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WHAT DYNAMIC CAPABILITY ARE NEEDED TO IMPLEMENT E-BUSINESS?

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Abstract

The study focuses on what capabilities are needed to implement electronic business (E-Business) successfully. We utilize an E-business innovation model to analyse the key differences in both business technology and business model dimensions between brick-and-mortar business and E-Business. The results indicate that the nature of the innovation from brick-and-mortar business to E-business is a radical change for the incumbents. A set of dynamic capabilities of exploiting and implementing E-business is identified. These results provide great insight for practitioners and scholars for enhancing their understanding of E-business innovation and provide guidelines to help incumbents adapt to new E-business applications.

Keywords: E-business, Dynamic capabilities, E-business innovation, E-commerce

Introduction

Over the past decade, rapid developments in information and communication technologies such as the Internet and mobile computing have substantially changed the landscape of both the established and emerging commercial world. In the digital world, electronic business (E-business) is being used in innovative ways that involves inter-organizational process digitization and integrates E-commerce technologies, business modeling and information exchanges among the collaborative stakeholders. Today, it has been a promising solution to improve the efficiency and quality of business operations and has been receiving significant attention of business practitioners. In fact, several innovative E-business applications, such as enterprise resource planning (ERP), supply chain management (SCM), and customer relationships management (CRM), have dominated the applications of business information system now.

However, E-business is not just suturing on an E-commerce appendage to the body corporate [1], but also innovating in servicing customers,

collaborating with supply chain partners, and offering new products or services to expand business area [2]. The implementation of E-business will change the way of doing business and transform the existing business operations. Zhuang [3] argued the E-business enabled change as “E-business innovation”.

E-business innovation will alter the existing capabilities of the incumbent businesses. From dynamic capability perspective [4], in order to cope with the E-business innovation, the incumbents need to evaluate E-business-enabled changes in business technology and business model and concern with the extent to which they will meet capability gaps in the change. Then, it is necessary to identify and dispose the organizational capabilities to match the requirements of implementing E-business successfully. To this end, the incumbents must understand the significant differences in nature of technology and business model in the transformation from traditional business to E-business. Possessing the understanding is crucial for identifying core capabilities that implement E-business and match the requirements of exploiting E-business innovation [5]. Therefore, this study applies E-commerce innovation model [6], with a secondary data analysis and comparative analysis to analyze the differences in business technology and business model, so as to identify the core capabilities for E-business implementation.

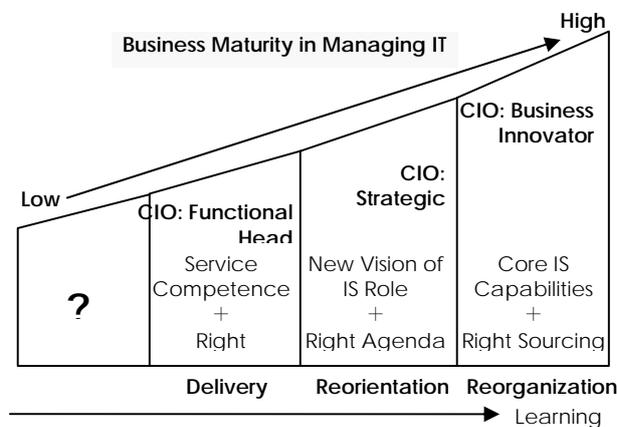
The remainder of this paper is organized as follows. First, we briefly describe the concept of E-business innovation and introduce the E-business innovation model. Second, we analyze the key differences in technology and business model dimensions between brick-and-mortar business and E-business. Third, we analyze and identify the specific capabilities necessary to leverage the E-business innovation. The last section concludes with a summary that discusses the implications for exploiting E-business innovation.

