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The roles of information and communication technology in solutions offering: The concept of ICT-enabler and value creation activities

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Information and communication technology (ICT) is used in every value chain activity, including upstream procurement, internal production, downstream sales, and customer services. However, the theoretical and practical contributions of ICT to businesses have not yet been clarified. Through a literature review, this article attempts to (1) show the theoretical contributions of ICT and (2) clarify the roles of ICT in the context of a service-oriented approach under a business-to-business setting. The literature review shows that the resource-based view appropriately explains the roles of ICT. The review also indicates that ICT can be regarded as an enabler that has indirect rather than direct effects on firms' activities. Specifically, we identified four roles of ICT as an enabler in terms of offering superior value to customers. These findings contribute to both the emerging theory of service innovation and the management of value creation in business marketing.

Keywords: service innovation, service oriented approach; ICT; ICT-enabler

1. Introduction

1.1 Impact of ICT on businesses

The emergence of the Internet and high-speed information and communication networks has changed the nature of businesses. Companies have gradually benefited from advanced information and communication technology (ICT), including in a business-to-business (B2B) setting. For example, in the ICT industry, the

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number of actors involved in the telecommunication market has dramatically increased, and the market is now segmented into areas such as middleware products and software, consisting of many specialized actors within each layered stack. Telecommunication operators are shifting away from their managerial mode as telephone service provider to that of service provider, integrating layered services and offering them as a package. These movements are closely related to the development of web-based technologies. The standardized interfaces and software components provide ICT developers with common and integrated development circumstances.

In the advanced processes of the service development of ICT, service providers are required to integrate and manage these services in cooperation with other service providers. IT vendor companies used to integrate the hardware, software, and networks into a system in a customized way to suit their clients' environment. Software for major business applications has normally been run on users' corporate servers. However, several IT vendor companies now provide such software as an on-demand service (software as a service; SaaS) through their own network. This trend is apparent in areas such as infrastructure (cloud computing) and service delivery platforms (platform as a service; PaaS). In the ICT industry, changes in collaborative patterns among firms have been observed in new technological circumstances.

1.2 Toward a service-oriented approach

Apart from ICT-related businesses, firms are now attempting to offer "services" rather than "goods." This trend comes from recent developments in which companies now face volatile and rapidly changing markets, and the life cycle of a product is increasingly becoming shorter, narrowing profit margins. As a result, product and cost now provide less differentiation. Especially, commoditization erodes the existing competitive differentiation of companies. Therefore, "services" or "service-oriented approach" is now recognized as a tool for coping with commoditization and market developments (Ulaga and Eggert, 2006).

The trend toward a "service economy" indicates that the service industry is becoming a more important part of the economy. However, today, the trend is influencing not only the service industry but also the manufacturing industry. The concept of "servitization" aims to extend service-oriented discussions to manufacturers, featuring integrated perspectives, that is, how products and services could and should be integrated in the capital goods industry (Windahl and Lakemond, 2010). Behind this trend is the change in companies' strategic attitude from

product to customer centric. Companies now emphasize relationships with their customers more than products and manufacturing technologies because of the decreasing effectiveness of product differentiation and innovative technology in yielding and maintaining competitive advantage. Therefore, companies are now likely to recognize strategic competition as developing products for and selling solutions to customers rather than only selling products.

1.3 Discussion of the service-oriented approach

The service-oriented approach features the “provision of functions” rather than the sale of products. The aims of the service-oriented approach are developing (1) efficiency and (2) effectiveness, and (3) integrating both aspects to create new customer value. The first aim involves improving the efficiency of a service operation through the scientific measurement of the service delivery process. The concept “service science” focuses on developing an efficient service offering process by using advanced ICT. However, recent discussions on ICT tend to focus on investigating effectiveness and creating new customer value by introducing the concept of “co-creation value.” Underlying this movement in the literature are the highly competitive circumstances that prompt businesses to determine how to capture and fulfill demand.

1.4 Purpose of the study

ICT is used in every value chain activity, including upstream procurement, internal production, downstream sales, and customer services. However, the theoretical and practical contributions of ICT to businesses have not yet been clarified (Ashurst et al., 2012). This study aims to show how firms develop new service-offering methods, focusing on the relationship between ICT and service offerings in the context of a service-oriented approach. The three main topics in the service-oriented approach are (1) creating a new business model (e.g., outsourcing and venturing using advanced ICT), (2) offering new customer value, and (3) changing comprehensive service offering systems through development of business processes. This study focuses on topics (2) and (3). This article attempts to propose new roles of ICT under new service-oriented business circumstances in B2B settings. Specifically, the study examines 1) how ICT enables companies to create service innovation and 2) what part of an ICT's role should be emphasized in creating service innovation. The study achieves these goals by reviewing the existing literature on information systems, service operation, and innovation management in B2B settings.

The rest of article is organized as follows. First, the study briefly introduces the service-oriented approach and describes how introducing the concept of co-creation value affects business strategy, prompts the shift from offering goods to that of services, and emphasizes the importance of offering integrated solutions to the customers and of managing inter-firm relationships. Second, the article addresses the important issue of ICT resources and the role played by moderating factors that influence ICT resources and firm-performance relationships. Third, the article discusses the concept of ICT as an enabler and proposes four roles of ICTs in creating innovative customer value in the context of a service-oriented approach. Finally, the article presents the limitations of the study, contributions to academia and management, and future research avenues.

2. Service-oriented approach

2.1 Customization: Different approaches to offering goods and services

Research on service development has tended to focus on the service sector rather than on the manufacturing sector. Especially, key studies on service marketing have focused on consumer markets rather than on industrial markets. Marketing to the industry is essentially different from marketing to the consumer. Mainly, they differ in two aspects: partnering and the purchasing process. The organizational buying task is clearly more complex, takes place over a longer period of time, and is influenced by more forces within and outside the company than is the consumer buying process (e.g., Webster and Wind, 1972; Bagozzi, 1974; Windahl and Lakemond, 2010).

Early studies on industrial services (e.g., de Brentani 1989; Jackson et al., 1995) focused on showing the differences between tangible and intangible goods in term of exchanging goods. According to Windahl and Lakemond (2010, p. 1281), "classifications of both goods and services show that the degree of interaction with customers and the degree of customization vary within different types of services and goods." Windahl and Lakemond (2010, p.1281) further explain the differences as follows: "service providers, such as fast food, call centers and providers of financial services, are in the mass services businesses where customization plays a minor role. However, capital goods manufacturers, especially those producing complex and expensive machines, usually have a long tradition of involving customers in product design and production."

Windahl and Lakemond (2010) added that the focus on goods equals a focus on mass production and standardization (without customer involvement), whereas

the focus on services is strongly connected to customization. Customization requires non-standardization; therefore, heterogeneity may contribute to customer value, while standardization may negatively influence value creation. Even though customized solutions create desirable client outcomes, they can be very expensive. Thus, firms tend to reduce the level of customization and move to modular solution platforms (Matthyssens and Vandenbempt, 1998).

2.2 Value and solution offering

Discussions on “value” can be categorized into two distinct research streams: customer-perceived value and the value of relationships. Customer-perceived value has been approached in various ways (e.g., Brady et al., 2005; Payne and Holt, 2001; Flint et al., 1997). “Customer perceived value” was defined by Woodruff (1997) as a perceived preference for and evaluation of product attributes, performances, and consequences that facilitate achieving the customer’s goals and purposes in use situations. This definition means that the perceived value of the product can override both the product price and the costs of owning the product in the customers’ decision-making process (Lindgreen et al., 2012). In this sense, value has been regarded as the trade-off between benefits and sacrifices by the supplier and the customer (Ulaga and Eggert, 2005; Flint and Woodruff, 2001).

