Win-Win on E-Business by Complementary Assets with IT Competence and Innovative Capabilities

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ABSTRACT

Information Technology (IT) has been widely applied to business operations and service systems and derived various innovative business models and novel areas, especially e-business. E-business provides service by websites via IT with online information or systems to create multiple innovative values which change user behavior. Under this trend, e-business (hereinafter referred to as native e-business firms) has deeply threatened the survival of traditional service firms. To overcome difficulties, many traditional firms select bottom-up integration to increase e-services (hereinafter referred to as tradition-to-e-business firms) for expanding their multiple marketing channels. To face the challenge, native e-business firms, on the other hand, choose top-down integration, including physical stores, logistics, cash flow, supply chain, etc., to increase service values. Under competition in many years, the tradition-to-e-business firms are hard to surpass native e-business firms. On the contrary, native e-business firms cannot defeat traditional firms also.

In this study, we explore the reason why native e-business and traditional firms cannot supersede each other. We find that the nature of firms and development strategy influences business focus, growth trajectory and advantage position. In the emerging stage, "e-business" is core business in native e-business firms. The firms are led by entrepreneur insights and their IT capabilities. Traditional firms were forced to build e-business, when they perceived customer disappearance. E-business is just one of their marketing channels. In the growth stage, e-Business and complementary assets oppositely lead enterprise resource integration, and the capability of which affects the company's competitive advantage.

This article adopts qualitative research methods to investigate innovative capability, IT competence and complementary assets which derive the impact of e-business value creation on firms with different origins and background. Then we interpret the phenomenon of change by resource-based view (RBV) and structure inertia theory, analyze the advantages and limitation of native e-business firms and traditional service firms, and explain why it is difficult to surpass and hard to be defeated by each other. Finally, we proposed theory contribution and management implication.

Keywords: Information technology, IT competence, innovation, complementary assets, e-Business

INTRODUCTION

In recent years, e-business including online shopping, e-books, Internet marketing, news wires, communication, digital streaming and cloud App, etc., rises. Those native e-business companies rose from Internet; they have no physical stores and merely use websites to offer information and product sales, building delivery mechanism and member community. Meanwhile e-business firms played the long-tail effect [9] to extend service boundary by unlimited virtual space, time and retail price advantage. And then they step by step created new business models and consumer using habits [36] [14] [2]. Following, they headed for top-down integration including cash flow, logistics and service center, through mix of virtual and physical complementary assets [19], and gradually expanded sphere of influence.

E-business is a service platform based on Information Technology (IT) and Internet, engaging in e-commerce, information and communication delivery. E-business enables consumer to obtain value exchange in similar service to physical stores via websites which provide product/service sales and information applications [2].

E-business value includes novelty, efficiency, lock-in and complementarities [2]. Doern and Fey [14] expanded it to eight elements: novelty, efficiency, lock-in, complementarities, ease of use, accessibility, ease of search, trust, which are closer to users' habits and needs. Hernández et al. [21] stated key factors in e-business value strategy which determine website quality: accessibility, speed, navigability and content. Soto-Acosta and Merono-Cerdan [41] pointed out, based on RBV, that e-business has been affected by three dimensions, which contain Internet infrastructure, e-business capabilities with suppliers, Internal e-business capabilities.

Empirical studies show that e-business value creation is inseparable with innovation and IT. Engineers use IT technique to design web interface, showing online information, product/service description, inventory status, purchasing records, expert opinions, and user sharing. The online system also links with payment gateway and logistics system for twenty-four hours arrival assurances. They have achieved various service innovations by IT application.

Due to the impact of native e-business, in the last decade, lots of traditional service providers chose to change. The change included developing compound business, enhancing IT capability to provide similar internet service (i.e. tradition-to-e-business) with native e-business firms. They have integrated physical entities with virtual websites, maintaining

existing business and extending diverse channels to meet the threat of native e-business (see figure 1).

We have observed for a long time that many traditional service providers have well-known brand identity, outstanding service characteristics, conventional rules, and deep network with internal and external stakeholders. They are leaders in the region and traditional sector. After changes, however, tradition-to-e-business firms rarely lead the e-market. It is hard for them to access the leading status of native e-business firms. Relatively, the scale of native e-business firms are getting larger, but they are still difficult to substitute the traditional service firms completely. This phenomenon induced our motive to study the key advantage to survive in both types of businesses. We are interested in knowing why the two types of firms can't surpass and are hard to be defeated by each other, as well as how IT and innovative capability influence e-business performance and how the firms set their strategy to face challenge.
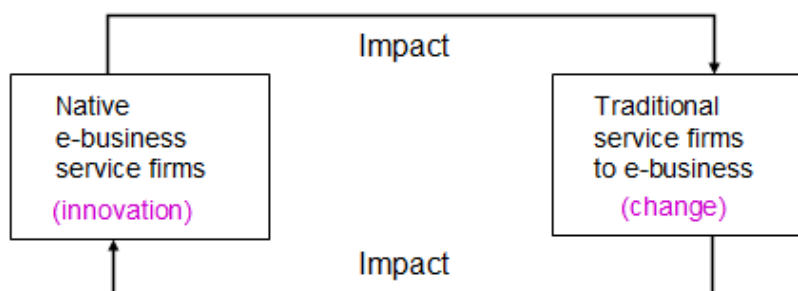