E-Business Innovation

The Evolution of Business maturity in managing IT

Today's enterprise has evolved to the point where its goal to explore and exploit the business opportunities with information technology (IT). In digital era, organizations have embraced E-business to achieve a high degree of integration and performance by increasing the business maturity in managing new IT. Willcocks et al. [7] proposes an evolutionary growth model to elucidate the path an organization can take in evolving its IS capabilities and maturing its ability to manage and source IT, as shown in Figure 1. It indicates an evolutionary process (passing through delivery, reorientation, and reorganization phases) according to an organization's business maturity in managing IT. For businesses to succeed in IT exploitation at different phases they must acquire and focus new sets of information system (IS) capability over time and their CIOs must have different emphasis in roles. Hoque et al. [8] also identified the three states of alignment, synchronization, and convergence to demonstrate different business maturity in managing IT. Similarly, the enterprise architecture maturity stages model identifies four stages are: business silos; standardized technology, rationalized technology, and business modularity to indicate an organization's progress in using IT strategically [9]. Each stage incrementally increases the strategic value of IT and enhances business effectiveness.

Figure 1: The evolution of business maturity in managing IT



As E-commerce technologies grow, new E-business applications will soon follow. Over the past decade, we have witnessed the intense progression of E-business applications has substantially changed the landscape of business. More and more businesses adopt new E-business applications to integrating business information and business processes internally or externally. However, the adoption of new E-business applications often transforms the current business operations and stimulates organizational changes [10]. In the E-business enabled innovation, the

incumbents need to mature its ability to use new E-business technology and reinvent their business models.

Categories of E-Business Innovation

Damanpour [11] defined an innovation as adoption of an internally generated or purchased device, system, policy, program, process, product, or service that is new to the adopting organization. The elements of this definition are embedded in E-business. E-business is defined as the key business operations of an organization are carried out through the use of information and Internet technology. It is an inter-organizational IS that integrates IT and business model and allows the various participating stakeholders to exchange information about commercial offerings. Essentially, E-business is also an innovative inter-organizational application of business technology. It implies the important characteristics of the definition an innovation [11]. Moreover, when E-business is introduced into a firm, it requires new technologies such as computer hardware, networking, software applications, and policies for conducting business transactions and safeguarding confidential information. Thus, the implementation of E-business will transform the incumbents' business technology applications and business model. It implies the important characteristics of the definition an innovation[11].

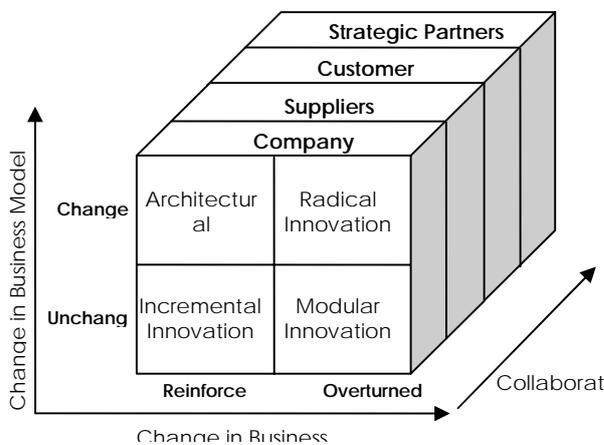
Understanding the nature of an IT-enabled innovation is a crucial first step in managing the changes associated with the innovation [10]. To comprehend E-business innovatively, it is necessary to understand the attributes of E-business innovation [12]. Barua et al. [13] argued that the E-business drivers include three distinct but related areas: IT applications, business model (processes), and the partnerships with customers and suppliers. In fact, the implementation of E-business involves business technology upgrade, business reorganization, business model reinvention, supply chain reconfiguration. Moreover, the collaboration of a firm's suppliers, customers, and strategic partners can play important role in E-business innovation. Thus, E-business innovation can be characterized as both technical and business innovation in terms of inter-organizational focus.

E-business innovation can be conceptualized as a net-enabled organizational innovation arising from new business technology. By drawing upon Wu and Hsia's [6] E-commerce hypercube innovation model, we propose a three-dimensional E-business innovation model, shown in Figure 2, to analyze the typology of E-business innovation. The model suggests the overall domain of E-business innovation is made up of three principal constructs:

business technology, business model, and collaborators.

