important organizational resource. In general, information resources include IS infrastructure (hardware, software, network, data), information and knowledge, proprietary technology, technical skills and IT staff, end users of the IS, relationships between IT and business manager, and IT-enabled business processes (Pearlson& Saunders, 2004). Hence, the concept of IS integrates both technology and people in the context of a firm's management of IS/IT practices (Avgerou& McGrath, 2007). *Management information systems* (MIS) deal with the planning for, and the development, management, and use of information technology tools to help people perform tasks related to information processing and management (Rainer et al., 2009). A new term *digital value domain* is introduced in this paper. The digital value domain consists of all digital value propositions pertaining to products and services that can be fully or partially digitalized.

INTERPLAY OF INFORMATION TECHNOLOGY AND BUSINESS

In recent years, IT/IS has become an inseparable part of all aspects of a firm. The interplay of IT and business has caused fundamental changes to the environments in which firms find themselves, and has greatly impactedmanyfirms' internal business operations and strategic choices made to maximize their long term value in the external environment. To better understand this phenomenon, we will examine the impact of digital technology and information systems from the perspectives of products and services, business processes, and management.

Products and Services

There is an increasing trend of embedding digital components into physical products through product reengineering as digital technology has become mature and inexpensive. Konana (2007)grouped fully or partially digitalized products and services into three categories: product enrichment, product digitalization and product substitution.These digital components can enhance product functionality and create new features for product differentiation. They can also digitalize portions of the physical product and allow firms to capture information in the complete product life cycle and to provide ongoing and new downstream services. Some physical products can even be replaced with digital formats (Konana, 2007).Konana believed that the embedded digital component has induced product changes from incremental to radical. Embedded digital technologies allow traditional products, such as cars, airplanes, refrigerators and footwear, to be remotely monitored, controlled, diagnosed, serviced and customized based on supplier and customer needs. These embedded digital components provide critical product and market information to firms that enable them to respond and innovate to real time changes in the

market (Konana, 2007). The real-time responses are further enabled by wireless digital communication between firms and their customers, which has enhanced a firm's capability to build direct relationships with customers (Barnes, 2002).

Digitally enhanced product life management (PLM) consolidates diverse business activities that create, modify and use data to support all phases of a product's lifecycle from ''beginning-of-life'' (design and production), "middle-of-life" (use and maintenance), to "end-of-life" (recycling and disposal). Embedded digital information technologies in large scale manufacturing systems allow real-time product life cycle management and become an enabler and transformer for manufacturing firms to become more adaptive in the market (Pereira &Corra, 2007).Burgelman and Grove (2007) described how digital technology-enabled products and services could work in tandem with the Internet to bring cross-boundary industry disruptions. Firms such as Apple that have crossed the boundaries of media, telecommunications and entertainment industries are a good example of this. These cross-boundary industry disruptions often work as a "force multiplier" to induce more products and services with digital options/components.

Business Processes

As noted by Straub and Watson (2001), electronic trading, communication systems and net-enabled information systems have greatly changed firms' capabilities for reaching consumers and handling B2B and B2C customer/supplier relationships. The connections among firms in the business environment have gone beyond physical boundaries through real-time, information-intensive and networked global connections. Wheeler (2002, p. 125) formalized net-enablement as a four step process in the context of the business innovation cycle. Each step is intended to increase the value potential of an innovative product or process. It is worth noting that Wheeler explicitly identified "assessing customer value" as the fourth step of the process which draws input from the firm's external market. In other words, he suggested that emerging technology is critical inenabling a business innovation process for both internal processes and external value creation. Sambamurthy et al. (2003) described how digital-enabled cross-functional processes enhance a firm's ability to respond quickly to customers, partnering and operational opportunities as well as to detect and capture new business opportunities in markets. They also observed how IT-enabled processes allowed better inter-firms collaboration in the supply chain through networked portals.

Management

The main concern for managerial decisions is to increase a firm's performance and competitiveness. Sambamurthy et al. (2003) emphasized that digital options should be considered as a part of a firm's strategic capacities and strategic processes for enhancing its performance.One group led by Britt, Evans and collaborators stressed that IT business fusion will lead to more competitive business strategies and measurable IT outcomes (Britt, 2002; Evans, 2003; Evans, 2004a, 2004b; Evans &Hoole, 2005). Lam and Black (2008) believed that IT business fusion would enhance the management of enterprise applications. An empirical study conducted by Barua, Konana and Whinston (2004) showed that building online information capabilities will lead to improved operational and financial performance when both supply and demand sides are ready. Both of these

studies stressed the importance of fusing IT and strategy at the process level by taking into consideration digital options and market readiness.

