A Proposed Research Model for the Relationship between Organizational IS capabilities, Organizational Performance and Strategic Planning

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Abstract

E-business and globalization in 1990 onward have led the field of information systems (IS) to IS capability era, in which organizations aim to achieve sustainability from IS and take internal perspective rather than external. Basically, capabilities are organization’s core skills and routines in doing different activities effectively. Likewise, IS capability is a flow of actions to do the information system-related requirements of the organization effectively. Recently, the use of firm-wide IS capabilities have become more popular in studies such as e-commerce success, process innovation, IT harnessing, and business intelligence success. This paper provide a review of related studies on IS capability dimensions in IS research and finally proposes a conceptual model indicating the relationship between organizational IS capabilities, organizational performance and strategic planning.

Keyword – strategic information system, capabilities, organizational performance

Introduction

Information systems field has faced with several changes in the last decades. Accordingly, there are four different, albeit overlapping, IS management eras: data processing (DP), management information systems (MIS), strategic information systems (SIS), and IS capability (ISC). Table 1 depicts the characteristics of four eras of IS evolution (Ward and Griffith, 1996, Ward and Peppard, 2002).

Table 1: The four eras of IS evolution

<table>
<thead>
<tr>
<th>Time</th>
<th>Eras</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>1960s</td>
<td>Data processing (DP)</td>
<td>Single computers and cost saving objectives</td>
</tr>
<tr>
<td>1970s-1980s</td>
<td>Management information systems (MIS)</td>
<td>User-driven, interconnected, process distributed</td>
</tr>
<tr>
<td>1980s-1990s</td>
<td>Strategic information systems (SIS)</td>
<td>Business-driven, networked, related to business strategy, seeking out competitive advantages through IT opportunities</td>
</tr>
<tr>
<td>2000s</td>
<td>IS capability</td>
<td>Developing and leveraging business value through IS</td>
</tr>
</tbody>
</table>
Based on the impact of resource based view of the firm (RBV) on strategic management thinking, the focus on the demand side (i.e. external-focus) have changed with emphasis on supply side (i.e. internal-focus) that is associated with organizational capabilities in strategic information system planning. King (1995) suggests that strategic capability architecture is the fundamental basis for sustainable competitive advantage (SCA) of a company and its performance. In his discussion, SCA is a basic plan of organizational capability that is continuously improving and flexible.

**Sustainable Competitive Advantage in IS Field**

The increasing significant of IS has led to the needs to understand how information systems (IS) results in business advantage. Based on classic strategic theories, IS can be deployed in a manner to enhance bargaining power of the firm, offer novel services and products, and increase entry barriers (Porter and Millar, 1985). But, firms soon realized that value creation from IS is not easy, because IS resources (i.e. hardware, software, network) are imitable and therefore are not the source of sustainable competitive advantage.

Recently, there is an increasing interest in studying the “sustainability” essence to maintain the continuity of the advantages of IS/IT investments. Sustainability and competitive advantage have a clear distinction; while sustainability relates to an ongoing status, a specific competitive advantage might be temporary (Mata et al., 1995). From an IS point of view, sustainability is the organization’s ability to provide continuous explicit value for business through IS/IT(Ward and Peppard, 2002). While IT investments still provide effectiveness and efficiency and also seek out competitive advantage opportunities through IT and IT-business strategy alignment, yet scant attention has been paid to the organizational mechanisms through which firms achieve sustained and repeated value from IT (Peppard and Ward, 2004). Therefore, the challenge of understanding how to develop this sustainability is becoming more important.

Some researchers (Marchard et al., 2000; and Bharadwaj, 2000) have studied IT and sustainable competitive advantage of a firm. In summary, their studies show that when all firms have access to a similar technology, only management differences determine sustainable competitive advantage. Accordingly, acquiring sustainable IT-based competitive advantage requires organizational infrastructure that provides innovative action strategies. Furthermore, IT management skills are required to contribute to exploit business and human resources and intangibles.

In essence, management differences determine economic superiority that firms gain from their IS/IT investments. For example, some managers can fit the parts together more elaborately than others, so management of IS/IT skills could be a source of sustainable competitive advantage. In this regard, researchers (e.g. Bharadwaj, 1999, 2000, and Ross et al., 1996) have shown that in order to use IT to improve organization’s ongoing competitiveness, “IS capability” has to be developed. Rooted in strategic management and RBV perspective, IS capability is a complex group of IT-related resources, knowledge and skills practiced through organizational processes and empower the firm to utilize IS/IT assets for desired objectives (StoeI and Muhanna, 2009).