Figure 2. E-business innovation mode

The taxonomic model considers that an E-business innovation can be described in terms of its changes in business technology and business model. The changes of E-business innovation can be categorized into four types: incremental, modular, architectural, and radical depending on the extent to which the innovation impacts the existing business technology and business model. An E-business innovation is incremental if it conserves the existing business technology and business model; modular if it destroys business technology but conserves the



business model, architectural if it destroys the business model but preserves the business technology, and radical if both business technology and business model become obsolete.

Business technology is defined as the application of IT to deliver a products or services and automate a business operation [8]. In E-business environment, the three key domains about business technology generally include: IS integration, process integration, and digital services [5] [14][15]. Here, IS integration refers to the degree to which a firm has established IT infrastructure for the consistent and high-velocity transfer of information within and across its boundaries. Process integration refers to the degree of a firm has integrating the flow of information, materials, and finance with its partners by using IT [15]. Digital services refer to the degree of digitization of a firm's business operations and transactions executed with its partners and online services. These components are further divided into several elements for comparison described as:

- IS integration — consisting of IT infrastructure, business applications and data consistency.

- Process integration — consisting of information flow, logistic flow, and financial flow.
- Digital services — consisting of operational service, transaction mechanism and security.

A business model is a coherent framework that converts the business technologies through markets into business value [16]. A business model is often used to describe the key elements of a given business. Johnson et al. [17] argued that a business model consists of four interlocking elements: customer value proposition, profit formula, key resources, and key processes taken together, create and deliver value. Afuah and Tucci [18] proposed a set of elements of Internet business model, including profit site, customer value, scope, pricing, revenue sources, implementation, capabilities, and sustainability. Based on the aforementioned literature, the functions of a business model are to: articulate the customer value proposition; distinguish a market segment; estimate the cost structure; assess the profit potential; identify the structure of the value network within the bank needed to collaborate with their customers and other stakeholders. We therefore define the components of a business model, including value proposition, market segment, cost structure, profit potential, and value configuration. Furthermore, in E-business environment, a company needs to work with other collaborators such as suppliers, customers, and strategic partners. Thus, the model presents the collaborators dimension specially to indicate the three key stakeholders.

Dynamic Capabilities Perspective

To cope with rapid changes of business environment, a firm must constantly reconfigure, gain, and dispose organizational capabilities and resources to match the requirements of a changing environment [4]. The ability to recognize and identify a firm's new market opportunities, determine their potential strategic importance, and renew its competencies is called "dynamic capabilities." Dynamic capabilities vary with environment dynamism. That is, the capabilities are essentially change-oriented capabilities that help the firm redeploy its resources and renew its competences to sustain competitive advantages and to achieve congruence with the shifting business environment. However, the development of dynamic capabilities reflects an organizational ability to cope with the change in a timely way.

Dynamic capabilities perspective (DCP) has been applied for the E-business domain. For instance, Rindova and Kotha [19] employed the concept of dynamic capabilities to examine how the organizational form, function, and competitive advantage of E-business dynamically coevolved.

Daniel and Wilson [20] identified eight dynamic capabilities that are necessary for E-business transformation and proposed practices in developing these capabilities that are both effective and common across firms. Dynamic capabilities can be beneficially applied for understanding core capabilities that are necessary for implementing E-business in a dynamic E-commerce environment. Wheeler [21] proposes the Net-Enabled Business Innovation Cycle (NEBIC) model for measuring, predicting, and understanding a net-enabled organization's ability to create customer value through the use of innovative IT. This approach incorporates both variance and process views of net-enabled business innovation and defines four essential capabilities: choosing new IT, matching economic opportunities with technology, executing business innovation for growth, and accessing customer value for net-enabled business innovation that creates customer value. The strengths or weaknesses of these capabilities can be used to predict the firm's ability to create value for the net-enabled business innovation.