The effective use of digital enabled project and resource management information systems can enhance firm competencies such as in new product development. These systems provide useful real-time information on the availability, usage, and cost of firms' internal resources and enable firms to realize their best resource allocation, resulting in building a firm's capability to compete better in a turbulent business environment (Pavlou& El Sawy, 2010).Orlikowski (2009) discussed using digital technology-enabled synthetic worlds for organizational activities such as internal cross-functional collaboration, project management and online learning and simulation.

To summarize, in a digital technology-enabled business environment, it is important for firms to recognize that business values can be created in digital format through products and services as well as internal and external processes (Wheeler, 2002; Sambamurthy,Bharadwaj& Grover, 2003; Konana, 2007). Studies have shown that many traditional products, services and business processes can be re-engineered completely or partially in digital format (Barnes, 2002; Wheeler, 2002; El Sawy, 2003; Sambamurthy et al., 2003; Konana, 2007; Pereira &Carro, 2007; Orlikowski, 2009). Business processes such as managing customer relationships are also enhanced with digital and information technology. From the perspective of management, digital technology has no doubt enhanced a firm's capabilities in managing resources, introducing better products and services, and building better relationships with customers. All of these are critical for a firm's performance and competitiveness. In the next section, we will examine the digital environment in which all firms are operating.

CONCEPTUALIZATION OF THE BUSINESS VALUE DOMAIN

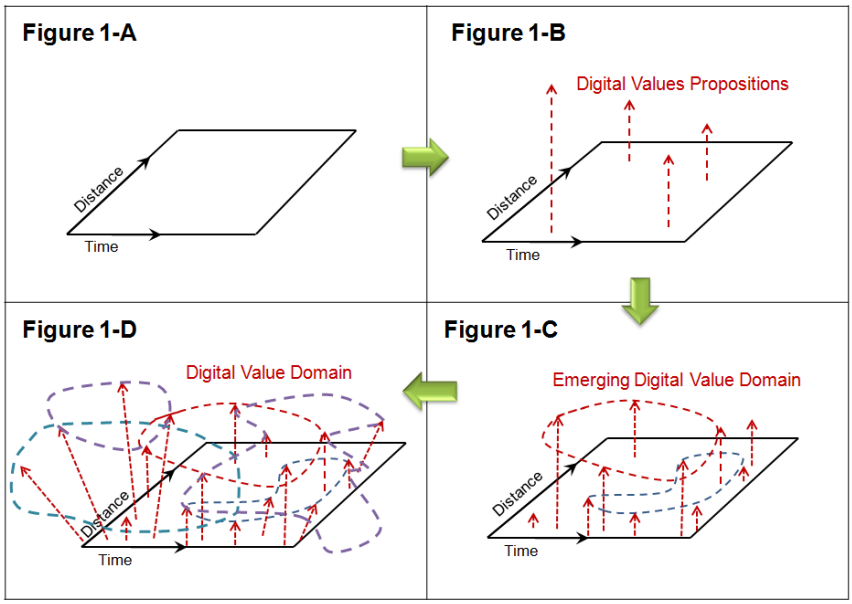
In the traditional business domain, business values are primarily created based on the consumption of the physical forms of goods and related services. Firms become more competitive if they can create and capture values effectively. As discussed in the previous section, it is important for firms to recognize that business values can be created in digital format through products and services as well as processes in the digital technology-enabled environment. In this section, we will examine the digital domain through the lens of "digital value". Using the analogy of a physical domain that contains value propositions based on physical goods and services, we conceptualize and define the digital value domain as the competitive business environment composed of value propositions of products and services in partial or complete digital form.

The thought process leading to the conceptualization of the digital value domain is demonstrated in Figure 1 below, which consistsof four figures. These four figures are used to describe the evolution of business from the traditional physical domain that primarily contains physical products and services to a digital domain where the majority of products and services are digitalized partially or fully.

The traditional market is shown in the two-dimensional area in Figure 1-A, in which the horizontal line represents time and the vertical line indicates geographical distance. In this environment, value propositions are primarily associated with the physical form of a product. Business competition in this environment tends to be confined by a two-dimensional space of time and space.Figure 1-B illustrates products, services and

processes where business values are created in digital format. Each vertical bar represents digital products and services offered to the customers by different firms. The length of the vertical bar indicates the degree of digitalization of products and services. Today, firms in some industries have identified new value propositions by embedding digital technology in their products and services. Examples are companies in high-tech industries, such as Apple, Google, Facebook, and Twitter that have provided value propositions in the form of apps, search engines and social networks.In traditional industries, more and more products and services are incorporating digital technology, such as in the automobile industry. These examples demonstrate that value can be created in digital form either to partially enhance existing physical products or completely replace physical functionalities. This is an emerging trend as digital technology becomes ubiquitous in all aspects of business, especially in new products and services development.