**RBV (Resource Based View of the Firm)**

Resource-based view (RBV) originates in 1950 and its deep conceptualization took place in the early 1990s. RBV has gained increasing dominance in the strategic management field and views organization as a bundle of resources. According to Barney (1991), the organizational resources are the main elements that differentiate an organization from others in the industry and make the firm matchless. Generally, the resources are divided into tangibles and intangibles. For instance, Bharadwaj (2000) has categorized IT-based resources as tangible and intangible IT-based resources.
Tangible IT-based resources are software, hardware, communication, and IT applications which are hardly inimitable and unique and consequently cannot be a source of competitive advantage (Teo and Ranganathan, 2003). On the other hand, intangible resources are more important and are related to staff’s skills and knowledge, culture, structure, and processes of IS function (Ward and Peppard, 2002). Similarly, Barney (1991) has defined resources as information, knowledge, firm attributes, organizational processes, assets and capabilities that empower the firm to formulate and implement effective and efficient strategies. Mata et al. (1995) have introduced IT resources (i.e. managerial IT skills, technical IT skills, proprietary technology, access to capital and customer switching costs) and have argued that only managerial IT skills can provide distinct advantage. Bharadwaj (2000) showed that, although IT resources have no innate value, a combination of IT resources and human and business resources, as complementary resources, can guarantee higher firm performance. Based on Teo and Ranganathan’s (2003) definition, Peppard and Ward (2004) classified IS resources into business resources, technical (IT resources) and behavior and attitude (human part of IS resources).

**IS Capability**

One of the main concepts introduced by RBV perspective in IS field is IS capability (Grant, 1996). Defining capability, competency, and resources is one of the RBV challenges (Wade and Hulland, 2004). For interpreting “IS capability”, it is necessary to start by understanding capabilities in the organization. As Barney (1991) stated, a firm is a composition of a group of resources that leads to a different performance. Basically, capabilities are repeatable patterns of organization’s core skills and routines in doing different activities effectively (Finney and Campbell, 2008). Likewise, IS capability is a firm’s repeatable flow of actions to do the information system-related requirements of the organization effectively. Moreover, understanding the notion of competency is essential to interpret the IS capability concept.

Broadly defined, competencies are organizational characteristics that empower the firm to visualize, select, and implement strategies (Barney, 1997). For example, enterprise systems success is far more dependent on the firm’s ability to “change management” and “implementation” than “software” and “technology applications” (Davenport, 1998). In other words, re-assessment and improvement of change management and implementation as IS competencies will enable the firm to succeed with enterprise systems. By improving these organizational characteristics, new strategic opportunities can be produced. In essence, the extent of the ability provided by those competencies determines the power of IS capability. Simply stated, all organizations have IS capability, but some have a stronger IS capability in comparison with others.

**IS Capability in IS Research**

Although many research have been conducted about IS capability, there is little consensus on its description (Calderia and Dhillon, 2010). According to Srinivasan et al (2002), resource is a particular asset or know-how while the capability comprises of skills gained through firm’s processes that empower organization to use its assets. Defining competence as a firm-wide concept that represents a group of technologies and skills, Peppard and Ward (2004) describe that capability reflects the strategic application of those competencies in order to attain business objectives. Peppard and Ward (2004) used the organization’s IT exploitation concept to provide a framework for positioning IS capability. Based on the Calderia (1998) model, they also constructed a model (Figure 1) to indicate the IS capability components (Peppard and Ward, 2004).
In this model, the fundamental premise is that utilizing and combining mechanisms (e.g. managerial IT skills) produce firm’s strategic benefits. Those mechanisms that are firm specific and hard to imitate are called “IS competencies” (Teo and Ranganathan, 2003). In other words, a combination of firm’s resources including knowledge and skills interact through organizational roles, processes, and structure and build the organizational competencies. Then, the coordination of competencies through strategy and investment allocation shapes organizational capabilities. Recently, there is an emerging consensus of using this hierarchy model as a common model in IS literature for RBV concepts interpretation (Peppard and Ward, 2004, Duhan et al., 2001, Calderia and Ward, 2003, Duhan, 2007).

In summary, business resources, technology resources, knowledge and skills, and behavioral attributes are the key ingredients of the IS competencies. At the organizational level, these resources are integrated via processes, structures, and roles and build IS competencies. Finally, the business level IS capability emerges that is the result of strategic application of IS competencies.