Analysis of E-Business Innovation

To further understand the nature of E-business innovation, we propose an E-business innovation model (see Figure 2) by using secondary data analysis to evaluate and analyze differences in two dimensions: business technology and business model and then explores the dynamic capabilities for implementing E-business innovation.

Changes in Business Technology

Initially, to understand the transformation from brick-and-mortar business to E-business in terms of business technology, we analysis the key differences in the dimensions such as IS integration, process integration, and digital services, considered in the previous section, based on an analysis of the extant literatures. Table 1 summarizes the major variations relating to each of these dimensions

dimension
The history of business automation records the shifts in the IT-infrastructure from mainframe, to PCs, to client/server, before the emergence of the Internet. These IT-architectures are embodied in desktop computing and wired networking architecture, which is supported by proprietary electronic network implemented by private third party. In the past, the business networking is largely based on the wide area network (WAN) architecture. Traditional online transaction systems, conducted with the use of IT centering on electronic data interchange (EDI) over proprietary value-added networks (VANs) that are established by vendors to deliver services over and above those of common carriers. The EDI is generally an

industrial standard that provided the data exchange

Elements	Brick-and-mortar business	E-business
IS Integration		
IT infrastructure	<ol style="list-style-type: none"> 1. Desktop computing 2. Isolated network architecture 3. Proprietary networking: WAN, and VAN 4. Quarantined bandwidth 5. Regional EDI Standards: UN/EDIFACT, ANSI X12 	<ol style="list-style-type: none"> 1. Web-based and mobile computing 2. Open network architecture 3. Internet networking: Intranet and Extranet 4. Multimedia transmission 5. Abundant bandwidth 6. Unified Standard: TCP/IP
Business application	<ol style="list-style-type: none"> 1. Functional information systems 2. Support internal business operations 3. Transaction processing oriented 	<ol style="list-style-type: none"> 1. Cross-functional information system integration 2. Dominate inter-organization business operations 3. Information and strategy oriented 4. E-business applications: ERP,SCM, or CRM
Data consistency	<ol style="list-style-type: none"> 1. Disparate data formats 2. Heterogeneous and fragmented database systems 	<ol style="list-style-type: none"> 1. Standardized data formats 2. Integrated database systems
Process Integration		
Information flow	<ol style="list-style-type: none"> 1. Information is a supporting role in value chain 2. Operational information sharing 3. Information transmission in a firm 4. Combination of paper-based information and electronic information 	<ol style="list-style-type: none"> 1. Information is a strategic role in value chain 2. Operational, tactical, strategic information sharing 3. Information transmission across the supply chain. 4. Information flow integration
Logistic flow	<ol style="list-style-type: none"> 1. Logistic flow of marketplace 2. Mainly physical products and distribution networks 	<ol style="list-style-type: none"> 1. Logistic flow of marketplace and marketspace 2. Integrated logistic flow 3. Multichannel distribution networks
Financial flow	<ol style="list-style-type: none"> 1. Cash flow of physical payment 2. Mainly cash, invoices, credit terms, and accounts. 	<ol style="list-style-type: none"> 1. Financial flow of virtual payment 2. Electronic transaction and payment 3. Integrated financial information
Digital Services		
Operational services	<ol style="list-style-type: none"> 1. Physical operation activities 2. Physical supply chain 3. Paper-based material requisition and order management 4. Physical distribution channel 5. Physical contact or phone services 	<ol style="list-style-type: none"> 1. Click-and-mortar operation activities 2. Virtual supply chain 3. Electronic material requisition and order management 4. Multiple distribution channels 5. Serve online customers simultaneously
Transaction mechanism	<ol style="list-style-type: none"> 1. Paper-based or EDI contract 2. Over-the-counter 3. Physical players, processes, or payments 4. Location and time critical 	<ol style="list-style-type: none"> 1. Online transaction 2. Anywhere-anytime 3. Virtual player, processes, or payments 4. Overcome geographic or time limitations

of standardized electronic transaction documents

and data. In contrast with the Internet, the VANs provide higher security features and quarantined bandwidth. The centralized control architecture limits the interoperability of linking additional networks and integration of heterogeneous IS applications. Moreover, the vast majority of traditional IS applications are meant to support transaction functions within firms and do not provide much information because of limited bandwidth, platform dependency, and data inconsistency [22].