Figure1: The Emergence of Digital Value Domain



Note:
1-A. Traditional business domain confined by time and space
1-B. Emerging digital values propositions
1-C. Emergence of digital value domain
1-D. Dynamic and developing digital value domain

When digital products and services in a particular industry form a critical mass, a digitaldomain naturally emerges for that industry. In Figure 1-C, artificial surfaces are used to help visualize the forming and shaping of new digital value domains. Each of these emerging digital domains has its unique characteristics in terms of degree of digitalization, trends for new product design and development, and ways to compete. These domains may intersect with each other leading to destructive changes in industries

that are affected. Two potential digital domains are shown in Figure 1-C. This figure also shows that these digital domains are moving away from the confinement of time and space that form the base of the graph. Instead, these domains are now defined by digital value propositions in the space above.

As business becomes more digitalized, more values will be delivered in digital forms for both digital and physical goods and services. In order to be competitive in this environment, it is imperative for firms to develop competencies in identifying sustainable digital value propositions and developing products to deliver those values. Figure 1-D illustrates an advanced state of the digital value domain. This domain represents the collective space consisting of possible digital value propositions that go beyond the constraints of time and space. This domain is constantly changing and continuously developing. In this new digital value domain, physical and digital products/services are created, exchanged, distributed and consumed in a digitalized global environment. In turn, digital value propositions are no longer limited to few companies or industries but become opportunities for all firms in all industries. As well, digital values can be obtained not only through digital products and services but also in terms of digital resources, digital processes and new forms of profit mechanisms enabled by digital technologies.

Competing in the digital value domain implies using IS/IT as part of a firm's value propositions as products and service as opposed to competing in the traditional domain where IS/IT plays a supportive role for products and services. The emergence of the digital domain implies that firms are facing the challenge of choosing in which domain to compete and what internal IS/IT resources, architecture and infrastructure they should invest for such competition. More specifically, firms have to decide if they will compete in the traditional domain using IS/IT to support traditional products, or compete in the domain with new digital products, or any combination of both. For example, although Kodak was the company that developed the first digital camera, it chose to focus on competing in the traditional physical domain with its traditional products that consists mainly of film and film processing.Kodak's strategic decision of not to compete in the then emerging digital value domain eventually led to its bankruptcy in 2012. Kodak's scenario illustratesthe importance of recognizing the digital value domain in the competitive environment. However, recognizing and competing in the digital value domain does not guarantee a firm's competitiveness in the market. The competition between Apple's iPhone and other companies in the cell phone industry such as RIM's blackberry at the early stage illustrates the adoption of different competitive strategies in the digital value domain. Apple's digital value propositions include not only its innovative hardware design but alsoi-products such as the iTunes store selling gadgets and applications. In Apple's case, IS/IT has been used as part of product value propositions. On the contrary, RIMchose to focus on the traditional domain by improving its product design and used IS/IT to support its mobile products. These examples demonstrate that different IS strategies have different implications for a firm's performance in today's business environment as the digital value domain emerges.

However, it is often the lack of understanding of the emerging digital value domain that causes difficulties for firms to formulate effective IS strategy. For example, Kodak decided that digital cameras did not have enough strategic value for the firm while RIM had difficulties in adjusting its business and IS strategies to face challenges brought by Apple's market expansion in the digital value domain. Both companies failed to

recognize opportunities and threats presented in the emerging digital value domain hence failed to formulate effective IS and business strategy accordingly.

The complexity and emerging nature of the digital value domain can be found in the strategic management literature which provides a theoretical foundation for analyzing a firm's resources and its internal and external environments, as well as how firms address the environmental impacts at the strategic level.

A key focus in strategic management is theory and research that explains performance at the level of the firm. Key concepts that explain superior firm performance from the standpoint of strategic management include the role of internal and external fit captured in the notion of SWOT and the importance for difference to competitive advantage, both introduced into strategy by Andrews (1971). To this, Porter (1980) introduced the concept of generic strategies and added that in addition to differentiation, low cost leadership leads to extraordinary performance, as well as the five-forces model which explains why some industries are more attractive than others. Porter's later contributions (1985) include value creation as a value chain in which technology is portrayed as a support activity rather than primary activity.Competitive advantage remains an important cornerstone of strategy research and practice but in the early 1990s and beyond, scholars have increasingly focused attention on the links between firm capabilities, competitive advantage and performance as a means to take advantage of external opportunities and respond to threats. The main reason was a growing consensus that external conditions were increasingly hard to predict in a dynamic external context driven by global competition and rapid technological change that was accelerating the rate of mutation and innovation within industries, dubbed creative destruction by Schumpeter (1942) and a continuing theme in strategy scholarship (e.g. McGahan, 2004). Of particular relevance to better understanding the characteristics of the emerging digital value domain isChristensen and Overdorf's (2000) discussion on disruptive technologies. They proposed the importance of disruptive technologies that underperform already available products available at the high end of markets but provide an interesting value proposition at the lower end of a market.