Figure 1: reciprocal competition between two types of e-business

We explored the nature of e-business, where IT and innovation are two indispensible elements. Draw on prior research, IT competence and innovative capability both showed critical meaning in business operation. That is IT influences innovation and firm performance significantly [32] [15] [40] [3] [27] [18].

Refer to previous studies of IT, most scholars focused on new product development (NPD) [15] [3], process [18], communication [40], collaboration [3] [27], performance, and organizational behavior. They emphasized in how IT influences innovation process and outcome. On the other hand, the efforts of e-business studies were devoted to business model [34] [12], strategy [4], innovation, NPD [15], consumer behavior [13], trust [26] [30], loyalty and lock-in [36], exploring the nature of e-business and business models. Meanwhile, there were broad studies on innovative capabilities [42] [22] [37] [33]. But how IT and innovative capability influence firm performance in e-business is seldom studied. Therefore we do not know why firms applied IT at the same recipes in e-business, but the performance is quite different between these two types of firms.

In this study, we adopted qualitative research method to explore the influence of e-business and its development route from emergence to growth. We separated cases into two groups, one is native e-business firms, and the other is tradition-to-e-business firms. We summarized secondary documents including news reports, company briefs and annual reports, inducted the critical events and activities which consist of new product announcement, new activities, and website opening. Then we deployed in depth interview with top management of four firms in each group to comprehend the impact of each innovation and change. We used comparative analysis by examining the difference of background, growth tracks, and strategy development between two groups of firm, and we looked for the relationship of IT competence and innovative capability with e-business. We also explained phenomenon of organizational change by resource-based view (RBV) and structure inertia theory. Then we analyzed their advantages and limitations to find out why the two groups of firm could not surpass and are difficult to be defeated by each other, and how the firms set their strategy to face challenge. Finally, we proposed theoretical contribution and management implications.

LITERATURE AND THEORETICAL BACKGROUND

E-business is embodied with websites by IT application, offering information intelligence for consumers, and some e-business combines cash flow and logistics to complete transaction and service delivery. Due to the lack of physical stores, e-business should meet sales goal by attracting consumer browsing (novelty), highly efficient service delivery (efficiency), stimulating consumer re-purchase (lock-in), and integrating complementary assets (complementarities) [2]. E-business is an emerging industry and it should have innovative capability [22] [37] and IT competence. Creative idea exhibits on e-business service by IT. IT and innovative capability play roles as enabler and trigger, both incubating innovation and stimulating e-business value creation. Therefore, By exploring innovative capability and IT competence we can explain the formation and competition advantage of e-business value creation.

Innovative Capabilities

Innovative capability is an important driving force to sustain growth and gain profitability in firms [18]. Many companies

invest large resources on research development and innovation every year [16]. To develop innovative capability is critical strategy goal of firms [31].

E-Business originates from innovation. IT is a tool in innovative practice, and IT is the enabler and trigger of innovation [32]. IT is embedded in operation process, knowledge management and communication systems to induce customer agility and trigger business innovation [37]. Napier and Nilsson [33] proposed that creative capabilities originate from creative business. They pointed out that collaborative routines and processes are the basis of innovative capabilities. Collaborative routines and processes could improve organizational capabilities and guide actions. Besides, Creative entrepreneur could connect with external input: market based assets and competition, community and customers. That is, innovative capabilities are composed of creative entrepreneur, customer agility and organizational process enterprise.

Creative entrepreneur:
e-business was originated from innovation and it has no previous example. Entrepreneurs used foresight and insight idea to approach market opportunity [37] [33], and fulfill the idea via IT technology and website design. Creative entrepreneur is an important element of e-business innovation.

Customer agility:
Perceiving environment change and customer needs urge firms to adjust strategy and innovation generation. Customer is co-creator of innovation, who can test innovation idea and share user experience for firms and others learning [37]. Traditional service providers face customers directly and make observation in store. They perceive customer needs through personal interaction and direct response. E-business perceives customer status via customer online response and visitor flow.