Thus far, E-business systems are based on web-based and mobile platforms over wired or wireless networks, which are supported by TCP/IP protocol. By relying on the open network and standardized protocol, the Internet provides an interoperable and worldwide networking model. Contrary to the limited bandwidth of the private network, the capacity of public Internet is abundant and nearly free. The World Wide Web (WWW) can support the transmission of multimedia data. Based on the platform, the E-business applications can be characterized as intense multimedia systems. They are frequently inter-organizational systems that must integrate with existing legacy transaction processing systems within a company and often need to connect with their suppliers, customers, and business partners. Developing E-business applications therefore require a combination of new skills such as content, online service, and user interface design together with web-based IS development techniques [23].

Table 1 Difference in business technology

The mechanisms of conducting secure transactions are important for inter-organizational transaction. Traditional business transaction processes mainly involve physical players, processes, and payments. In contrast, E-business is a new channel of integrating physical and virtual transaction activities via the Internet or mobile networks. It constructs an alternative channel by which customers can easily make a transaction anywhere-anytime and reduce their needs for intermediaries. Given the open nature of Internet, security is likely to emerge as the biggest concern among the business stakeholders [13]. Thus far, several well-developed digital transaction mechanisms and online payment systems have been developed to support the digital channel. For instance, the new generation of payment systems (e.g. electronic funds transfer networks) can be introduced to simplify use of cross-border transactions by global standardization. The typical security schema of e-business includes the encryption, firewall, and a certification of the firm's server to prevent another masquerading. Now, the popular security protocols include Secure

Socket Layer (SSL), Secure Electronic Transaction (SET), Wireless Transport Layer (WTL), and wireless Public Key Security (PKS) [24].

Over the past years, business operation has already been migrating customers from physical activities to online services. The nature of the former mainly focuses on internal activities such as transactional and administrative functions that allow firms to perform routine operations and to conduct transactions. In contrast, E-business is a click-and-mortar service channel whose utilization must be maximized, and is an interface to the customer base whose usage should enable customer s and partners relationship management [25]. Thus, E-business should be utilized as an integrated service channel that not only focuses on transactional and administrative services but also supports more informational services [26]. For instance, a company could share and distribute inter-organizational information, business intelligence, and other value-added services to partners in the supply chain by using E-business. Besides, it can use CRM systems to offer recommendations based on past transaction profile or customer interaction and tailor the services to the customers. In E-business environment, the collaborators have full access to business and customer information, and needs no longer to rely on the traditional communication services.

Change in Business Model

Every successful company already operates according to an effective business model [17]. Business model is the method by which a company develops and uses its resources to offer its customers better value and to make profit [18]. It is also a mediating framework between new technologies and business value [16]. A good business model provides the answers for: Who is the customer? What does the customer value? How do we make money in this business? How can we give value to customers at a proper cost? The elements of a business model include value proposition, market segment, cost structure, profit potential, and value configuration [6][18]. The differences in the five elements of a business model — customer value proposition, profit formula, key resources and key processes — between brick-and-mortar business and E-business are independently analyzed in this section. Table 2 summarizes the key differences relating to each of these elements.