A high-velocity, dynamic business environment such as the digital value domain has the characteristics of a dynamic and complex business environment as discussed in the strategic management literature. Four main characteristics are concluded and discussed here. First, the digital domain assumes a new level of complexity. Digitalization has played a critical role in the transformation of traditional markets into high velocity markets where industry structures are ambiguous, boundaries are blurred, change is unpredictable and nonlinear and business models need to be fluid. Second, the changes brought by digital technology are often disruptive. Beyond global competition, digital platforms enable cross industry boundary disruptions. Increasingly, firms face global and unexpected cross-industry competitors while the rules of games can be quickly changed by disruptive changes caused by digital technology at lightning speed. Internally, companies have to assess and adapt to the increasing digitalization of products, services, functions and processes. The combination of external and internal complexity makes it difficult for firms to identify sustainable value propositions in the digital value domain. Third, digital technology drives changes in customer experiences. Digital capabilities permit personal interactions between customers with the products and services, creating a new level of experience and expectations at physical, emotional and intellectual levels. This implies that digital value propositions need to address a broad dimension of customer needs. Fourth, digital technologies increase firm capability to create and capture

downstream value by establishing direct relations with customers through digitalized products and information systems. Such direct relationships will enable firms to sell complimentary services through horizontal integration as well as to communicate with customers and digitally update products and services.

While agreeing that a firm's capability lies in resources, processes, and its collective value and culture and that firms need to build capabilities in order to face and embrace destructive changes in the environment, they noted that it is particularly difficult for successful companies to introduce disruptive technology or new business models and that this is often a reason why they stumble (Christensen and Overdorf, 2000). Johnson, Christensen and Kagermann (2008) used the iTunes Store to illustrate the formulation of new business models and to point out that firms should consider a new business model when there is a shifting basis for competition.

According to Johnson, Christensen and Kagermann(2008), the four elements of a successful business model are customer value propositions, profit formula, key resources and key processes. In an emerging digital domain, how to identify sustainable digital value propositions becomes a major challenge for many firms. These challenges can be summarized in four key points as the following:

1.Digital value propositions are multi-dimensional. Digital values can be obtained not only through digital products and services but also in terms of digital resources, digital processes and new forms of profit mechanisms enabled by digital technologies.

2.Digital value propositions often involve multiple stages of the economic process of production, exchange and consumption. Firms can no longer focus on the traditional notion of a simple value proposition in the form of product, or in ways of exchange or ways the product is consumed in the macro economy. For example, although Apple still relies on the traditional supply chain to enable the production, delivery and consumption of its physical products, its digital products such as applications no longer rely on the traditional supply chain. The production, exchange and consumption of its digital products are done instantly online.

3.Products that used to be in physical form can now be delivered in digital form. Firms are unsure how values of physical products can be replaced or enhanced by digital products. Hence, it is difficult to identify their value propositions.

4.The life span of value propositions has shortened due to the fast changing environment in the digital era.

For many firms, the emergence of the digital domain represents a shifting paradigm for competition and they may have no choice but to participate in order to survive. How to identify sustainable digital value propositions and develop corresponding resources and processes to support the value propositions becomes a key issue that all firms need to consider. The digital nature of products and services as well as the necessary IT resources and capabilities all point to the importance of formulating an effective IS strategy that will enable a firm to compete in the digital value domain. In particular, firms should ask whether their IS strategy is formulated in such a way that allows them to take into consideration the environmental factors; whether their IS strategies enable them to address the challenges in the digital value domain; whether the IS strategy recognizes the interplay between the digital and traditional domains; and finally, what are the processes for formulation of an effective IS strategy?

In the following sections, we answer these questions by providing a framework for IS strategy formulation in the emergent digital value domain which is built upon existing

MIS literature on IS strategy formulation. We will conduct a review of IS strategy in MIS literature before we propose our framework for IS strategy formulation.