However, the recent stream of research focuses on the fact that the supplier benefits from the customer at the same time as it offers value to the customer (Walter et al. 2001; Möller 2006), because customer value is a dynamic, interactive phenomenon (Bervaland and Lockshin 2003). In a B2B setting, firms do business to not only directly benefit from products and services but also fulfill the requirements of other factors, especially of future capabilities that can create customer value through collaborative activities. This type of value activities emphasizes the relationships between suppliers and customers in order to directly or indirectly benefit from actors in a network. An important point in the discussion of value comes from the new paradigm that services should be used as a perspective. According to Edvardsson et al., (2005) viewing services as a perspective involves

- (1) Focusing on value creation rather than on a category of market offerings;
- (2) Focusing on value through the lens of the customer; and
- (3) Realizing that the co-creation of value with customers is key, and its interactive, processual, experimental, and relational nature forms the basis for char-

acterizing service.

In this sense, a customer buys a product in a market because the customer recognizes the value that the firm provides. The term "customer value" can be defined as value that a firm can offer to customers through products and services. This means that value can be perceived by customers. In traditional marketing, exchanges occur when both buyers and sellers recognize what their offerings are worth to the other. On the other hand, the concept "co-creation value" is a different approach from that long discussed by marketing researchers. A firm does not create and offer customer value. Rather, value is created by customers. This interactive process is called co-creation value. In this concept, a customer is defined as a co-producer who creates value with suppliers. It does not mean that customers are involved in the process of product development; rather, it emphasizes that customers create value and firms only propose value to customers.

2.3 Co-creation value activities

The basic premise of co-creation value is that a firm can create customer value through collaborating with customers. The premise stems from the perspective of "user innovation" (e.g., von Hippel, 1994) focused on interactions with users in product development. It emphasizes that users can only create innovation in the process of product development. On the other hand, a new approach, "value-in-use," has a different perspective of value creation. In this concept, users, not suppliers, can perceive the value. Value is determined from the customers' perspective, and customers determine the value of the offering. However, this definition of value does not mean that only customers create value and firms are only expected to set the situations in which customers can create value. Suppliers also play an important part in determining the meaning of value in that they need to propose, show, and even educate the customers. The success of value creation depends on both the customers' and suppliers' ability to perceive and determine value.

Departing from the traditional marketing thought that products should be delivered to fulfill customers' needs, the service-oriented approach regards marketing as a more interactive and cooperative activity among actors. Although companies should apply their knowledge and skills to serve their customers, the process is not a unilateral but rather a collaborative effort to create value. The service-centered view sees service as inherently customer oriented and relational, because it is defined in terms of a customer-determined benefit and is co-created.

The service-oriented approach focuses on the process in which companies apply their resources such as knowledge and skills to serve their customers. The resources should be activated and developed through interactions among actors. The exchanges of resources are inherently relational.

As summarized in the above discussion, the focus of serving customers moves away from answering the customer's operational needs (system selling; Mattson, 1973) to creating customer value in existing or new markets based on a solution strategy. The term "solution" means solving customers' specific problems. An aim of offering solutions is to increase value for customers in their specific context (Nordin and Kowalkowski, 2010; Shepherd and Ahmed, 2000; Stremersch et al., 2001).

However, the outcome of solutions is expected not only to solve specific customer problems but also to yield superior value for customers (Brady et al., 2005; Matthyssens and Vandenbempt, 1998; 2008). Value creation has been argued in terms of yield for both customers and providers. According to Sawhney (2006), the value of a solution can be conceptualized as the following:

- (1) The value of individual products and services that make up the solution;
- (2) The value of marketing and operational integration provided by the solution vendor;
- (3) The value of customization based on the customer's specific needs and context.

2.4 Emphasizing the service offering process in value creation

The service-oriented approach emphasizes the importance of managing the processes of creating value (Payne et al., 2008). Supplier activities can be regarded as part of the customers' value creation processes. According to Payne et al. (2008), the processes can be categorized according to three frameworks, and solution offerings are delivered by each or a combination of the three:

- (1) Customer value-creating processes: Customers proactively attempt to create value. The customer uses processes, resources, and practices to manage its business and activities. In a B2B setting, these are used to manage the customer's relationships with suppliers. For example, the Japanese telecommunication operator, Nippon Telegraph and Telephone (NTT), has been a customer of some major Japanese ICT companies (e.g., Hitachi, NEC, and Fujitsu) but has initiated major projects involving constructing a communication network of its own in Japan.

- (2) Supplier value-creating processes: A supplier proactively uses processes, resources, and practices to manage its business and its relationships with customers and other relevant stakeholders.
- (3) Encounter processes: These are the processes and practices of interaction and exchange that take place within customer-supplier relationships and that need to be managed in order to develop successful co-creation opportunities.

2.5 Toward an integrated perspective for offering solutions

When companies adopt a solution offering strategy on a large scale, these solutions are provided through a combination of many different products and services (Galbraith, 2002). According to Windahl and Lakemond (2010), studies that view integrated solutions as an extended offering in the goods-based exchange assume that integrated solutions are provided only after the product has been delivered to customers. This assumption is related to the content of offerings, and more particularly, the service dimension of offerings. It stresses the degree of integration of the offering within the customer's value chain (Foote et al., 2001; Galbraith, 2002). As a result, these studies tend to omit the connection between manufacturing and services (e.g., Oliva and Kallenberg, 2003). On the other hand, the studies that emphasize changing strategies and organizations to provide solution offerings have mainly focused on operational offerings and sometimes on performance offerings (e.g., Penttinen and Palmer, 2007). These works have a more integrated perspective and emphasize the entire value chain system, including R&D activities.

Miller et al. (2002) showed three types of integrated solutions, described below:

(1) Business process integration

In this integrated solution, a supplier takes over some of the ongoing operation of a customer, that is, a part of the customer's value chain. The supplier performs an activity with greater efficiency or at a lower cost, reduces client risk, and allows the client to focus on areas of core competency. A supplier seeks to add customer value by integrating a solution into the service value chain or the business process of the customer. The overall aim is mostly a partial, outsourcing solution.

(2) Technical application integration

In this solution, a supplier adds value by fine-tuning the technical solution to the specific needs of the customer. This means that the supplier tries to move the customer's technical capabilities up the value chain.

(3) Turnkey solution

In this solution, companies combine both tactics. This seems less feasible in the more highly commoditized mainstream market segments.

Along with the works of Windahl and Lakemond (2010), studies on integrated solution strategy have identified the following four characteristics of integration solutions:

- (1) From less complete to more complete,
- (2) From unbundled to bundled (Stremersch et al., 2001),
- (3) From system to solution (Davies et al., 2007), and
- (4) From product oriented to process oriented (Oliva and Kallenberg, 2003).

2.6 Managing interdependency (integration and inter-firm relationships)

Galbraith (2002) explained why a company should pursue an integrated approach. A product-oriented company tries to find as many uses and customers as possible for its products. In contrast, a customer-centric company tries to find as many products as possible for its customer. In this sense, companies attempt to integrate products and services to meet customer demand.

An integrated solutions approach emphasizes the importance of addressing customers' needs and changing relationships with customers from transactional to relational, that is, (1) long-time relationships built on trust, (2) relationships with partners and suppliers, and (3) relationships within the network.

The interdependency between suppliers and customers increases with integrated solution offerings. From the increased interdependency with customers, suppliers develop potential for value co-creation. The challenges associated with the development of integrated solutions are connected to not only the internal organization but also the relationships and interactions between the actors in the network (Windahl and Lakemond 2006; Matthyssens et al, 2006). A business network is embedded in an environment comprising of other organizations (Pfeffer and Salancik, 1978). An environment is regarded as a market, which facilitates exchanges between a firm and other actors. In a network, interactions take place reciprocally and indirectly. According to Håkansson and Ford (2002, p.

133), "relationships enable companies to cope with their increasing technological dependence on others and the need to develop and tailor offerings to more specific requirements."

Therefore, instead of focusing on itself or even its industry, the firm focuses on the value-creating system where different actors (e.g., suppliers, business partners, allies, and customers) work together to co-produce value. In this system, roles and relationships need to be reconfigured in order to create value in new forms, and a dynamic fit between competencies and customers becomes crucial (Windahl and Lakemond, 2006).