Table 2 Differences in the business model dimension

Elements	Brick-and-mortar business	E-business
Value	1. Localization	1. Efficiency: low cost,

Proposition	<ol style="list-style-type: none"> 2. Safe transaction 3. High quality of service 4. Fast distribution of physical product 	<ol style="list-style-type: none"> high speed, fast, and product/service variety 2. Convenience: flexible and around-the-clock shopping time and across organizational and geographic boundaries 3. Customized services 4. Supply chain extension
Market Segment	<ol style="list-style-type: none"> 1. Marketplace 2. Local market 	<ol style="list-style-type: none"> 1. Marketplace and Marketspace 2. Universal market
Cost Structure	<ol style="list-style-type: none"> 1. Higher asset cost 2. Higher human cost 3. Higher transaction cost 	<ol style="list-style-type: none"> 1. Lower shelf space cost and community creation and maintenance cost 2. Higher IT infrastructure investment cost 3. Higher risk cost 4. Low distribution cost for digital products
Profit Potential	<ol style="list-style-type: none"> 1. Economics of scale 2. Capacity utilization 3. Operational efficiency 	<ol style="list-style-type: none"> 1. Business process reengineering 2. Digital products and services 3. Information utilization 4. Value chain reconfiguration
Value Configuration	Physical supply chain	<ol style="list-style-type: none"> 1. Integration of physical and virtual supply chain 2. Information-centric business collaboration 3. Members sometimes is temporary assembly

Brick-and-mortar business needs to establish a physical channel presence in a geographical location in order to serve local customers there. The outlet is more effectively serve customers with lower IT awareness and acceptance. Therefore, brick-and-mortar business is better able to build consumers' trust because of their physical presence in the markets they serve. It has realized the value arising out of reduced transaction risks and improved trust.

E-business channel eliminates physical and geographic boundaries and time limitations of bricks-and-mortar business. It provides consumers with convenience—time-saving and high speed—services online. Customers should be able to access rich information and services via the Internet. Such convenience has three potential impacts. First it may result in an information asymmetry where the partners share more business information. Second, it is possible that an information transparency may result in a online service channel in virtual world [27]. In addition, E-business can be utilized as a click-and-mortar channel to develop long-term customer and partner relationships through ready access to a broad and increasing array of products, services and low-cost financial shopping, rapid

response to market inquires, and customized product or service innovation [25]. Consequently, the integrated channel may extend the existing supply chain and market. We sum up that E-business realizes these value propositions: efficiency, convenience, customization, and supply chain extension [15].

The market segment refers to the market scope to which the value should be offered. The market scope and customer base of brick-and-mortar business is restricted within local marketplace. E-business is a new marketspace, so the market segment of geographic business and E-business are quite different. To exploit the new marketspace and increase the existing market share, the incumbents must seek to capture the potential customers and strategic partners as early as possible. The cost structure of brick-and-mortar business and E-business operation is different. E-business is driven largely by the prospects of operating costs minimization and operating revenue maximization [13]. In contrast to traditional business, E-business is efficiency and it handles business operations and transactions automatically, without being weighed down by bulky documents. Thus, the use of E-business has the potential for order-of-magnitude reductions to the cost of processing and transmitting information [28]. E-business allows firms to link directly to customers and partners online, thereby significantly reducing transaction, labor, promotion, and service costs. In the brick-and-mortar business context, firms receive their revenues sources directly from operational efficiency, capacity utilization, and economics of scale. It is apparent that many firms are motivated to implement E-business by forces relating to the maximization of the earning through increased market scope and improved customer relationship due to product delivery convenience and service customization [7].

The value configuration describes the position of a company within the industry linking suppliers, customers, and partners [18]. In the brick-and-mortar business context, companies collaborate with their business stakeholders via physical supply chain. In contrast, E-business has blurred the geographic and physical boundaries between companies and their stakeholders and form an integrated supply chain [15]. The integration of virtual and physical supply chain will intensify the scope of competitive environments and the complexity of inter-organizational business involving various stakeholders.

Development of E-Business dynamic capabilities

The results of comparative analysis manifests pronounced variations in business technology and business model between brick-and-mortar business and E-business. The variations raise a number of changes in IS integration, process integration, digital service offerings, and business model and lead to a radical overhaul of the way of doing business. Accordingly, the capabilities that underpin the organizational ability to successfully implement E-business relate to three generic capability domains: business technology, business management, and collaboration. These capabilities combine, along with the business practices, to form the dynamic capabilities of exploiting E-business. Based on the results of aforementioned comparative analysis, we identify eleven core dynamic capabilities through the reviewed extant literatures about IS capabilities, observation, and discussions with E-business practitioners.