MANAGEMENT INFORMATION SYSTEMS AND IS STRATEGY

MIS emerged as an academic discipline in the 1960s (Chapman & Brothers, 2004). McNurlin, Sprague & Bui (2010) briefly summarized the history of the MIS field into four major periods: 1950-1970, 1970-1980, 1980-2000, and 2000 and beyond. The main focus in the early stage of computer technology before 1970 was the computerization of manual information processes in business functions such as accounting, payroll and word processing. The development of MIS in the 1970s focused on automating complex data analysis and supporting knowledge workers in organizations. The introduction of decision support and executive support systems in the 1980s enhanced executive decision-making to support business planning and strategy. The rapid growth of the Internet in the 1990s enabled the adoption of a web-based platform for doing business and the proliferation of e-business. Advanced telecommunication and digital technology in the 2000s has created a new world for digital business (McNurlin et al., 2010). As we move into 2011 and beyond, the Internet has fundamentally changed how things are done in society.

Research literature in the MIS field followed closely the evolution of the adoption of information technology in the business world. In the 1980s, research focused mainly on MIS development issues such as improving IS planning, facilitating and managing MIS, systems integration and quality assurance (Brancheau&Wetherbe, 1987). As summarized by Lederer and Mandelow (1988), MIS traditionally assumed that its role was to provide operational and management support in organizations. It was not until the late 1980s that researchers started to address the potential strategic impact of MIS. This is evident in surveys conducted in 1991 and 1994 by Watson, Kelly, Galliers and Brancheau (1997). Watson et al. found that key issues in the research of MIS were MIS and organizational alignment, information architecture, competitive advantage, and data as an organizational resource.

In the MIS literature, digital technology is considered to play a fundamental role that affects a firm's competitiveness, survival and sustainability (Virgo, 1987; Bharadwaj, 2000; Agarwal&Audretsch, 2001; Lee, Lee &Pennings, 2001; Cline &Guynes, 2004). There are many discussions surrounding various forms of digital technology-enabled business, such as e-commerce, e-business and digital business (Kao &Decou, 2003; Wall,Jagdev& Browne, 2007; Hindle, 2008; Miller, 2010). Nevo and Wade (2010) suggest that IT assets can have a strategic role when they are combined with organizational resources to create IT-enabled resources. One area in MIS research focuses on better understanding and conceptualizing digital business and determining whether IS strategy is the same as digital business strategy (Sherman, 2003; Blount, Castleman&Swatman, 2005; Daghfous& Al-Nahas, 2006; Zongjun&Guo, 2006; Huang, 2008; Caniato,Cagliano, Kalchschmidt, Golini&Spina, 2009).

El Sawy (2003) suggested that IT is immersed in the business environment and cannot be separated from individual work, the internal functions of businesses, and inter-organizational relationships. His position is that IT has become part of business, not merely a utility or adjunct system to organizations. This has established a solid ground

for a fusion view in MIS. The key notion of IT and business fusion is that IS has strategic value in the firm. In the next section, we will discuss the strategic value of IS and IS strategy.

Strategic Value of IS and IS Strategy

In the past decade, many MIS scholars and practitioners have discussed the strategic value of IS due to its increasing importance (Galliers,Swatman&Swatman, 1995; Watson et al., 1997; Luftman& Ben-Zvi, 2010a, 2010b; Chen et al., 2010), especially with regard to the potential for information technology to create competitive advantages for firms (Clemons, 1986; Barney, 1991,1995,2001; Mata, Fuerst& Barney 1995; Bharadwaj, 2000; Santhanam& Hartono, 2003; El Sawy&Pavlou, 2006). Results from the annual survey of 100-300 IT leaders on key issues for IT Executives conducted by the Society for Information Management (SIM) since the 1980s show that IT strategic planning has been a top concern of IT leaders in the past decade (Luftman, Kempaiah& Nash, 2006, 2008; Luftman&Kempaiah 2007; Luftman, Kempaiah&Rigoni, 2009; Luftman& Ben-Zvi, 2010a, 2010b).