Organizational routines and processes:
Merging business decisions, rules, and resources become business capability and innovation basis by temporal and environmental revolution [37] [33]. Organizational routines and processes also have been seen as barrier of organizational change when their scale, tenure and complexity increased [20].

IT Competence

IT is broadly used in business operation and is embedded in operation, knowledge and communication system. IT is a basic role on product/service innovation, business model innovation and management innovation. IT is an operand resource (tangible and static, a support tools of performing tasks-enabler) and operant resource (intangible and dynamic, to stimulate other resources for effectiveness and innovation-trigger) of firm for innovation process and outcome [32]. IT plays roles of digital tool and digital component on product development [32]. IT can derive product globalization, product diversity, enhancing communication between design teams, customers, partners and stakeholders. IT also enforces innovation processes to be more open and collaborative [18].

IT competence includes IT resource and IT capability of organization [37]. Sambamurthy et al. [37] proposed two measuring indexes which impact firm's innovation: IT investment scale and IT capability. Pavlou and Omar [35] further explored how to leverage IT competence, there are functional competencies (the capability of performing new product development processes) and dynamic capabilities (the capability of integrating, establishing, restructuring functional competence to cope with turbulent environment on new product development). Gordon and Tarafdar [18] examined the impact of IT to innovation processes on four management dimensions: information and knowledge management, project management, collaboration and communication, and business involvement. Song and Song [40] deployed two categories to answer how to use advance information technology achieving R&D-marketing integration: ITc (computer assistance communication technique, that is email, video conferencing, electronic bulletin boards and computer conferencing) and ITd (computer assistance decision technique, that is decision-support system, expert systems, and executive information systems), in order to achieve better decision and information retrieving.

E-Business value creation

E-business provides IT applications, information service and e-commerce via website and it is an innovative regime of synthesis approach on IT technique and service [17] [6]. Therefore, e-business is a new business model which combines technology competence and characteristics of service innovation. With virtual market characteristics, e-business can deal business transaction with remote users and offer service value via Internet. Therefore it's not a requirement for service providers to make any face to fact contact with users [2].

Amit and Zott [2] proposed e-business emphasizes on innovative user experience (novelty), highly efficient automatic mechanism (efficiency), member management and loyalty (lock-in), virtual/physical integration of product and operation (complementarities), and achieve consumer recognition of brand identity with good experience to use.

Novelty:
E-business, using websites as service platforms, creates multiple innovation design and well satisfaction of service encounter [38], and achieves e-business value [2] through IT. For example, Amazon's "one click ordering" is the first to simplify online shopping procedure by one click operation which connects shopping cart with member database to complete shopping transaction. E-business disrupted traditional business model by innovation and created brand new thinking and business pattern. It is the first to launch the service before competitor awareness, already constitute the first mover

advantage [44].

Efficiency:

E-business shortens the distance between supply and demand, decreases information filter and asymmetries, reduces misunderstanding and improves information delivery efficiency. E-business has Internet long-tail effect [9]. The commodity content and information can be expanded unlimitedly. It has lower customer searching cost, increases commercial opportunity and accelerates customer decision [2]. E-business provides twenty-four hour service, online click and real-time response. It improves transaction efficiency, reducing operating and service cost. Draw on transaction cost theory [45], the higher transaction efficiency the lower transaction cost. It creates the competition advantage of e-business. Furthermore, e-business owns same characteristics with information system. It can enhance marketing efficiency and business effect by connecting front-end shopping activities with back-end inventory system and supply chain [2].

Lock-in:

Due to the lack of emotion from face to face communication in e-business, the considering factors of building brand loyalty and retaining customer are providing customer preferred content, offering incentive program, creating co-value proposition with customer, improving service encounter satisfaction and overall satisfaction, and furthermore increasing switching cost ([36] [38] [8] [2]). Smith et al. [39] proposed that use habits of website constitute brand loyalty and lock-in [36] [38] [8]. If the user accesses to an unfamiliar environment, he should learn again and the willingness of switch will be decreased ([36]). To apply Internet externalities [28] is one of the methods to lock-in. Adapting social network concept to build member sharing mechanism can retain customers for a long period. The success cases include Facebook and LINE.

Complementarities:

Innovation could not succeed by itself. It should have complementary assets supporting [43]. For example, online shopping needs quick safety delivery, computer hardware must have software and mass manufacturing capability for cost reduction. If follower owned complementary advantages than innovator, they will replace the leader position. That is why complementarities are strategy assets in competition [1]. Complementarities could be applied on vertical integration (e.g. after-sales services) and horizontal integration (e.g. one-stop shopping, camera with spare battery) [2] for better customer satisfaction. In recent years, top-down integration, including cash flow, logistics and physical services, combining physical convenient service to enhance customer satisfaction (e.g. online shopping goes along with physical store for product maintenance,) is a prevalent trend of e-business. There is a classical success story where Apple's iPhone and iPod are connected with iTune and APP store. It is a paradigm case of physical device and e-business services combination.