From technological perspective, the core business technology capabilities include planning new IT-infrastructure, integrating IS applications, sharing value-added information, enhancing information security (as shown in Table 3).

Table 3 Dynamic Capabilities of Business Technology

Changes in E-business	Dynamic capabilities of business technology
The IT infrastructures of the E-business are significantly different from those of bricks and mortar.	Planning new IT infrastructure.
Effectively integrating inter-organizational IS applications is critical for successful e-business and real-time information.	Integrating IS applications.
E-business should create and share physical information and virtual information for data consistency.	Sharing value-added information.
Data transformation and transactions are conveyed over public Internet.	Protecting information security

Planning new IT infrastructures

This capability refers to the ability to plan, deploy, and develop new IT infrastructures and information systems for e-business. This capability is important because most companies may not do all investments regarding e-business immediately. Thus, a company may need to properly plan the e-business investments based on the bottom line [29]. There are some important issues for planning new IT infrastructure, such as the timing, context and focus of information technology investments.

Integrating IS applications

Although E-business can create many benefits for organizations, none of the benefits are achievable unless various cross-functional ISs within an

organization and across organizations can be well integrated [30]. The integration of inter-organizational IS systems has been seen as an important task for successful E-business traditionally, data integration occurs within a single organization and the problem of integration can be solved by utilizing data warehouse techniques. In E-business, data integration occurs across organizations and there are many barriers for the integration, such as different organizations with different content formats and semantics. Thus, the task of integration of IS applications is usually difficult for an organization [31].

Sharing value-added information

Adoption of E-business relies on effective information exchange between companies and their customers, suppliers, and partners. When digital services replace a traditional service, the customer will need real-time access to relevant information to reduce the uncertainty of transaction. Companies have to give up its information asymmetry relative to its collaborators to enable them to share their information. For example, customers may be supported by informational services to quickly query order and inventory situations online. With these features, companies must provide value-added information such as price, inventory, and customer-related information that matches the collaborators' needs. However, a challenge for the companies is to determine what information content they need to reveal in order to remain as a preferred partner versus the information they will not share in order to control stakeholders' decisions.

Protecting information security

E-business involves online transactions among many collaborators. That means that transactions data is conveyed over public internet and there are many accompanied security problems which usually cause serious disasters. It is found that the Internet attack events increase by the rate of 10% to 15% annually [32]. Thus, an E-business system needs the ability to deal with various related issues, such as privacy policy, government regulations for privacy threats and various security threats.

From business model perspective, the core business management capabilities for E-business consist of aligning IT with business strategy, planning and managing business reorganization, Exploring new business opportunities, and positioning in an attractive site, matching IT with business strategy, planning and managing business reengineering, understanding emerging technology to see new business opportunity (as shown in Table 4).

Table 4 Core Dynamic Capabilities for Business

Management

Changes in E-business	Dynamic capabilities of business management
IT is the core driver of E-business and the alignment of IT and business strategy is important.	Aligning IT with business strategy
E-business requires a wide range of business reorganization and process reengineering.	Planning and managing business reorganization
Internet provides many new marketspace and business opportunities.	Utilizing new IT to explore new business opportunities

Aligning IT with business strategy

Although a high proportion of organizations have announced their E-business plan, not all companies can obtain value or benefit from the implementation of the E-business [33]. The key point is not concerning whether the organization deploys E-business to take advantage of IT, but concerning how the organization deploys IT to match their business strategy [34].

Planning and managing business reorganization

E-business innovation has challenged conventional organizational forms and business model. Significantly redesigning traditional business model is necessary for the company to conduct new E-business model. The reorganization of business model and the reengineering of business processes in order for E-business requires the organization to establish new routines and norms and requires employees to learn new skills for the new processes [7]. These barriers can be treated as the knowledge barriers for developing E-business successfully.