IS strategy has also been well discussed by MIS scholars. Pyburn (1983) stated that "strategic IS planning is concerned primarily with the relationship between IS and the rest of the firm, and the communication between the senior IS manager and the top management team." (p. 3) In turn, "effective strategic IS planning is a process of building some consensus regarding the role of IS vis-a-vis the rest of the firm and the resources that will be committed to achieving that role." (p. 3) Reponen (1994) defined information management strategy as "a long-term precept for directing, implementing and supervising information management." (p. 30) Smits, Van Der Poel and Ribbers (1997) defined information strategy as "a complex of implicit or explicit visions, goals, guidelines and plans with respect to the supply and the demand of formal information in an organization, sanctioned by management, intended to support the objectives of the organization on the long run, while being able to adjust to the environment." (p. 131) Bajjaly (1998) referred to information system strategic planning as a comprehensive plan that includes the following components: IS mission statement, ISobjectives, linkage of the IS objectives to organizational goals, IS action plan for achieving IS objectives and mechanisms for management control, feedback and reporting (p. 78). Gottschalk (1999) derived the definition of IT strategy from Lederer and Sethi (1996) as a "written plan comprised of projects for application of information technology to assist an organization in realizing its goals." (p. 115) Duhan, Levy and Powell (2001) defined information systems strategy as the "search for competitive advantage through its [IS/IT] use." (p. 38) Brown (2004) referred to information planning as "the tangible outputs of the SISP (strategic information system planning) process which contain a portfolio of applications to be implemented together with priorities, as well as anoverall information architecture for the organization." (p. 23-24) Chen et al. (2010) defined IS strategy as "the organizational perspective on the investment in, deployment, use, and management of information systems." (p. 237).

The development of IS strategy has been dominated by alignment theory. The basic concept of MIS alignment theory concerns the development of a firm's IS strategy within the context of its business strategy (King, 1978). Alignment theory aims at a close link between the planning and implementation of IS strategy and business strategy. The notion of business strategies driving IS strategies has been supported throughout the

literature (King, 1978; Zviran, 1990; Reich &Benbasat, 1996; Teo& King 1997; Henderson &Vankatraman, 1999; Sabberwal& Chan, 2001; Luftman, 2003; Luftman&Kempaiah, 2007).

Henderson and Venkatraman (1999) suggested that IS strategy should be articulated in terms of internal domain (functional integration) and external domain (strategic fit). The internal domain includes IS infrastructure, IS processes and IS skills and should support the IS external domain of information technology, systems competencies, and IT governance. The objective is to align IS internal domain with utilities and resources of a firm and align IS external domain with the firm's business strategy.

Chen at al. (2010, p. 246) conducted a comprehensive review of MIS literature and identified three streams of IS strategy. These are (1) Strategic IS planning relating to the use of IS to support business strategy; (2) IS strategic alignment leading to a IS functional plan; and (3) IS for competitive advantage implying a shared view of the IS role within the organization.Luffman and Kempaiah (2007) suggested measuring business and IT alignment through six components: clear communications of business and IT strategies, understanding the values of IT resources, governance of setting IT policies and resources allocation, partnership between IT and other parts of the organization, effective scope and architecture to support the information needs of a firm, and skills, knowledge and learning of organizational personnel.

IT and business fusion were formally defined by Britt (2002) as "Business and IT – in terms of both organization and strategy – are unified." (p. 5) Britt suggested fusing IT and business to create greater customer value and profitability. He further stated that by "fusing business and technology strategies, companies can simultaneously respond to several fundamental needs —meeting earnings targets today, improving competitive positioning for tomorrow, and establishing a platform for perpetual growth." (Britt, 2002, p. 5) Britt also proposed a grid to demonstrate different degrees of fusion to help organizations determine their level of IT-business fusion.

According to the fusion view, "IT is more than immersed: it is fused within the business environment such that business and IT are indistinguishable to our standard time-space perception and reasoning." (El Sawy, 2003; p. 594) El Sawy (2003) was the first to introduce IT business fusion explicitly as an alternative way of thinking to alignment theory using the argument that IT is no longer a tool simply for helping people conduct their work, instead, it has a strong influence on business strategy. Other researchers (Tomasz, 2001; Lam & Black, 2008; Hinssen, 2009) have also suggested that the fusion view is an indication that alignment theory is no longer adequate to address a rapidly changing business environment.

Discussion

The above overview of MIS literature with a focus on IS strategy indicates two main schools of thought: the alignment theory and the fusion view. Alignment theory emphasizes the importance of developing IS strategies to support business strategy. Although alignment theory agrees that IS has become more strategic for firms, there is a lack of a comprehensive framework discussing how firms should formulate IS strategies in order to respond effectively to a fast-changing environment caused by the immersion of IT and business.