*The application of IS capability in IS research*

Generally, most of capability studies have linked them to organizational performance. Recently, O’Regan and Gholobadian (2004) have used organizational capabilities to study the relationship between them and strategy, and performance. Their study has developed a comprehensive model that provides a strong representation of IS/IT value for business strategy and performance.
O’Regan and Ghobadian (2004) argue that firms need to know the influence of capabilities on both performance and strategic decision making to be able to align their capabilities with strategy and performance. In order to do so, they defined capabilities as firm’s ability to integrate, build and reconfigure their resources and competencies. In their framework, they proposed that generic firms’ capabilities are related to the strategic planning and performance of the firm.

The results indicated that there was a high degree of correlation among generic firm-wide capabilities and strategy factors that is consistent with RBV which assumes the organizations as a bundle of resources (capabilities) that are utilized for competitive advantage. Finally, they highlighted the role of generic capabilities and their influence on strategy. Clearly stated, organizations use their capabilities as an integral part and basis of their strategic direction. They also show that low performing firms rarely see capabilities as the most important factors. Their findings also provided a foundation for organizations to revise the critical aspects of their operations to understand the necessary actions for the effective strategy planning and deployment. Another key point was that their focus was on generic capabilities that can be seen in every organization not specific or firm-oriented ones.

Using O’Regan and Ghobadian’s (2004) framework, this study is in search of suitable capability factors to be used in IS research (i.e. IS capability factors). Therefore, previous frameworks of IS capability are reviewed.

Previous Frameworks of IS Capability

In order to utilize IS capability, related studies must be investigated. IS capability has been studied by a number of authors (Bharadwaj 2000; Chen, 2001; Basselier et al., 2001; Peppard and Ward, 2004; Wade and Hulland, 2004; Morris, 2006; Calderia and Dhillon, 2010; Doherty, 2009; Stoel and Dhillon, 2009). The capability to which most of the researchers specify is primarily related to finding a bundle of factors that appropriately represent the firm-wide IT capability. A review of research conducted on IT/IS capability revealed that there are two threads of research in this field: (1) IS/IT capability from the IS unit perspective and (2) IS/IT capability from the whole organizational perspective.

Viewing IS capability as a characteristic of IS unit, researchers have classified IS capability into skills and tacit know-how (Sambamurthy, 1994), critical IS skills and knowledge (Lee et al, 1995), and explicit and tacit IT knowledge (Basselier et al., 2001). Recently, from organizational perspective, viewing IT capability as an organizational ability is more accepted among IS researchers (Peppard and Ward, 2004;
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Wade and Hulland, 2004). In this thread of research, IS/IT capability is assumed to be necessary to gain benefits from IS/IT investments.

The first influential research on organizational IS capabilities can be traced back to the conceptual work of Bharadwaj et al. (1999). The researchers proposed that IT capability involves both technology and organizational attributes. They defined IS capability as the organization’s ability to integrate, deploy, and assemble resources. Based on three categories of resources (i.e. human, business, and technology resources), they introduced IT capability constructs as IT infrastructure, IT management, business process integration of IT, strategic thinking of business-IT, external IT relationships, and IT-business partnership.

Using a firm-wide perspective, Feeny and Willcocks (1998a) defined IS capability as the firm’s sufficient and necessary IT conditions that allow it to exploit technology to obtain business value over time and classify them into IT leadership, relationship building, business systems thinking, architecture planning, informed buying, making technology work, contract facilitation, vendor development, and contract monitoring. More recently, in their influential paper, Peppard and Ward (2004) defined IS capability as the strategic exploitation of IS competencies. In their definition, competency is a firm wide concept that represents a group of technologies and skills that are integrated through processes, structure, and roles (see Figure 1). They categorized IS capabilities into Strategy formulation, IS strategy, IT strategy, Exploitation, Deliver solutions, and Supply.

In another influential research in IS capability field, Wade and Hulland (2004) defined IS capability as a bundle of repeatable exercises of actions in utilizing IS resources to produce value for the firm and categorized them in three parts of outside-in (manage external relationships, market responsiveness, and IS business partnership), spanning (IS planning and change management), and inside-out resources(cost effective IS operations, IS infrastructure, IS development, and IS technical skills).

In moving ahead towards better understanding and explanation of IS/IT capability, Calderia and Dhillon (2010) used interview and a Delphi panel among 16 case studies to determine the required capabilities/competencies for exploiting benefits from IS investments. They introduced six high level fundamental capabilities and seventeen facilitating capabilities needed to gain benefit from IS investments (see Table 2).