2.7 Repositioning

Along with changing the strategy and the relationship with suppliers and customers, it should be emphasized that a firm is willing to reposition itself within the value chain. First, when the importance of inter-firm relationships in a business increases, firms are willing to cooperate with a specific supplier in a single source relationship (Swift and Coe, 1994; Swift, 1995). In this way, the relational path first focuses on close, established relationships with customers. The relationship is developed through closer operational linkages, enhancing information sharing, and more fully articulating legal and contractual obligations.

Enhancing a solution strategy enables a firm to change its position. According to Penttinen and Palmer (2007), a firm's repositioning process is carried out along with enhancing offerings and developing buyer-seller relationships. The strategic repositioning is influenced by customer needs and enabled by ICT and the acquisition of new competencies through networking (Penttinen and Palmer, 2007). Therefore, the service-oriented approach should focus on relationships in a network rather than on a dyadic relation and should emphasize relationships in a network on the transactional-relational continuum.

Cannon and Perreault (1999) identified four factors that mediate the change in firms' positions and function as measures for positioning a relationship on the transactional-relational continuum: (1) information exchange, (2) operational linkages, (3) legal bonds, (4) cooperative norms, and (5) relationship-specific adaptations by the seller or the buyer. Similarly, Gulati and Sytch (2007) explored two important mediators, namely, joint action and quality of information exchange. The concept of joint action is defined as the degree of interpenetration of organizational boundaries (Heide and John 1990), leading to the degree of dyadic cooperation and coordination across a wide array of organizational activities (Gulati and Sytch 2007). Joint actions can involve the development of solu-

tions to relational and operational problems. Meanwhile, the quality of the information exchange is linked to its detail, accuracy, and timeliness. Therefore, joint action should be related to higher levels of value creation in the relationship and the manufacturer's concomitant performance, which mediates the effect of joint dependence on the manufacturer's performance in exchange relationships (Gualati and Sytch, 2007).

To summarize the discussion in this section, values are created through collaborative activities with suppliers and customers. As a result, the process of creating value, rather than solely the suppliers' development and manufacture of products, is emphasized. Emphasizing the process of value creation leads to focusing on the management of interdependency and relational activities with suppliers. This service-oriented approach also leads to emphasizing six factors in the development of integrated solutions (Windahl and Lakemond, 2006): (1) the strength of the relationships between the different actors involved, (2) the firm's position in the network, (3) the firm's network horizon, (4) the solution's impact on existing internal activities, (5) the solution's impact on customers' core processes, and (6) external determinants.

3. ICT and service innovation

3.1 ICT as business resources

Firms have focused on ICT to develop new ways to create innovations. ICT companies such as computer, electronic device, and communication companies, as well as other firms in other industries such as retailing, manufacturing, and service sectors are using ICT infrastructures to create superior competitive advantages.

In investigating trends in ICT's roles in business, it is important to consider how ICT yields benefits to a firm's management. Regarding this issue, studies have examined the "IT value paradox," which refers to when business profitability does not significantly increase despite the substantial increase in manufacturing productivity and creativity and the subsequent increase in customer value through increasing ICT investments (Hitt and Brynjolfsson, 1996). Similarly, Car (2003) found that companies with the biggest IT investments rarely see significant financial results and that firms find it difficult to create a competitive advantage through an ICT investment.

3.2 ICT as an enabler

Previous research has focused on the direct impact of ICT, especially on manufacturing performance. For example, Rai et al. (2006) measured the direct effects of ICT on procurement activities, operational cost reduction, productivity improvements, improvements of access to information, quality of decision making, competitiveness, and customer service. However, recent discussions have focused on indirect rather than direct effects (e.g., Wade and Hulland, 2004). ICT systems can be used for supporting inter- and intra-organizational information exchange and for fostering joint decision-making capabilities with customers and suppliers (Banker et al., 2006). Especially, highly effective ICT users tend to pay greater attention to the intangible benefits of IT, such as improved customer services, enhanced product quality, increased market responsiveness, and better coordination between buyers and suppliers in evaluating ICT systems (Bharadwaj 2000). These discussions indicate that ICT should be regarded as an enabler that can affect firms' performance indirectly and create competitive advantages and customer value. ICT alone does not create value; rather, it works together with other intra- and inter-organizational resources to create value in a value chain system (Dong et al., 2009).

3.3 ICT and resources for value creation

The basic premise of prior discussions on ICT is that ICT affects other resources or processes, which, in turn, leads to competitive advantages. Based on this role, it is appropriate to measure the effect resources have on other resources or processes. Information system researchers have used the resource-based view (Barney, 1991) in order to show the relationships between ICT and competitive advantages of firms (e.g., Bharadwaj, 2000; Ray et al., 2006; Ashurst et al., 2012). In this discussion, ICT can be regarded as resources that generate competitive value only when they leverage or enable pre-existing firm resources and skills. The application of specialized skill and knowledge for the benefit of another party (customer) is the fundamental unit of exchange and the first premise (Vargo and Lusch, 2008). Therefore, this exchange process is characterized by the collaborative nature between a service provider and the customers.

Resources are defined to include physical things that a firm acquires for its own use and the people it hires. Meanwhile, services are considered as yielded by resources and regarded as a function of how resources are used. Constantine and Lusch (1994) categorized resources as either operand or operant. Operand resources are those with which an action is performed to create value. On the

other hand, operant resources represent the knowledge and skills by means of which actions are performed. Operant resources are invisible and intangible; they are infinite and dynamic as opposed to static and finite. Madhavaram and Hunt (2008) pointed out that there are three types of operant resources—basic, composite, and interconnected. Basic operant resources are resources such as the skills and knowledge of individual employees. This type of operant resources often does not sustain competitive advantages because it is more easily imitated. On the other hand, composite operant resources are developed from organizing activities in a department or a firm and interconnected resources that are created by interactions between external firms. This type of operant resources is more difficult to acquire and develop, but can sustain competitive advantages. In summary, operant resources can be characterized as follows. The mere existence of operant resources has no meaning. An operant resource is employed to act on other operant resources in order to produce effects (Vargo and Lusch, 2004). Reacting and fusing resources produces values. Therefore, competitive advantages consist of a bundle of capabilities (or competences) (Penrose, 1959), which are a complex bundle of operant resources (Day, 1994). These resources are robust and can be used in different ways to speed up the firm's adaptation to environmental change (Day, 1994). In addition, these resources, which are reusable, generic, and stable, allow firms to be more flexible in accommodating individual customers' demands.

3.4 Roles of ICT resources

ICT-related resources can be categorized as either physical ICT assets or intangible ICT capabilities. The productive use of ICT involves a mixture of physical assets and intangible capabilities (Wade and Hulland, 2004).

3.4.1 Physical ICT assets

Physical ICT assets form a firm's overall ICT infrastructure, which comprises the computer and communication technologies and the shareable technical platforms and databases (Ross et al., 1996; Bharadwaj, 2000). These assets can become a competitive advantage when they have a well-defined technological architecture and are involved in business processes (Bharadwaj, 2000). Because ICT systems can be purchased or duplicated fairly easily by competitors, they are unlikely to serve as sources of competitive advantages (Mata et al., 1995). Technological components may easily become commodities, but a high-level system architecture removes the barriers of system incompatibilities and makes it

possible to build a corporate platform for launching business applications. Therefore, a well-defined architecture is clearly not a commodity because building such integrated infrastructures takes time and effort and involves experiential learning. Moreover, highly integrated business systems are very difficult to imitate because these systems are highly involved in a firm's business processes. Therefore, only systems involved in the business system can become resources.

An ICT-enabling system is developed based on standardized technologies and Internet technologies. Such a system enables a firm to connect with individual resources owned by supply chain partners and integrate these resources into bundles of coexisting resources (Zhu and Kraemer, 2005). This system makes the firm capable of integrating inter-firm processes through ICT on an Internet-based platform, in order to integrate the entire supply chain, both upstream and downstream the firm's operations (Lee et al., 2000; Rai et al., 2006).