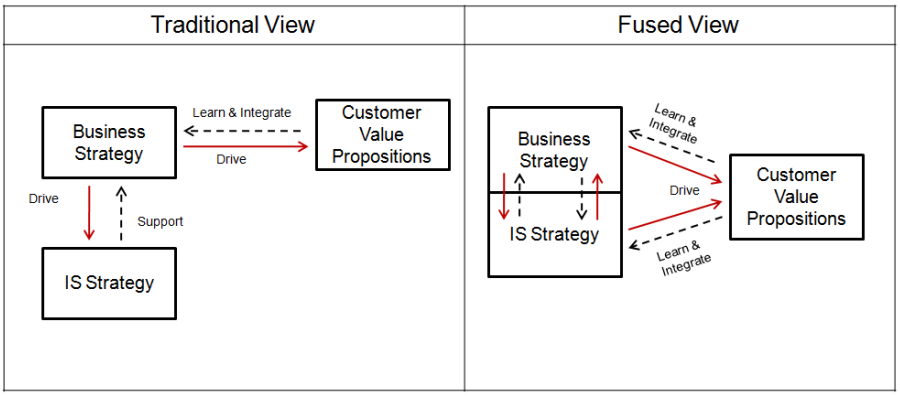
Proponents of fusion theory suggest that, due to the immersion of IT and business, the trend is toward the fusion of IT and business strategy. In other words, they believe IT

strategy will take on the role of business strategy and respond to the environment to improve firm competitiveness. While the fusion view stresses the merger of IT and business in an increasing dynamic environment, the above review shows that there is a lack of systematic discussion explaining ways in which business and IT fuse, and how this fusion affects the competitive environment. Another gap that was revealed in the review is the lack of discussion concerning the implications of IT business fusion on IS strategy. In short, in the MIS literature, there is no comprehensive discussion of IS strategy formulation in a business and IT fused environment such as the emergent digital value domain.

A PROPOSED APPROACH FOR FORMULATING IS STRATEGY IN THE DIGITAL VALUE DOMAIN

We maintain that firms competing in the digital value domain follow the fundamental principle of business models which is to identify and create effective value propositions and establish profit mechanisms by utilizing key resources and processes to obtain competitive advantage. However, the advancement of digital technology introduces added complexity to the traditional business models by expanding traditional value propositions to include digital value propositions. It is important to recognize that, in the digital value domain, not only products and services are digitalized but that key resources and processes are also digitalized in various forms. The main challenge for firms lies in deciding what should be digitalized and the degree of digitalization that is necessary to remain competitive in the industry. We believe strategic IS planning plays a critical role for firms to develop dynamic business models and adapt to the changing paradigm of the new digital value domain. In the remainder of this section, we will present an IS strategy formulation framework in the digital value domain.

Figure 2: The Fusion of IS Strategy and Business Strategy



First, we will use Figure 2 to illustrate the relationship between IS strategy and business strategy. On the left side of the figure, under the traditional view, business strategy identifies value propositions in the environment and IS strategy supports business strategy. When IT and business are fused, business strategy and IS strategy

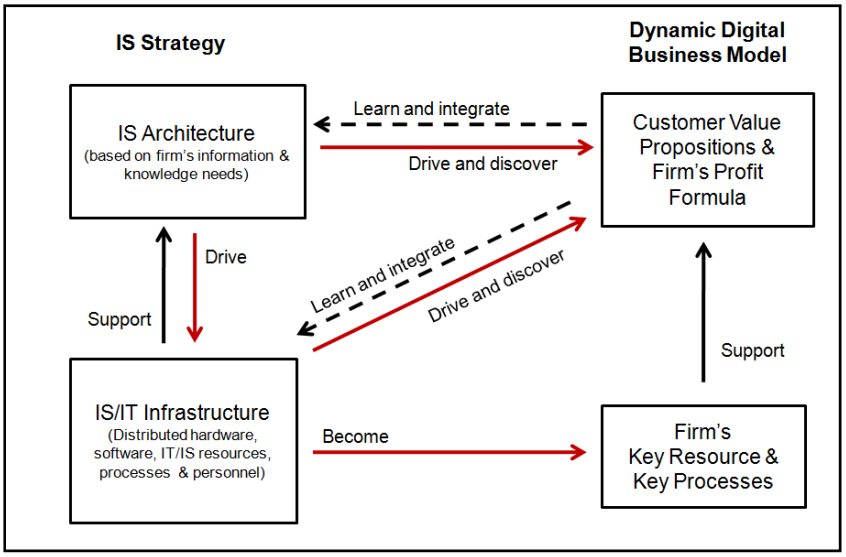
become an integral part of each other. As shown on the right side of Figure 2, both IS and business strategies are driving the identification of value propositions and both will integrate the knowledge learned in the environment for developing new value propositions and effective business models.