From a new perspective, Stoel and Muhanna (2009) defined IS capability as a complex group of IT-related resources, knowledge and skills practiced through organizational processes and empower the firm to utilize IS/IT assets for desired objectives. They classified IS capability into external (external IS/IT capabilities that help to market alertness (e.g. CRM processes, market Research)) and internal (internal IS/IT capabilities help to provide products and services in a good manner (e.g. operational support, back-office production)). Table 2 depicts different classifications of IS capability done in key IS capability studies.

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<tr>
<th>Author(s)</th>
<th>Description</th>
<th>Categories (capabilities)</th>
<th>Sub-categories</th>
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<tbody>
<tr>
<td>Sambamurthy (1994)</td>
<td>•Capabilities, skills and tacit know-how that organizations develop over time and enable them to acquire, deploy, and leverage their IT investments.</td>
<td>Skills and tacit know-how</td>
<td>-</td>
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<tr>
<td>Author(s)</td>
<td>IS Capability Description</td>
<td>IS Capabilities Description</td>
<td>IT Capabilities Description</td>
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<tr>
<td>Lee et al. (1995)</td>
<td>Critical IS skills and knowledge</td>
<td>Technology management, technical specialties, interpersonal relationships, business functions, and management</td>
<td>-</td>
</tr>
<tr>
<td>Ross et al. 1996</td>
<td>IS capability is ongoing development of three IS/IT assets that are: human, technology, and relationships assets</td>
<td>Human assets</td>
<td>Trained IT staff to provide the best solutions for business requirements</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Technology assets</td>
<td>A well-managed, cost-effective IT platform for information needs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Relationship assets</td>
<td>Effective IT-business relationships</td>
</tr>
<tr>
<td>Feeny and Willcocks (1998)a,b</td>
<td>Core IS capabilities are the firm’s sufficient and necessary IT conditions that allow the firm to exploit technology to obtain business value over time</td>
<td>Exploitation, delivery solution, and supply</td>
<td>IT leadership, relationship building, business systems thinking, architecture planning, informed buying, making technology work, contract facilitation, vendor development, and contract monitoring.</td>
</tr>
<tr>
<td>Bharadwaj and Sambamurthy (1999), Bharadwaj et al (1999), and Bharadwaj (2000)</td>
<td>IS capability is the organization’s ability to integrate, deploy, and assemble resources</td>
<td>Based on three categories of resources (i.e. human, business, and technology resources) introduced IT capability constructs</td>
<td>IT infrastructure, IT management, business process integration of IT, strategic thinking of business- IT, external IT relationships, IT-business partnership.</td>
</tr>
<tr>
<td>Chen (2001)</td>
<td>Based on Bharadwaj (2000)'s definition</td>
<td>IT-enabled intangibles, IT infrastructure, and human-IT resources</td>
<td>-</td>
</tr>
<tr>
<td>Bassellier et al. (2001)</td>
<td>IS/IT related tacit and explicit knowledge</td>
<td>Explicit IT knowledge</td>
<td>Systems development technology, applications, access to IT knowledge, and IT management</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tacit IT Knowledge</td>
<td>Experience (personal use of IT, IT management, IT projects), and cognition (process view and IT role vision)</td>
</tr>
<tr>
<td>Peppard and Ward (2004)</td>
<td>IS capability is the strategic exploitation of IS competencies (Competence is a firm wide concept that represents a group of</td>
<td>Strategy formulation</td>
<td>Information governance, Business strategy, Investment criterion, and Technology innovation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IS strategy</td>
<td>Systems and process innovation, Prioritization, Business</td>
</tr>
<tr>
<td></td>
<td>Technologies and Skills</td>
<td>IT Strategy</td>
<td>Exploitation</td>
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<tr>
<td>Wade and Hulland (2004)</td>
<td>IS capability is a bundle of repeatable exercises of actions in utilizing IS resources to produce value for the firm. Proposed a typology of main IS resources</td>
<td>Infrastructure development, Sourcing strategies, and Technology analysis</td>
<td>Benefits planning, Managing change, and Benefits delivery</td>
</tr>
<tr>
<td>Morris (2006)</td>
<td>IT capability is a combination of complementary IT and non-IT abilities</td>
<td>Outside-in IS resources</td>
<td>Spanning IS resources</td>
</tr>
<tr>
<td>Caldeira and Dhillon (2010)</td>
<td>IS capability is necessary to gain benefits from IS/IT investments</td>
<td>Based on a comparison between several researches in the IS/IT capability area has proposed a nine dimension model</td>
<td>Cost effective IT operations, IT development, IT technical knowledge and skills, IT infrastructure management, IT strategic Change management, IT-business Strategic integration, IT-business Internal relationship, IT alertness, and IT external relationship</td>
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</table>
### Seventeen facilitating capabilities