METHODOLOGY

E-business is expanding rapidly. Due to the emerging of native e-business and the later participation of traditional-to-e-business firms, the upward and downward integration of services, and the intertwined competition between virtual and traditional businesses, this study induced from multiple dimensions to explore the nature of research questions. We adapted qualitative analysis [25] [29] to study backgrounds, developed tracks, and strategies between native e-business firms and tradition-to-e-business firms to understand how and why [45] both of them can not surpass and are hard to be defeated by each other.

Data and Summary:

The case firms in this study were established for over ten years in average and we separated them into two groups, one is native e-business firms, and the other is tradition-to-e-business firms. We read company's documents and picked out the critical innovation events/activities, and then interviewed with informants asking them to describe the stirred factors of the innovation activities, trajectory of change and strategic activities. By these studies, we explored changes and results in companies with different origins and background.

We have interviewed with top managers of eight firms. There are four in native e-business firms and another four in tradition-to-e-business firms. Besides, we have interviewed two teachers who are heavy users on internet services as well as traditional services (Table 1). Before interview, we provided a brief question (Appendix 2) to respondents. In interview, we adopted open discussion of "how" and "why" to listen to respondent's narration. We asked respondents stating innovative scheme, background, internal procedure and effectiveness, etc., especially on innovation projects/activities and changes. Respondents should fill a questionnaire (Appendix 3) after they had spoken about one innovated and changed activity. We checked the questionnaire and ask respondent to clarify ambiguity to avoid cognitive bias. Every interview spent about one to two hours with audio recording and a transcript will be done within 24 hours for later analysis.

Table 1: Detail of informants

Types	Firms	People interviewed
Native e-business firms	Global B2B marketing service	CEO, Senior manager
	Clouding web system service (SaS)	General manager
	Internet service	General manager
	e-Market Place	CEO, Senior manager
Tradition-to-e-business	Advertising and Trading service	CEO

firms	Book store 1	General manager
	Book store 2	CEO
	Publishing Company	General Manager, SA
Stakeholders	University	Assistant professor
Stakeholders	High school	Teacher

We adapted triangulation strategy [11] to gather multiple data sources. We studied news, industrial annual reports in near decade to find out the key events of industry change. We marked the industrial data related to our cases for further comparing with the result of interview. Further more, we interviewed stakeholders including customers and scholars to gather research issues from third-party and referred their critical opinions in this study.

We deployed multiple cases methodology [25] [47] for data induction and analysis. First, we identified common patterns and archive repeatability from interview narrative in our cases. We listed keywords (e.g. construct, sub-construct and keywords) and coded each of them. Then we inserted the code into related phrases of transcripts. By each of the code, we searched and found relevant sentences, summarized into first-order categories (construct and sub-construct). Second is a parsimony step, we eliminated duplication and inducted the sentences into the second-order categories (Appendix 4). Finally, we converged the results into our exploratory framework which had been developed by literatures and theories.

Draw on previous works, we iteratively checked data by steps, discussing the relation between constructs and theories, the causality of innovative events and outcome, identifying key factors that interpret our research questions. Then we draw trajectory of various interactions to derive further analysis and finding. Finally, we proposed our management implication.

Table 2: Selected narration of first order categories

Traditional to e-business	**First-order Categories**	**Native e-business**
• This structure was discussed in team meeting but most ideas were from me. • One of our members has IT capabilities. He is from IT background, and also the owner of a firm. • Our innovation was referring to others firm's idea.	**Creative Entrepreneur foresight / insight**	• My boss has insight. He always proposes his idea on the trend of consumer's needs and technology development. He guided company to innovation.
• When we discovered customer disappearance and income decline, we begin to think how to change. • The income drop down by 5%, 7%, 8% every month. We have considered change and compound management. • Publisher and book store are dependent on each other. If we do not fulfill customer needs, the books will be returned frequently. We hope to know clearly where customers are through regional management.	**Customer agility**	• Innovation is originated by customers, because the quality of service is relevant to their benefit. Partners will give opinions which are another source of innovation. • Sales process is a trigger of innovation. We hope to reduce operating manpower, replaced by automatic systems.
• Our firm is very small. We are used to the traditional ways. • It totally does not save any cost after we used computer. Computers only provide accurate statistics, because we need people to pack, delivery, post, and postage. In this business, manpower is necessary.	**Organizational routines and processes**	• From IT workflow view, we want to optimize working processes, and eliminate all unnecessary processes. Organizational routine and processes may evolve and accumulate experiences, triggering innovation and the evolution will go on.
• We are the pioneer of computerization in this field. We outsource IT system design and maintenance. • We have a fulltime computer operator, but top manager has no IT capabilities. This is the reason of failure. • Top manager does not have IT abilities, and it influenced the outcome of firm's computerization.	**IT investment and capabilities**	• IT is our core competence. We use IT to design working process and services. • We make large investment on IT hardware and manpower. • We have built our capabilities, rarely outsourcing. • My company adopts electronic operation, and we rarely use paper.
• We observed the field practice, learning their strength and considering self-ability for the next development. We adopted outsourcing.	**Novelty**	• We enhance our website with interesting and convenience through innovative design. The purpose is to win customers' good feeling.
• Website service really increased interaction with	**Efficiency**	• The direct effect of IT and internet service is