Exploring new business opportunities

Although E-business benefits to organizations in creating value and enabling more efficient operations, it also creates new types of rivals which well utilize new business opportunities E-business innovation brings [35]. This capability is consist of the ability of sensing and seizing opportunities. The former ability refers to the ability of an organization to sense customer needs and technological opportunities. The later ability refers to the ability of an organization to seize the new market opportunities and technical opportunities which have been sensed by the organization. They also can be seen as business technology management capability [8].

In term of the collaboration, the core collaborating capabilities for E-business consist of managing and leading virtual market, integrating physical and virtual channels, sharing information to co-create value, dealing with global market and collaboration,

Table5 Core Dynamic Capabilities of

Collaboration

Changes in E-business	Dynamic capabilities of collaboration
The governance of E-business is important for company in the E-business value network.	Managing and leading virtual market development
E-business should integrate physical and virtual channels into a click-and-mortar channel.	Integrating physical and virtual channels
Enhancing supply chain relationships is the source of business value co-creation.	Co-creating business value
There are the challenges of global market and virtual collaboration.	Dealing with global market and collaboration

Managing and leading virtual market development

Infinite virtual capacity is one of the most important E-business properties and utilization of the infinite virtual capacity will create additional profits [18]. However, in virtual world, customers virtually experience product features and service and employees and business partners virtually collaborate with each others. Many human contacts are eliminated [36]. Thus, the governance and of virtual market and channel is different from that of physical or traditional market, business process and channel.

Integrating physical and virtual channels

Most E-business companies provide multiple distribution channels to satisfy customers' needs, including physical and online channels. For example, a customer can choose shopping online but paying in physical world. Effective integration of multiple channels can bring business maximum benefits.

Co-creating business value

In E-business, collaboration is a strategic resource of creating business value. For example, unlike traditional media which can only share business information to customers, online media is a two-way marketing communication in which customers requires information from a company and also provide useful information to the company. That is, the ability of an organization to share information to enhance supply chain relationships can co-create business value for the company and its collaborators [37].

Dealing with global market and collaboration

Some challenges accompanied with E-business are created, such as the issues of culture, currency, and delivery. Supply chains becomes more dispersed because of global configuration and thus have given rise to the problem and complexity of coordinating flow of information and materials between an organization with supplier or customers in its supply chain [35].

Discussion and Conclusion

The inductive results indicate that the transformation from brick-and-mortar business to E-business is radical, leading to massive changes in both areas: business technology and business model. We conclude that the change may render the incumbents' capabilities and experiences obsolete. It implies that the incumbents attempt to duplicate the previous business technology applications and business model to respond E-business is impractical. Conversely, in the face of the change, businesses must seriously rethink how they do business reorganization.

To assist the businesses successfully exploit E-business, we further identified several core capabilities for implementing E-business innovation. These capabilities fall into three distinct domains that must be balanced and be constantly reconfigured. One domain relates to the capabilities to utilize the emerging business technologies, while the second domain is the capabilities for the reinvention of the business model, and the third domain is the capabilities for the collaboration with customers, suppliers and business partners. It stresses the notion that the incumbents are unable to properly exploit E-business without a strong dynamic capabilities related to innovative using of IT, reinventing business models, successful collaborating with stakeholders. The implications of the results for the incumbents can be viewed in two ways. On the one hand, they need to develop uniquely innovative services and products through the secure IS platforms and inter-organizational processes, and on the other hand, they need to evaluate their business model that change the way company operated and how it interacts with its stakeholders.

Our research is positioned as an exploratory one seeking to extend the dynamic capabilities perspective to the E-business context. The results provide the incumbents with appropriate recommendations for responding the changes derived from E-business. It is valuable to enhance our understanding of the nature of E-business innovation and also for providing insights into the transformation from brick-and-mortar business to E-business.

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