As summarized in the previous section, a firm's IS strategy should develop IT as a core competence and dynamic capability, which implies that IS strategy should be formulated to support collecting broad business intelligence and guide the IS architecture and infrastructure that allows learning, the development of second-order competences, and exploratory capabilities. Most importantly, the formulation of IS strategy should have the same goal as formulating any business strategy. In other words, when IT and business are fused in the digital domain, the goal of formulating IS strategy should include identifying business opportunities, creating value propositions, building firm competitiveness and striking for sustainable performance. Furthermore, the formulation of IS strategy should be linked to creating effective business models to realize business values. This understanding leads us to develop a conceptual framework showing how IS strategy formulation can be guided by dynamic digital business models. In the context of our proposed framework, dynamic digital business models have the same components of traditional business models as pioneered by Johnson et al. (2008), which include value proposition, profit mechanism, key resources and key processes. We use the term dynamic digital business model to specify that our framework focuses on digital value propositions in the dynamic digital value domain. The proposed approach of IS formulation in the digital value domain is presented in Figure 3.

As shown on the left side of Figure 3, IS strategy formulation includes two major components: IS architecture and IS/IT infrastructure. IS architecture is a blueprint based on the firm's information and knowledge needs. IS/IT infrastructure consists of physical facilities, IT components, services and personnel. In general, IS architecture drives the design of the IS/IT infrastructure. The right side of Figure 3 shows that firms rely on effective business models to create and capture value by utilizing key resources and key processes in the digital domain.

Building on the notion in Figure 2 that both IS and business strategies are driving the identification of value propositions and both will integrate the knowledge learned in the environment for developing new value propositions and effective business models, we incorporate IS strategy as both IS architecture and IS/IT infrastructure and as main drivers for firms to discover digital value propositions. The dotted and solid lines connecting the boxes of IS architecture and business value proposition indicate that the IS architecture incorporates the learning from the exploration and creation of digital values and transforms the learning as corporate knowledge for further development of dynamic capabilities and enabling higher-order processes. The learning feedback is also incorporated in the design of IS/IT infrastructure. When firm's IT/IS infrastructure is developed based on the dynamic digital business models, it will eventually become a part of the key resources and key processes of the firm.To summarize, the essence of our proposed IS strategy formulation framework lies in the formulation process being guided by the digital business model.

Figure 3: A Framework for IS Strategy Formulation in the Digital Value Domain



CONCLUSION AND FUTURE STUDIES

We posed two research questions in this paper. First, we asked what the characteristics of the emerging new domain due to digital technology are, and whether we can find a construct to describe the new digital domain. To answer this question, we examined digital technology embedded products, services, processes and strategies and proposed a conceptual space to represent the emerging digital domain. This domain was built on the traditional business domain that was based on the perception and reasoning of time and space. We introduced a new perspective in presentinga digital business environment and called it the digital value domain. Digital value proposition was used as the key construct to explain this digital value domain. In the digital value domain, value propositions have created new possibilities for adding business values for firms in terms of digital products and services, digital resources, digital processes and new forms of profit mechanisms enabled by digital technologies. We pointed out that although most firms recognize these benefits, they are faced with the challenge of how to identify proper digital value propositions to their customers in the digital business domain and, how to determine how these value propositions can be transformed into competitive advantage in a digital domain.

The main contribution of identifying the digital value domain is that it provides a clear structure for firms to visualize the complex business environment caused by the impact of digitalization and globalization. Through the lens of digital value proposition, firms can better understand the drivers of profitability in the digitalized industries. Furthermore, firms can use digital value proposition as a measure for evaluating the effectiveness of theirIS strategies.

Our second research question was concerned with the implications of the emergence of this new digital domain on IS strategies and identifying the general characteristics and models of IS strategy in this new digital domain. We identified the key characteristics of a firm's IS strategy in order for firms to compete in the new dynamic digital value domain. We also proposed a framework for IS strategy formulation in the digital value domain. This new IS strategy formulating approach calls for IS strategy planning to be guided by a dynamic digital business model.

The key contribution of this new approach is that it provides a systematic path to support firms inbridging the gap between an established IS strategy and the constantly changing dynamic external environment. This is particularly important in today's business world when digital value propositions in the forms of digital products and services have become an important component of a firm's competitive advantage.

Based on the study in this paper, several areas warrant further research. For the digital value domain, possible studies may include developing parameters to measure digital value propositions in order to better describe the digital value domain, conducting empirical studies to observe and categorize the practices of identifying and creating digital value propositions by firms in different industries in the digital value domain, and exploring other constructs in addition to that of a digital value proposition to further describe the digital value domain. As for ourproposed framework for IS strategy formulation, further studies may include developing the formulation process and detailed design of the IS/IT architecture and infrastructure as well as exploration of the role of links between a firm IS strategy and business strategy to firm performance within and across industries.

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