customers. We provide online matching with buyers and sellers in time.		enhancing efficiency. From information search, shopping and auto response could reach efficiency by IT
• We use various service combinations to increase customer return, for example: renewal discount program. • In these years, customers were not easy to be locked-in, because there are too many choices. The services have minor difference.	**Lock-in**	• Lock-in including increase switch cost. The database record, easy use, and good user experience all perform lock-in and e-business value.
• We have complementary online and physical services to increase sales channels and provide customer with more convenience. • Our products include combined package, for example, school commencement package.	**Complementarities**	• We have embodied one stop shopping service via IT (products horizontal and vertical integration), For example, when people buy a camera, we provide relevant tripods, cases, memory cards, and lenses for them to choose.

Fact Summarized:
- Native e-business firms emphasize creation; entrepreneurs are the source of innovation.
- When the number of customers and the income drop, we come out the idea of change.
- Traditional managers have limited IT ability, which in turn has restricted the innovation of e-business. Compound management is the main direction. IT is not their strength and very few ideas were proposed.
- The focus of IT design is the convenience of user interface. Prompt feedback from the online customers is the source of agility to creation.
- Routine and processes may evolve and accumulate experiences to trigger innovation, and the evolution will go on.
- Tradition-to-e-business firms are combined with virtual services, which can increase sales channels and bring more convenience to customers.
- At growth stage, innovation of native e-business was triggered by e-business and tradition-to-e-business firms were driven by organizational creative capabilities. Evolution was derived by overall resources and abilities.

COMPARATIVE DATA ANALYSIS

At emerging stage and growth stage, we found the motivation, development trajectories and business focus extremely different between native e-business and tradition-to-e-business, resulting in heterogeneities of competence, advantages and resource utilization.

A: e-Business emerging stage

After analyzing the difference of entrepreneurial motivation and development trajectories, we found that tradition-to-e-business firms emphasized on using existing resources to build multiple service channels to retain customers. Conversely, native e-business firms focused on e-business value creation and innovation, sustaining competitive advantage. From resource-based view (RBV), its leading status is difficult to surpass.

Native e-business firms: IT is an enabler of innovation. The entrepreneur realizes ideas through IT on e-business value creation (Figure 2) (e.g. Google, Youtube). The goal is to create a successful e-business. They devoted entire energies on service innovation (novelty), effectiveness enhancement (efficiency), customer loyalty (lock-in). At this stage, "People and IT" were in a dominant position which attributed to resources heterogeneities, unmovable and hard to be imitated [5].
Users' experiences, habits, recognition and trust are the basis of brand identity [24] [23]. Native e-business firms originated from innovation, obtaining the first mover advantage [44]. In this stage, they lead users to use, build service systems and member community, accumulate buying records and habits, and create brand identity and trust. Customer locked-in with brand loyalty enhances the difficulty of substitution by followers, building resource position advantage [44].
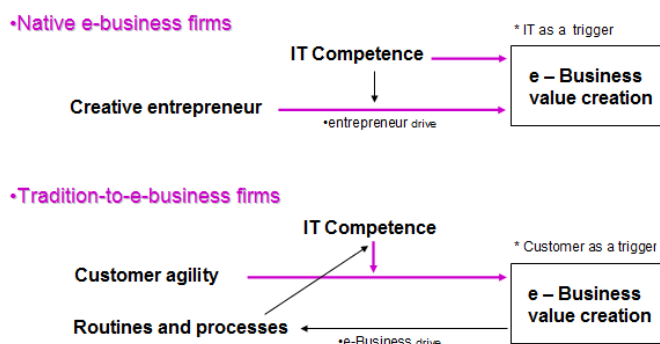

Figure 2: Emerging trajectories of native e-business firms and tradition-to-e-business firms

Tradition-to-e-business firms: perceiving the stress of sales declined and customer disappeared, the firms employed diverse strategies, building similar e-business to increase new sales channel. From the origination, firm was not derived by entrepreneur's creative ideas, the operational model and web design almost imitated from native e-business firms. This e-business entrepreneurship was motivated by customer agility (Figure 2).