3.4.2 Intangible ICT capabilities

Technology can be defined broadly as knowledge or, more specifically, as information required to produce and/or sell a product or service (Capon and Glazer, 1987; Glazer, 1991). Therefore, the intangible aspects of ICT are emphasized to create competitive advantages and customer value. One aspect of these resources is related to the capabilities of individual employees, who can consistently solve business problems and address business opportunities through ICT (Bharadwaj, 2000). Such a staff has been trained through a combination of formal and on-the-job experience (Barney, 1991; Grant 1991). Their accumulated ICT knowledge evolves over long periods of time through the accumulation of experiences.

Organizational activities should be considered more important than individual employees. For example, in large-scale software development, interaction and collaboration with team members are required more than individual technical abilities. These organizational development skills and coordination mechanisms are developed through learning-by-doing and repetition for a long period of time within an organization (Bharadwaj, 2000). These resources have been accumulated and embedded in the organization and then used for future projects (Pfeffer and Salancik, 1978). Such skills include not only current knowledge but also the ability to deploy, use, and manage that knowledge. These are personal- and corporate-level knowledge assets that are difficult to transfer (Leonard-Barton, 1992). In addition, the adaptability of organizations to technology and business environmental changes is another factor that determines the strategic flexibility of the firm (Grant, 1991). All these organizational elements provide an environment

that individual engineers can depend on not only for acquiring technical and management skills but also for obtaining effective knowledge on the entire technical network within which the organizational members belong (Bharadwaj 2000, p.174). There are five types of intangible ICT capabilities:

(a) Technical knowledge and skills (Ross et al., 1996; Bharadwaj, 2000)

This type of resources encompasses knowledge, experience, and portfolios in hardware, software, and networking products, for example, software programming, and system analysis and design. These resources are accumulated in both individuals and organizations and are the fundamental elements required to provide an effective solution in the ICT industry (Shepherd and Ahmed, 2000).

(b) ICT management skills (Bharadwaj, 2000)

The effective management of ICT functions includes the ability to coordinate and interact with technological communities, project management, and leadership skills. ICT development abilities refer to the capability to develop or experiment with new technologies. This capability also provides abilities to use emerging technology trends in order to allow a firm to quickly capitalize on new advances.

(c) Problem-solving orientation (Ross et al., 1996)

This type of resources is used for deeply understanding customers' business and for providing solutions. An element of these resources is linked to the ability to coordinate with external actors. Frequent interactions with clients provide a deep understanding of customers' businesses. Close working relationships with customers allow IT staff to observe business processes in action and accumulate experience in solving business problems. Another element of these resources is linked to the ability to collect information and to understand such information. In order to deeply understand customers' needs, firms should have a variety of information collection methods. In addition, firms should demonstrate to customers a process of value creation in a manner that makes it easy to understand. Some operational approaches, like the process mapping method, are available for visualizing a customer's business processes.

(d) Managing relationships with external and internal actors (e.g., Davies et al.,

2007)

The paper have already pointed out that the management of a value creation process leads to emphasizing interactions between suppliers and customers. This function represents the firm's ability to manage resource linkages between internal and external partners.

(d-1) Management of external relationships

This capability can help an organization working with suppliers to create customer value. In addition, it can help manage customer relationships by providing customer solutions, support, and services. Offering solutions heavily relies on the abilities of external partners. Therefore, the abilities to collaborate with and to manage these relationships are indispensable organizational capabilities (Wade and Hulland, 2004).

(d-2) Managing internal relationships

This capability refers to the internal activities in service-offering processes, that is, the internal network of staff relationships that emerge for the sharing of know-how. With this capability, everyone in the firm is linked to one or more individuals or groups in an internal customer-supplier relationship (Arndt, 1979; Gummesson, 1987). Each supplier receives feedback from the customers within the firm. The content of this feedback includes know-how, skills, and client information. This capability enables the management of internal relationships, which provide superior customer value.

(d-3) Integration ability

This capability represents the process of integration and alignment between the organization and other functional areas or departments both within and outside the organization (Wade and Hulland, 2004). This type of resources demands expertise not only in the technical integration of components, but also in the identification of valuable business, process, and organizational integration opportunities (Shepherd and Ahmed, 2000). A successful ICT-enabling system requires a firm to possess not only technological capability, but also managerial skills and integration ability with external resources (Dong et al., 2009). This system enables firms to have real-time information sharing and improve coordination of allocated resources across the

supply chain (Lee, 2004). Thus, the value is generated through developing ICT-enabled integration capability and manifested at the process level (Dong et al., 2009). Therefore, ICT-enabled value creation stems more from the integration of various systems, both internally among business units and externally with suppliers and business partners, than from individual ICT components (Dong et al., 2009).

(e) Market responsiveness

This capability represents the ability of the organization to quickly react to changes in market conditions. In this capability, "market" is used broadly to include all sources that have relevant knowledge and ideas for creating future market needs. A market includes all stakeholders and constituencies that (1) possess or are developing knowledge that has the potential to contribute to the creation of superior customer value or (2) that are threats to competitive advantages (Slater and Narver, 1995). The resources can be developed by both market or business knowledge and customer partnering ability, which involves (1) the collection of information from sources external to the firm regarding an industry, technology, and customer, and the depth of customer relationship; and (2) the dissemination of a firm's market intelligence across its departments (Shepherd and Ahmed, 2000; Wade and Hulland, 2004). In a practical sense, this capability aims to produce a wealth of information about customers, competitors, and external conditions and then share it and come to a consensus on its meaning. As a result, this capability is used by a well-positioned firm to anticipate the developing needs of its customers and respond to them through the addition of innovative products and services. Therefore, this capability is defined as the subset of the competences generated by organizational learning, which allows the firm to create new products and processes and respond to changing market circumstances (Teece and Pisano, 1994). Collaboration and partnerships can be vehicles for new organizational learning, helping firms to recognize dysfunctional routines and prevent strategic blind spots (Normann and Rafael, 1993; Teece and Pisano, 1994).

4. Roles of an ICT enabling system

It should be emphasized that an ICT-enabled system is significantly different from a traditional vertical integration. In this sense, inter-firm relationships of a

value chain are more established through information flow in rather than through ownerships. It also differs from the traditional approach to coordination abilities that directly relied on the linkages between physical processes such as shipment, inventory, and warehousing (Barua et al., 2004). Therefore, a feature of an ICT-enabling system focuses less on the connection of physical processes, and more on intangible resource-based abilities that can integrate upstream and downstream activities within a firm's operations (Zhu et al., 2004).

Highly connected suppliers and/or customers can help a supplier launch and market new products more swiftly in response to competitors' moves or more quickly respond to customer problems. These outcomes can be achieved from a variety of ways, including joint forecasting, buffering inventories for customers, managing logistics, and transportation (Rai et al., 2006; Saraf et al., 2007). In addition, integration with customers and/or suppliers allows a focal firm's business processes that deliver customer value to be intermeshed with consumption processes and processes spanning firm boundaries to be operationally integrated (Saraf et al., 2007). From the next section, we attempt to clarify the roles of an ICT-enabling system.

4.1 Role of enabling integration

4.1.1 Internal integration

This type of integration focuses on enhancing the capabilities of internal firm operations (Wade and Hulland, 2004). An internal integration ability enables a firm to collaborate with its internal actors. Therefore, this ability emphasizes inter-organizational relationships in which the participating parties agree to invest resources; achieve mutual goals; share information, resources, rewards, and responsibilities; and jointly make decisions and solve problems (Soosay et al., 2008).

Many enterprise systems are only working within a firm because of security and internal confidence. These infrastructure resources support cost-effective operations, which help firms to develop and sustain cost leadership positions in their respective industries (Ross et al., 1996). Brady et al. (2005) cited plant operation management systems (OMS) as an example of this type of ICT system, because OMS control and monitor internal plant processes by supporting computerization of shop floor operations and synchronization across multiple plants. As mentioned above, the role of internal integration focuses more on increasing the efficiency and productivity of operations.