<table>
<thead>
<tr>
<th>Stoe and Mohanna (2009)</th>
<th>Confidentiality, deploy cost effective applications and systems, ensure compliance with standard IT methods and procedures, facilitate behavior enrichment for technology adoption.</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS capability is a complex group of IT-related resources, knowledge and skills practiced through organizational processes and empower the firm to utilize IS/IT assets for desired objectives</td>
<td>The ability to: IT staff management, continuous IT training, senior management support, business processes design, systems consistency maintenance, users’ involvement, institute Agreements with suppliers, IT standards identification, in-house software development, manage IT consultants and vendors, software sourcing, system response time maintenance or decrease, knowledgeable users, business and IS requirements identification, IT department credibility, service accountability, IS architecture development</td>
</tr>
</tbody>
</table>

Deriving from the studies listed above, it is realized that IS capability is a complicated multidimensional firm-wide construct. Such a firm-wide IS capability comprises of complex and multifaceted combination of IT and non IT abilities (Bharadwaj et al., 1999). In more detail, IS capabilities consist of human, technology and relationship resources that link IS function to the business. Some researchers have used a narrow (IS unit) perspective of IS capabilities (Sambamurthy, 1994; Lee et al., 1995; Chen, 2001), while...
others have used a broader (firm-wide) perspective (Wade and Hulland, 2004; Peppard and Ward, 2004; Bharadwaj, 2000). Moreover, in the IS capability field, there is no consensus on a set of IS capability constructs. But reviewing all these studies provides some common capability constructs that are (Morris, 2006):

- cost effective IS operations,
- IS development,
- IS technical knowledge and skills,
- IS infrastructure management,
- IS strategic Change management,
- IS-business Strategic integration,
- IS-business internal relationship,
- IS alertness, and
- IS external relationship

**Discussion and proposed research model**

Based on RBV theory, IS capabilities are emerged when IS and non-IS resources, and assets are combined together through business roles, processes, and structure (Peppard and Ward, 2004). IS capability is a complicated multidimensional firm-wide construct. Acknowledging the complexity of IS capability constructs, the researchers conceptualized a multidimensional IS capability framework to be linked to performance and strategy in IS research. Such a firm-wide IS construct comprises of several single IS capabilities. Single IS capabilities are the firm’s repeatable exercises of actions in doing IS-related requirements of the business effectively (Finney et al., 2008). Based on the common list of IS capabilities suggested by Morris (2006), nine single IS capabilities were identified that are cost effective IS operations, IS development, IS technical knowledge and skills, IS infrastructure management, IS strategic Change management, IS-business Strategic integration, IS-business internal relationship, IS alertness, and IS external relationship.

Having explained the classification and development of the firm-wide IS capabilities, it is necessary to find out “how” to link them to performance and strategic planning. Previous literature contains some evidence indicating that single firm-wide IS capabilities are positively related to the performance (Bharadwaj, 2000, Morris, 2006) and strategic planning (O’Regan and Ghobadian, 2004). Therefore, we propose the research model as indicated in Figure 3:
To organize the research based on organizational attributes of information systems, a causal relationship between organizational IS capabilities and organizational performance and strategic planning is suggested in the research model as demonstrated in Figure 3. The research model indicates the relationship between those three factors.

As previously stated, recently, IS era is characterized by capability conceptualization based on the RBV logic (Peppard and Ward, 2004). In IS capability era, organizations are considered as collections of firm-wide capabilities through which they produce their goals and provide their services. By considering organizations as capability collections, traditional IS theoretical frameworks must be adapted to this new conceptualization. Finally, the research model, as a conceptual model, needs practical confirmation in next studies.

**Conclusion**

IS capability literature was investigated in this paper. Generally, IS capability is the result of the last shift in IS management discipline. The literature provides different IS/IT capability classifications that assist the understanding of IS capability nature in detail. Generally, capabilities have been indicated to have the ability to influence organizational performance and strategic planning. As a firm-wide multidimensional construct, IS/IT capability is related to the ability of an organization to provide sustainable competitive advantage, superior performance and successful strategic planning. In this paper, several organizational IS capabilities were identified that can be used in IS research in order to study the bidirectional relationship between those IS capabilities and organizational performance, and strategic planning.
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