Tradition-to-e-business firms integrated existing resource with virtual and physical complementarities. E-business drove organizational routines and processes change, firm inevitably faced impact of structure inertial [20]. It was limited both by innovative capabilities and IT competence, which impeded e-business performance. That is why the tradition-to-e-business firms rarely surpassed native e-business firms.

B: e-Business growth stage

At e-business growth stage, the competition was keen resulted from more challengers entering the market.

The growth of native e-business firms has been driven by e-business operation to combine virtual and physical complementary assets with top-down integration. In this stage, the firm still focused on e-business value creation. Corporate entity and brand identity has become more solid. Tradition-to-e-business firms has emphasized on upgrading online service quality. In parallel with physical business effectiveness, they gradually enhanced innovative capabilities and IT competencies to increase user experiences and loyalty. This enabled corporate entity more solid and sustained competitive advantage.

Native e-business firms: the business scale was expanding (e.g. rapidly increased information traffic and customers), institutions and internal innovation team had been formed progressively. In this time, the firm engaged in upgrading service efficiency, simultaneously defended volume of competitors, the e-business reversed to become a trigger of innovation. It reflected online user needs, and transformed the needs to web functions via IT and internal innovative capabilities, cycling embodied on value creation of e-business (Figure 3).

The performance of e-business, competition status, and customer response constantly stimulates firms' capability of innovation, and transforming into innovative design (novelty), efficient services (efficiency), retains customer (lock-in) and increases resources complementary (complementarities). The complementary assets are virtual-physical resource integration by demands of service efficiency (e.g. books.com.tw allies with seven-eleven chain stores, ezTravel.com established physical service points). It has increased service value of e-business, satisfied customer efficiency requirement, defended competitors, and eroded traditional service market. At this stage, the firm's innovative capabilities are restricted by entrepreneur's perception, customer agility, and internal routines/processes. The key factors of sustained long-term growth are how to transform from personal ideologies into team innovative capabilities when the organization received impulses from e-business.
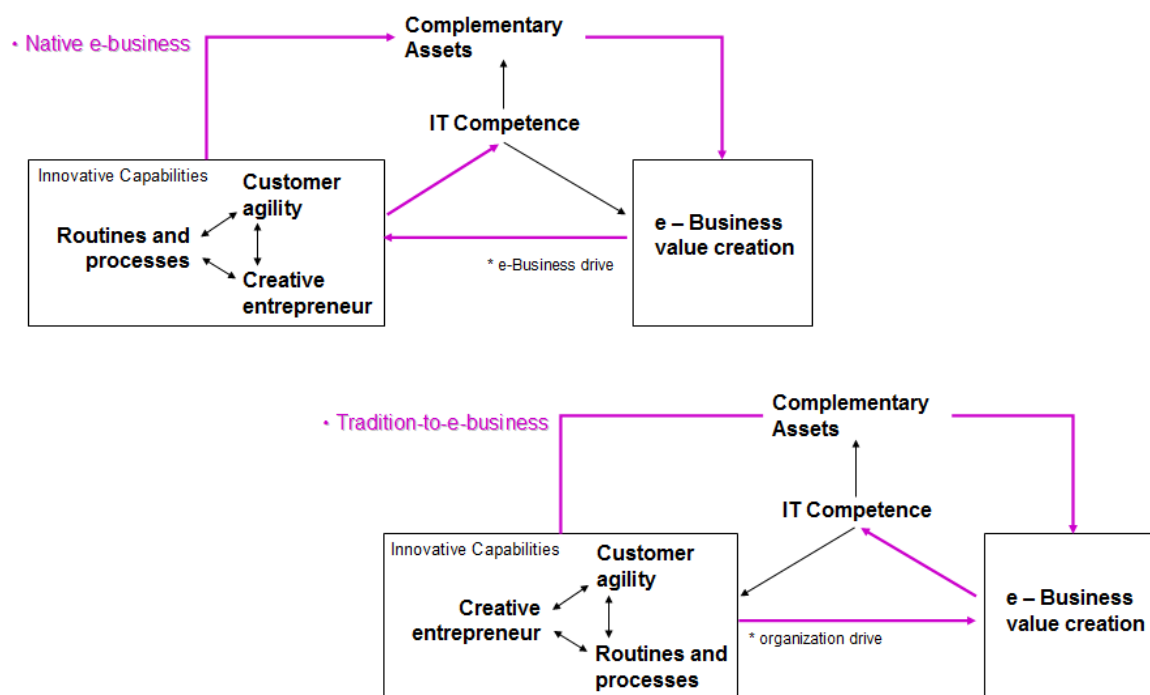