These systems provide an ability to integrate internal processes (Luo, 2002;

Haynes and Thies, 1991) by addressing the following tasks (Narayana et al., 2011): (pa) task cooperation and support across departments during implementation, (pb) joint monitoring and quality control via cross-departmental efforts, and (pc) in-house process integration via cross-functional teams.

In addition, these systems provide an ability to increase communication between departments (Chang and Wang, 2011). An inter-organizational collaboration requires the use of ICT to support the collaboration process (Chang and Wang, 2011), and is achieved by the following methods: electronic chats including recent social networking services (SNS), video/audio conference, online customer ordering/tracking systems, and information storage facilities.

These ICT services emphasize the following roles (Chang and Wang, 2011; Dong et al., 2009; Bhatt et al., 2010) of ICT in the enterprise: (ca1) providing adequate multiple communicative channels among the different departments, (ca2) providing methods of free information exchange in every department, (ca3) providing methods for frequent professional support interaction among staff in the different departments, (ca4) providing methods to promote superior and subordinate communication for the purpose of preventing misunderstandings, and (ca5) providing methods to promote interaction between the different departments, for example, between the marketing and manufacturing departments regarding new product/service development.

4.1.2 External Integration

This type of integration enables firms to manage relationships between external stakeholders, customers, suppliers, and other partners. Therefore, this type of integration is characterized as providing an inter-firm interface. For example, electronic data interexchange (EDI) refers to external integration with upstream actors (suppliers); this system architecture has changed how organizations conduct business by improving the accuracy and timeliness of information exchanges (Banker et al. 2006). This system successfully integrates software applications of a firm with those of its customers and partners (EI1), and/or enables these software applications to work seamlessly across customers and partners (EI2) (Saraf et al., 2007; Dong et al., 2009; Byrd et al., 2008). The external integration provides more high-level functions (at the application level), which include functions at the lower network stack (such as hardware and network). These high level integrations can be characterized by the ability to easily share data with customers and suppliers (EI3), that is, once data is captured by a firm, it can immediately share the data to the firm's partners (EI4)

(Saraf, et al., 2007; Dong et al., 2009; Bhatt et al., 2010). The external integration ability is achieved by a combination of these technological approaches.

In this integration, ICT fosters capabilities for quick response and flexibility to deal with changes in market conditions (Ross et al., 1996; Zaheer and Zaheer, 1997) and the business environment (Bhatt et al., 2010). A customer relationship management (CRM) system refers to external integration with downstream actors (customers); this system has changed how organizations manage their relationships with customers by accumulating and analyzing information on interactions with customers and customers' behaviors. Therefore, a CRM system enables firms to facilitate market responsiveness capabilities by fostering customer and supplier involvement in forecasting and ordering management processes (Anderson and Lanen, 2002).

Zhu and Kraemer (2005) found that both front- and back-end capabilities contribute to the creation of business value, but that a back-end integration has a much stronger impact because front-end functionalities are becoming commodities. Recently, supply chain management has been defined as the management of upstream and downstream relationships with suppliers and customers in order to create enhanced value in the final marketplace at a lower cost for the supply chain as a whole (Christopher, 1998; Juttner et al., 2007). Therefore, integrating upstream and downstream integration capabilities is required for ICT.

4.2 Role of enabling collaboration

Previous studies have shown that collaborative activities positively affect innovation practices (e.g., Hagedoorn, 2002; Eisingerich et al., 2009) and help businesses improve and enhance their innovative capabilities (Faems et al., 2005; Chen et al., 2011). Previously, companies tended to accumulate their core resources through vertical integration. Companies then integrated the resources in-house and through capital ties and developed products and services with the accumulated resources. However, more recently, businesses rely more on cooperative activities with other companies through alliance and outsourcing, not on capital ties. Consequently, many products and services are developed from a combination of technological resources that have been accumulated not only by companies on their own or through their capital ties but also through collaboration with other companies or organizations. Apart from using collaboration activities to increase the efficiency and productivity of operations, creating customer value emphasizes the significance of knowledge accumulated by staff through their constant and close interactions with external and internal experts.

These collaborative activities are supported by ICT. ICT can contribute to collaboration activities by enabling, facilitating, monitoring, regulating, and/or guiding the process (Hartono and Holsapple, 2004). ICT enables inter-and intra-firm collaboration by providing the infrastructure for assimilation and integration of information across different functional areas (Bharadwaj, 2000). Compared with the role of internal integration, the collaboration function of ICT more greatly emphasizes developing the effectiveness of a firm's service operation, which includes an application that enables firms to take advantage of technological advances to support effective ICT operations (Zaheer and Zaheer, 1997) and of software that better fosters IT infrastructure capabilities (Marchand et al., 2000). According to Dong et al. 2009, the ability enables value chain activities to share information such as online orders and inventories (Col1); to be involved in governing entire value chain activities (Col2); and to align technology strategies to accommodate the use of ICT and manage business process reengineering with partner companies (Col3).

This ability also emphasizes that the effectiveness of a system stems from the development of communication methods for employees in a department or a firm. For example, companies are now considering the installation of SNS for their communication systems. They are also using e-learning systems for more effective communication with staff in order to create new customer value. This ability focuses not just on the technological compatibility of software applications at the code level, nor does it just involve the syntactic integration between the databases or the implementation of a single firm database. Rather, this ability also requires collaboration at the semantic level (Saraf et al., 2007).

The following items increase the semantic level of communication between different actors (Chang and Wang, 2011; Dong et al., 2009): providing effective multiple communicative channels between an enterprise and other enterprises (Col4); providing communication methods to obtain working information from partner enterprise (Col5); and facilitating frequent professional interaction between the staff of the enterprises (Col6).

4.3 Role of an enabler in developing innovative business processes

Technologies can be converted into valuable resources through deployment in specific processes (Dong et al., 2009). For example, the use of ICT has received significant attention in the supply chain. The supply chain management can be defined as dealing with the management of material, information and finance flow in a network consisting of customers, suppliers, manufacturers, and distributors

(Lambert and Cooper, 2000). The characteristics of supply chain management, such as the demand process and the replenishment lead time, have a significant impact on the benefits of information sharing to the manufacturer (Lee, 2002). There exist tight linkages between manufacturing capabilities and information systems such that process-specific business routines cannot be implemented effectively without the use of ICT (Banker et al., 2006). One factor that promotes this trend is the development of information-sharing capabilities through advanced ICT (Lee, 2002).

One of the other implications of using ICT is the “spanning process” (Banker et al., 2006), which enables integration and alignment between ICT systems and other functional areas. The spanning process provides capabilities necessary to integrate a firm’s internal and external resources and allows managers to plan, manage, and use appropriate technology standards and span functional gaps across business processes (Feeny and Willcocks, 1998; Ross et al., 1996).

In order to innovate business processes, two basic premises must be considered: work procedures are available online (BP1), and the functional process steps are systematically validated using a workflow system (BP2) (Schwarz et al., 2010). ICT offers the following abilities in order to achieve these premises (Chang and Wang, 2011; Saraf et al., 2007): (1) enabling the firm to have highly integrated operational procedures with external collaborative corporations and/or customers (BP3); (2) enabling the firm to integrate its business procedures and routines with those of its customers and/or suppliers (BP4); (3) enabling the firm to rely on procedures and routines of its customers and suppliers for efficient operations (BP5); and (4) enabling a firm to connect its upstream suppliers and downstream distributors to form a logistical value chain (BP6).

Enterprise resource planning (ERP) is an application system of the spanning process. ERP attempts to integrate all departments and functions across a company into a single information system that can serve all of the different departments’ particular needs (Tarantilis et al., 2008) and enable synergetic relationships across different functional areas (Banker et al., 2006). The CRM system also supports an innovative business process in terms of sales force automation (SFA). CRM has always been considered as an organizational process in which ICT and organizational alignment are subsumed (e.g., Parvatiyar and Sheth, 2001). The classification of CRM technologies into analytical, operational, and a collaborative CRM is widely accepted (e.g., Greenberg, 2001; Keramati et al., 2010). An analytical CRM refers to the data analysis dimension of CRM, that is, business intelligence. Meanwhile, an operational CRM covers the business opera-

tions dimension of CRM, including SFA and computer telephony integration. Finally, collaborative CRM involves the coordination activities for multiple customer contact points.