Figure 3: Growth trajectories of native e-business firms and tradition-to-e-business firms

Tradition-to-e-business firms: possessed abundant service experiences, regional advantages, well-known brand image and customer reliabilities. Considering overall benefits, the firms performed e-business and constituted a virtual and physical complimentary mechanism. E-business value creation was dominated by the evolution of internal innovative capabilities (Figure 3). E-business was constantly impacted by multiple responses from customers, and evolution of routine/processes (including pricing strategy and resource allocation). IT was embedded in routines and processes, reflecting online applications and technological needs, stimulating IT investment and innovative capabilities enhancement.

After e-business maturity, tradition-to-e-business firms broadly created business boundary, expanded sales channels, developed manpower and IT capabilities. Those all are key elements to strengthen the firms' overall competition capability.

FINDING AND DISCUSSION

Firms face competition and pursue growth. They constantly drive innovation and changes for sustaining competitive advantage from emerging to growth stage. IT is a digital tool and component of innovative design and services, and IT is embedded in organizational routines and processes to help business establishing operation system and improving work efficiency. IT is a trigger of innovation, the e-business must rely on IT, through internet website to build a new service regime.

Native e-business firms applied IT by disruptive innovation to start new business. Tradition-to-e-business firms look for changes by offering similar e-business service. This trend expands from online shopping to various fields including retailing, talent matching (104.com.tw), house broker (591.com.tw), trade matching (alibaba.com), communications (LINE), auxiliary education (Englishtown), games, love matching, audio and video streaming, news, advertising/marketing, travel services, cloud services, etc. Those all deeply influenced human life and work convenience.

The contest between native e-business and tradition-to-e-business is kept on going. Our study issues are "why the firms cannot surpass and are hard to be defeated by each other?" and "how IT and innovative capability influence e-business performance and how the firms set their strategy to face challenge". In this article, we explored the reasons from two groups. We have found, they are difference of innovation, change strategy and development route between native e-business firms and tradition-to-e-business firms in emerging and growth stage. These induced the difference of resource allocation and advantage position in two kinds of firms. We describe as follow:

1. IT and innovation dominate advantage position in emerging stage.

Native e-business exhibited innovation by IT applications based on creative idea of entrepreneur. E-business was their core business, so they dedicated to build competitive advantage. At this time, entrepreneur's idea and IT competence are important capitals for success. Traditional firms adapted "following strategy" when their customer disappeared, building similar e-business which embedded in existing organizational systems. E-business was not their main business and they lack human resource and IT competence. We found that IT competence and creative entrepreneur dominate e-business development and competitive advantage in emerging stage.

2. Complementary Assets dominate advantage position in growth stage.

Native e-business firms were driven by online growing demands and competition in growth stage. They integrated complementary assets and improved team innovative capabilities, by which derived creativeness through IT to sustain competitive capability. On the other hand, the overall resources and innovative capabilities of tradition-to-e-business firms strongly influence performance of its e-business and e-business drives IT investment and IT competence. In growth stage, IT was embedded in routines and operation processes, fostering innovation to e-business.

From RBV view, native e-business firms pioneered entering market and connected complementary resources. It was the first mover and formed resource position advantage [44]. Tradition-to-e-business firms applied existing resources and complementary assets, built online sales channels, combined with brand identity and region advantage. These also formed competitive advantages which are hard to be substituted [5]. Thus, in growth stage, team innovative capabilities and integrated complementary assets dominated firms' competitive advantage.

3. Innovative capabilities and IT competence:

IT plays an important role in e-business. IT achieves creativity and exhibits e-business service value, changes user habits and increases customer loyalty [36]. It is valuable and hard to be replaced by followers [44]. In addition, IT is embedded in organizational routines and processes, stifling creativity and innovation by standardizing operation; it is hard to change [20]. In addition, the development of tradition-to-e-business firms is generally restricted by its IT incompetence and the lack of IT-based innovative thinking, which makes the firms tend to operate conservatively. In interviews, we found that entrepreneurs' IT capability influences e-business innovation. Therefore, it should enhance team innovative capabilities to sustain competitive advantage at growth stage.