4.4 Enabling innovative business systems (service innovation)

The role of developing service processes tends to focus more on increasing the efficiency of the service-offering process. However, service innovation aims to offer more innovative outcomes that lead to the development of customer values. Therefore, ICT should be emphasized as an enabler that creates the effectiveness of service offerings.

Michel et al. (2008) pointed out that the perspective of traditional innovation theory remains difficult to understand in the context of recent business innovations. They indicated that all innovation, whether a service or a tangible product, should be viewed as a service-logic innovation. Therefore, service innovation can be seen as new developments in the service processes that deliver core products and services (Oke, 2007). In terms of its customer-oriented nature, service innovation captures both the development of new service offerings and the processes or methods employed to develop and market new services to customers (Chen et al., 2011).

Service innovation focuses on the structure of business processes (Gadrey and Gallouj, 1995), which stresses the importance of innovating value chains. Only the development of business processes within a firm can affect the value chain system. A supplier takes over some of the ongoing operation of a client, that is, a part of the client's value chain. A supplier seeks to add customer value by integrating a solution into the service value chain or the business process of the customer. A change in the value chain system emphasizes the need for organizational changes and for repositioning within the value chain (Foote et al., 2001; Galbraith, 2002). ICT is expected to generate strategic and significant changes in the firm (Schwarz et al., 2010).

The role of innovating business structures is expected to increase the effectiveness of service operations. However, this structural change of a business system does not occur directly. Rather, service offering operations should be developed first. For example, some operational methods are available for visualizing customers' business processes. Through visualizing the business processes, the problems of the business processes could be clarified and solutions found. These solutions include those beyond operational issues and require the development of a business model. These processes are initiated to innovate business structures, in

order to restructure value chains.

As just described, an innovative business structure could be developed through developing business processes. However, innovating a business system can be very challenging, requiring a significant amount of time and resources. If a firm wants to terminate a relationship with another firm and then initiate a new relationship with another, the firm must again restructure its interfaces and make the required organizational changes to accommodate the new relationship (Gosain et al., 2004). In this context, ICT drastically reduces the time and resources required through managing business process reengineering (Byrd et al., 2008; Dong et al., 2009). Therefore, through an ICT-based platform, ICT is expected to manage organizational change and supply chain restructuring.

5. Conclusions

ICT is used in every value chain activity, including upstream procurement, internal production, downstream sales, and customer services. However, the theoretical and practical contributions of ICT to businesses still remain vague. This article attempts to (1) show the theoretical contributions of ICT and (2) to clarify the roles of ICT in the context of a service-oriented approach under a B2B setting.

A service-oriented approach emphasizes the importance of offering customer value rather than “products.” Customer value is generated through the effective use of ICT to improve upstream, downstream, and internal operations. Suppliers become involved in the customers’ value creation processes (i.e., fulfilling the customers’ needs and solving their specific problems) by reducing the customers’ costs and/or enabling the customers to create new and more competitive offerings. The key determinant of this assimilation is not accumulation but rather the integration of technologies (Zhu et al., 2006). Therefore, buying organizations simultaneously act as customers and co-producers of the service in order to achieve co-creation value (Van der Valk, 2008).

The result of this article’s literature review shows that the resource-based view (Barney, 1991) appropriately explains the roles of ICT. Previous studies have emphasized that ICT indirectly, rather than directly, affects businesses because a single technology on its own does not create value. Rather, ICT works together with other intra- and inter-organizational resources to create value in a value chain system. ICT enables efficient coordination with supply chain partners, and agile adaptations of processes and strategies become critical organizational capa-

bilities as competition intensifies (Dong et al., 2009).

The findings of this study suggest that ICT can be regarded as an enabler that affects firms' activities indirectly rather than directly. This concept of the ICT as an enabler plays a vital role in service-oriented approaches. Based on this concept, the article proposed four roles of the ICT as an enabler in offering superior value to customers: (1) an enabler that integrates value offering processes with internal and external actors, (2) an enabler that collaborates with customers (in downstream and upstream activities), (3) an enabler that more effectively develops business processes, and (4) an enabler that innovates business systems.

This article offers several contributions to both the emerging theory of service innovation in B2B settings and the management of value creation in business marketing from the perspective of the role of ICT. One contribution will be that the study provided a set of propositions that specify factors of ICT-enablers expected to be critical for the development of the value creation. These propositions can be a basis for further empirical work and hypothesis testing. However, owing to the theoretical nature of this study, further research is required to confirm our findings. Specifically, future studies should use qualitative methods to show how and under what conditions the roles of ICT as an enabler work in real businesses. Case and field studies on specific organizational contexts could be used to examine the ideas we proposed in this study. Empirical testing is also required to justify the hypotheses of this study.

References

- Anderson, S. W. and W. Lanen (2002) Using Electronic Data Interchange to Improve the Efficiency of Accounting Transactions, *Accounting Review*, 11(4), pp.703-729.
- Arndt, J. (1979) Toward a Concept of Domesticated Markets, *Journal of Marketing*, 43(3), pp.69-75.
- Ashurst, C., A. Freer, J. Ekdahl and C. Gibbons (2012) Exploring IT-enabled innovation: A new paradigm?, *International Journal of Information Management*, 32(4), pp.326-336.
- Bagozzi, R. P. (1974) Marketing as an Organized Behavioral System of Exchange, *Journal of Marketing*, 38(4), pp.77-81.
- Banker, R. D., I. R. Bardhan, H. Chang and S. Lin (2006) Plant Information Systems, Manufacturing Capabilities, and Plant Performance, *MIS Quarterly*, 30(2), p.315-337.
- Barney, J. B. (1991) Firm Resources and Sustained Competitive Advantage, *Journal of Management*, 17(1), pp.99-120.
- Barua, A., P. Konana and A. B. Whinston (2004) An Empirical Investigation of Net-enabled Business Value, *MIS Quarterly*, 28(4), pp.585-620.
- Beverlanda, M. and L. Lockshinb (2003) A longitudinal study of customers' desired value

- change in business-to-business markets, *Industrial Marketing Management*, 32(8), pp. 653-666.
- Bharadwaj, A. S. (2000) A Resource-based perspective on Information Technology Capability and Firm Performance: An Empirical Investigation, *MIS Quarterly*, 24(1), pp.169-196.
- Bhatt, G., A. Emdad, N. Roberts and V. Grover (2010) Building and leveraging information in dynamic environments: The role of IT infrastructure flexibility as enabler of organizational responsiveness and competitive advantage, *Information and Management*, 47(7), pp. 341-349.
- Brady, T., Davies, A., and Gann, D. M. (2005) Creating value by delivering integrated solutions, *International Journal of Project Management*, 23(5), pp.360-365.
- Byrd, T. A., J. P. Pitts, A. M. Adrian and N. W. Davidson (2008) Examination of a path model relating information technology infrastructure with firm performance, *Journal of Business Logistics*, 29(2), pp.161-187.
- Cannon, J. P. and W. D. Perreault (1999) Buyer-Seller Relationships in Business Markets, *Journal of Marketing Research*, 36(4), pp.439-460.
- Capon, N. and R. Glazer (1987) Marketing and Technology: A Strategic Coalignment, *Journal of Marketing*, 51(3), pp.1-14.
- Carr, N. G. (2003) IT Doesn't Matter, *Harvard Business Review*, 81(5), pp.41-49.
- Chang, H. and C. Wang (2011) Enterprise Information Portals in support of business process, design teams and collaborative commerce performance, *International Journal of Information Management*, 31(2), pp.171-182.
- Chen, J., H. Tsou and R. K. H. Ching (2011) Co-production and its effects on service innovation, *Industrial Marketing Management*, 40(8), pp.1331-1346.
- Christopher, M. (1998) *Logistics and Supply Chain Management: Strategies for Reducing Cost and Improving Service*, London, Pitman Publishing.
- Constantin, J. A. and R. F. Lusch (1994) *Understanding Resource Management*. Oxford, OH: The Planning Forum.
- Davies, A., Brady, T., and Hobday, M. (2007) Organizing for solutions: Systems seller vs. systems integrator, *Industrial Marketing Management*, 36(2), 183-193.
- Day, G. S. (1994) The Capabilities of Market-Driven Organizations, *Journal of Marketing*, 58(4), pp.37-52.
- de Brentani, U. (1989) Success and failure in new industrial services, *Journal of Product Innovation Management*, 6(4), pp.239-258.
- Dong, S., S. X. Xu and K. X. Zhu (2009) Information Technology in Supply Chains: The Value of IT-Enabled Resources Under Competition, *Information Systems Research*, 20(1), pp. 18-32.
- Edvardsson, B., A. Gustafsson and I. Roos (2005) "Service portrays and service constructions — a critical review through the lens of the customer, *International Journal of Service Industry Management*, 16(1), pp.107-121.
- Eisingerich, A. B., G. Rubera and M. Seifert (2009) Managing Service Innovation and

- Interorganizational Relationships for Firm Performance, *Journal of Service Research*, 11(4), pp.344-356.
- Faems, D., B. V. Looy and K. Debackere (2005) Interorganizational Collaboration and Innovation: Toward a Portfolio Approach, *Journal of Product Innovation Management*, 22(3), pp.238-250.
- Feeny, D. F. and L. P. Willcocks (1998) Core IS Capabilities for Exploiting Information Technology, *Sloan Management Review*, 39(3), pp.9-21.
- Flint, D., Woodruff, R. and Gardial, S. (1997) Customer value change in industrial marketing relationships: A call for new strategies and research, *Industrial Marketing Management*, 26(2), pp.163-175.
- Flint, D. and R. B. Woodruff (2001) The Initiators of Changes in Customers' Desired Value: Results from a Theory Building Study, *Industrial Marketing Management*, 30(4), pp. 321-337.
- Foote, N., J. Galbraith, Q. Hope and D. Miller (2001) Making solutions the answer, *The McKinsey Quarterly*, 3(3), pp.84-93.
- Gadrey, J. and F. Gallouj (1995) New modes of innovation How services benefits industry, *International Journal of Service Industry Management*, 6(3), pp.4-16.
- Galbraith, J. (2002) Organizing to deliver solutions, *Organizational Dynamics*, 31(2), pp. 194-207.
- Gosain, S., A. Malhotra and O. Sawy (2004) Coordinating for Flexibility in e-Business Supply Chains, *Journal of Management Information System*, 21(3), pp.7-45.
- Glazer, R. (1991) Marketing in an Information-Intensive Environment: Strategic Implications of Knowledge as an Asset, *Journal of Marketing*, 55(4) pp.1-19.
- Grant, R. (1991) The Resource-based Theory of Competitive Advantage, *California Management Review*, 33(3), pp.114-35.
- Gulati, R. and Sytch, M. (2007) Dependence asymmetry and joint dependence in interorganizational relationships: Effects of embeddedness on a manufacturer's performance in procurement relationships, *Administrative Science Quarterly*, 52(1), pp.32-69.
- Gummesson, E. (1987) The New Marketing-Developing Long-term Interactive Relationships, *Long Range Planning*, 20(4), pp.10-20.
- Greenberg, P. (2001) *CRM at the Speed of Light*, Osborne, McGraw-Hill.
- Hagedoorn, J. (2002) Inter-firm R&D partnerships: an overview of major trends and patterns since 1960, *Research Policy*, 31(4), pp.477-492.
- Håkansson, H. and D. Ford (2002) How should companies interact in business networks?, *Journal of Business Research*, 55(2), pp.133-139.
- Hartono, E. and C. Holsapple (2004) Theoretical Foundations for Collaborative Commerce Research and Practice, *Information Systems and E-Business Management*, 2(1), pp.1-30.
- Haynes, R. and E. Thies (1991) Management of Technology in Service Firms, *Journal of Operations Management*, 10(3), pp.288-397.

- Heide, J. B. and G. John (1990) Alliances in Industrial Purchasing: The Determinants of Joint Action in Buyer-Supplier Relationships, *Journal of Marketing Research*, 27(1), pp.24-36.
- Hitt, L. M., and E. Brynjolfsson (1996) Productivity, Business Profitability, and Consumer Surplus: Three Different Measures of Information Technology Value, *MIS Quarterly*, 20(2), pp.111-142.
- Jackson, R., L. Neidell and D. Lunsford (1995) An Empirical Investigation of the Differences in Goods and Services as Perceived by Organizational Buyers, *Industrial Marketing Management*, 24(2), pp.99-108.
- Juttner, U., M. Christopher and S. Baker (2007) Demand chain management-integrating marketing and supply chain management, *Industrial Marketing Management*, 36(3), pp. 377-392.
- Keramati, A., H. Mehrabki and N. Mojir (2010) A process-oriented perspective on customer relationship management and organizational performance: An empirical investigation, *Industrial Marketing Management*, 39(7), pp.1170-1185.
- Lambert, D. M. and M. C. Cooper (2000) Issues in Supply Chain Management, *Industrial Marketing Management*, 29(1), pp.65-83.
- Lee, H. L., K. C. So and C. S. Tang (2000) The Value of information Sharing in a Two-Level Supply Chain, *Management Science*, 46(5), pp.626-643.
- Lee, H. L. (2002) Aligning Supply Chain Strategies with Product Uncertainties, *California Management Review*, 44(3), pp.105-119
- Lee, H. L. (2004) The triple-A supply chain, *Harvard Business Review*, 82(10), pp.102-12.
- Leonard-Barton, D (1992) Core capabilities and core rigidities: A paradox in managing new product development, *Strategic Management Journal*, 13(S1), pp.111-125.
- Lindgreen, A., M. K. Hingley, D. B. Grant and R. E. Morgan (2012) Value in business and industrial marketing: Past, present, and future, *Industrial Marketing Management*, 41(1), pp.207-214.
- Luo, Y. (2002) Organizational dynamics and global integration: a perspective from subsidiary managers, *Journal of International management*, 8(2), pp.189-215.
- Madhavaram, S. and S. Hunt (2008) The service-dominant logic and a hierarchy of operant resources: developing masterful operant resources and implications for marketing strategy, *Journal of the Academy of Marketing Science*, 36(1), pp.67-82.
- Marchand, D. A., W. J. Kettinger and J. D. Rollins (2000) Information Orientation: People, Technology and the Bottom Line, *Sloan Management Review*, 41(4), pp.69-80.
- Mata, F. J., W. L. Fuerst and J. B. Barney (1995) Information Technology and Sustained Competitive Advantage: A Resource-Based Analysis, *MIS Quarterly*, Vol.19, No.4, pp. 487-505.
- Matthyssens, P. and K. Vandenbempt (1998) Creating competitive advantage in industrial services, *Journal of Business and Industrial Marketing*, 13(4/5), pp.339-355.
- Matthyssens, P., K. Vandenbempt and L. Berghman (2006) Value innovation in business markets: Breaking the industry recipe, *Industrial Marketing Management*, 35(6), pp.

- 751-761.
- Matthyssens, P. and Vandenbempt, K. (2008) Moving from basic offerings to value-added solutions: Strategies, barriers and alignment, *Industrial Marketing Management*, 37(3), pp. 316-328.
- Mattsson, L.-G. (1973) Systems selling as a strategy on industrial markets, *Industrial Marketing Management*, 3(2), pp.107-120.
- Michel, S., S. W. Brown and A. S. Gallan (2008) Service-Logic Innovations: How to Innovate Customers, not Products, *California Management Review*, 50(3), pp. 49-65.
- Miller, D., Q. Hope, R. Eisenstat, N. Foote and J. Galbraith (2002) The problem of solutions: Balancing clients and capabilities, *Business Horizons*, 45(2), pp. 3-12.
- Möller, K. (2006) Role of competences in creating customer value: A value-creation logic approach, *Industrial Marketing Management*, 35(8), pp. 913-924.
- Narayanan, S., V. Jayraman, Y. Luo and J. Swamitathan (2011) The antecedents of process integration in business process outsourcing and its effect on firm performance, *Journal of Operations Management*, 29(1), pp. 3-16.
- Nordin, F. and C. Kowalkowski (2010) Solutions offerings: a critical review and reconceptualisation, *Journal of Service Management*, 21(4), pp. 441-59.
- Normann, R. and R. Ramirez (1993) From Value Chain to Value Constellation: Designing Interactive Strategy, *Harvard Business Review*, 71(4), pp. 65-77.
- Oke, A. (2007) Innovation Types and innovation management practices in service companies, *International Journal of Operations and Production Management*, 27(6), pp. 564-587.
- Oliva, R. and R. Kallenberg (2003) Managing the transition from products to services, *International Journal of Service Industry Management*, 14(2), pp. 160-172.
- Parvatiyar, A. and J. N. Sheth (2001) Customer relationship management: Emerging practice, process, and discipline, *Journal of Economic and Social Research*, 3(2), 1-34.
- Payne, A. and S. Holt (2001) Diagnosing customer value: Integrating the value process and relationship marketing, *British Journal of Management*, 12(2), pp. 159-182.
- Payne, A., K. Storbacka and P. Frow (2008) Managing the co-creation of value, *Journal of the Academy of Marketing Science*, 36(1), pp. 83-96.
- Penrose, E. (1959) *The Theory of the Growth of the Firm*, Oxford University Press.
- Penttinen, E. and J. Palmer (2007) Improving firm positioning through enhanced offerings and buyer-seller relationships, *Industrial Marketing Management*, 36(5), pp. 552-564.
- Pfeffer, J. and G. R. Salancik (1978) *The External Control of Organizations: A Resource Dependence Perspective*, New York, Harper and Row Publishers.
- Rai, A., X. Tang, P. Brown and M. Keil (2006) Assimilation patterns in the use of electronic procurement innovations: A cluster analysis, *Information and Management*, 43(3), pp. 336-349.
- Ray, G., W. Muhanna and J. Barney (2005) "Information Technology and the Performance of the Customer Service Process: A Resource-based Analysis", *MIS Quarterly*, 29(4), pp. 625-652.

- Ross, J. W., C. M. Beath and D. L. Goodhue (1996) Develop Long-Term Competitiveness through IT Assets, *Sloan Management Review*, 38(1), pp.31-42.
- Saraf, N., C. Langdon and S. Gosain (2007) IS Application Capabilities and Relational Value in Interfirm Partnerships, *Information Systems Research*, 18(3), pp.320-339.
- Sawhney, M. (2006) Going beyond the product, defining, designing, and delivering customer solutions, in *The Service-Dominant Logic of Marketing: Dialog, Debate, and Directions*, R. F. Lusch and S. Vargo (Eds.), NY, M. E. Sharpe, pp.365-380.
- Schwarz, A., M. Kalika, H. Kefi and C. Schwarz (2010) A Dynamic Capabilities Approach to Understanding the Impact of IT-Enabled Businesses Processes and IT-Business Alignment on the Strategic and Operational Performance of the Firm, *Communications of the Association for Information Systems*, 26(4), pp.57-84.
- Shepherd, C. and P. Ahmed (2000) From product innovation to solutions innovation: A new paradigm for competitive advantage, *European Journal of Innovation Management*, 3(2), pp.100-106.
- Slater, S. F. and J. C. Narver (1995) Market orientation and the learning organization, *Journal of Marketing*, 59(3) pp.63-74.
- Soosay, C., P. Hyland and M. Ferrer (2008) Supply Chain Collaboration: Capabilities for Continuous Innovation, *Supply Chain Management: An international journal*, 13(2), pp.160-169.
- Stremersch, S., S. Wuyts and R. T. Frambach (2001) The purchasing of full-service contracts: An exploratory study within the industrial maintenance market, *Industrial Marketing Management*, 30(1), pp.1-12.
- Swift, C. O., and B. J. Coe (1994) Sourcing Preference Scale: Measuring Preferences of Purchasing Managers for Single Sourcing or Multiple Sourcing of Products, *Industrial Marketing Management*, 23(2), pp.171-180.
- Swift, C. O. (1995) Preferences for Single Sourcing and Supplier Selection Criteria, *Journal of Business Research*, 32(2), pp.105-111.
- Tarantilis, C. D., C. T. Kiranoudis and N. D. Theodorakopoulos (2008) A Web-based ERP system for business services and supply chain management: Application to real-world process scheduling, *European Journal of Operational Research*, 187(3). 1310-1326.
- Teece, D. J. and G. Pisano (1994) The Dynamic Capabilities of Firms: an Introduction *Industrial and Corporate Change*, 3(3), pp.537-556.
- Uлага, W. and A. Eggert (2006) Value-based differentiation in business relationships: gaining and sustaining key supplier status, *Journal of Marketing*, 70(1), pp.119-136.
- Van der Valk, W. (2008) Service procurement in manufacturing companies: Results of three embedded case studies, *Industrial Marketing Management*, 37(3), pp.301-315.
- Vargo, S. L. and R. F. Lusch (2004) Evolving to a new dominant logic for marketing, *Journal of Marketing*, 68(1), pp.1-17.
- Vargo, S. L. and R. F. Lusch (2008) From goods to service(s): Divergences and convergences of logics, *Industrial Marketing Management*, 37(3), pp.254-259.

- von Hippel, E. (1994) Sticky Information and the Locus of Problem Solving: Implications for Innovation, *Management Science*, 40(4), pp. 429-439.
- Wade, M. and J. Hulland (2004) The Resource-based view and information systems research: Review, Extension and Suggestions for future research, *MIS Quarterly*, 28(1), pp. 107-142.
- Walter, A., T. Ritter and H. Gemünden (2001) Value creation in buyer-seller relationships: Theoretical considerations and empirical results from a supplier's perspective, *Industrial Marketing Management*, 30(4), pp. 365-377.
- Webster, F. E. and Y. Wind (1972) A General Model for Understanding Organizational Buying Behavior, *Journal of Marketing*, 36(2), pp. 12-19.
- Windahl, C. and N. Lakemond (2006) Developing integrated solutions: The importance of relationship within the network, *Industrial Marketing Management*, 35(7), pp. 806-818.
- Windahl, C. and N. Lakemond (2010) Integrated solutions from a service-centered perspective: Applicability and limitations in the capital goods industry, *Industrial Marketing Management*, 39(8), pp. 1278-1290.
- Woodruff, R. (1997) Customer Value: The Next Source for Competitive Advantage, *Journal of the Academy of Marketing Science*, 25(2), pp. 139-153.
- Zaheer, A. and S. Zaheer (1997) Catching the Wave: Alertness, Responsiveness, and Market Influence in Global Electronic Networks, *Management Science*, 43(11), pp. 1493-1509.
- Zhu, K., K. L. Kenneth Kraemer, S. Xu and J. Dedrick (2004) Information Technology Payoff in E-Business Environments: An International Perspective on Value Creation of E-Business in the Financial Services Industry, *Journal of Management Information Systems*, 21(1), pp. 17-54.
- Zhu, K. and K. L. Kraemer (2005) "Post-Adoption Variations in Usage and Value of e-business by organizations: Cross-Country evidence from the retail industry, *Information Systems Research*, 16(1), pp. 61-84.
- Zhu, K., K. L. Kraemer and S. Xu (2006) The Process of Innovation Assimilation by Firms in Different Countries: A Technology Diffusion Perspective on E-Business, *Management Science*, 52(10), pp. 1557-1576.