4. Innovative capabilities and e-Business value creation:

This article inducted three influential e-business innovative capabilities: creative entrepreneur, customer agility, routines and processes from literature [37] [33] and interviews. By cases studied, we found creative entrepreneur's insight leads innovation and trends; customer agility perceives competition status and customer needs, both triggering innovation. Routines and process improvement evolves innovation; these are helping forces and/or obstacles of business development. At native e-business firms, innovation has been dominated by creative entrepreneur at emerging stage. Conversely, at the growth stage, it has been triggered by e-business online customer needs. For example, the firms may improve e-business service efficiency by integrating physical complementary assets. Tradition-to-e-business firms build e-business by receiving impulse of customer disappearance and organizational innovation capabilities influenced e-business performance at growth stage.

5. Innovative capabilities and Structure inertia:

Structure inertia influences organizational innovative capabilities and firm performance. Especially in organizational development process, innovative capabilities affected innovation efficiency and were influenced by tenure, scale and complexity [20]. At emerging stage, tradition-to-e-business firms relied on their overall resources which limited development performance. At growth stage, the innovation capability of native e-business firms was triggered by e-business self and then transformed to enhance IT competence. Tradition-to-e-business was driven by organizational innovative capabilities and its e-business stimulated firms' overall IT competence improvement. In this stage, IT competence and innovative capabilities of top management influences firm innovative efficiency. Found in interviews, if managers of tradition-to-e-business firms have strong dominance but lack of IT capability, it is adverse to e-business development. If creative abilities of entrepreneurs cannot be transferred to team capabilities in native e-business firms, their future development will be limited.

CONCLUSION

In this empirical case studied, we compared two groups of firms, exploring IT competence and innovative capabilities to find out their interaction with e-business. We interpreted the phenomena of firms' win-win situation by RBV and structure inertia theories. We found that e-business firms with different origins had differentiated strategy, IT resources, and developed tracks at emerging and growth stages. Those have answered our research questions: why the firms cannot surpass and are hard to be defeated by each other, and what is the impact of e-business development on different originated background. The research could guide new entrants of e-business measuring their conditions to make best development strategy in the future:

1. Native e-business firms emerged by creativity. It should compose external resources to sustain competition advantage at growth stage. Chen et al. [7] proposed that de novo firms usually excel diversified firms at early stage after founded. Due to lack of complementary resources and prior-experience of growth, they tend to fail to compete with diversified firms at last. Furthermore, at growth stage, facing stress by followers, the role of creative entrepreneur should be fading off and replaced by building team innovative capabilities. In this way, the firms could foster employees' abilities to sustain long term competition competences.

2. Tradition-to-e-business firms have its brand identity, regions advantage, and operating institutions which formed management path dependency and barriers of across boundary. It is hard to carry out innovation activities with IT and Internet thinking when they are developing e-business. The company should face organizational structure inertia [20] by adjusting routines and processes; it will influence the efficiency and performance of e-business. Hence, tradition-to-e-business should increase IT scale and investment, emphasizes on team innovation, then the company could strengthen e-business effects and enhance total competences with customer satisfaction.

3. Most tradition-to-e-business firms adopted follower strategy provided similar e-services with native e-business, but the brand cognition of consumers was hard to change. The customer loyalty to their e-services was hard to build. Thus, innovation is perhaps more favorable, that is, corporate should explore self advantage by prior-experience to develop differentiation and innovative service regime. Chen et al. [7] stated that diversifying firms have more successful opportunities than de novo firms at late development stage. The key point is dynamic competence which helps the new business derived from diversifying firm to overcome growth obstacle and to mature. Dynamic competence is that when corporate faces growth obstacle and technology discontinuity, they have the capability of re-adjustment, re-adaption and survival. This capability comes from pre-entry experience. Therefore, if traditional service firms could enlarge its core competence on which to expand to multiple innovation services, it may create another successful story. It does not need to follow native e-business firms. e.g. eslite.com expanded its bookstore to diversify shopping store, books.com.tw added website service to physical reading area with seven-eleven chain stores, kinstone.com.tw and liontravel.com enlarged integration of virtual and physical services, those are well direction of change.

4. Innovators may not be final winners [43]. When market grows, if the follower could find and exploit a gap in e-business values, they may reach success as well. Teece [43] proposed innovation cannot increase company profits, but imitators or followers gain the advantage. The key is to acquire complementary assets. From RBV view, it's easy to obtain leading position when a innovative product is the first to market [44]. But if the business is easily imitated, and it has no advanced technology, inadequate marketing channel, low manufacturing capacity or lack of capital and/or strategic partners, etc., they will lose market position and failed by surpass of followers. Therefore, if a new company enters e-business with following

strategy, the best way to obtain competitive leading position is to provide far more powerful service value and complementary resource integration.

5. New entrants may face solid defense by the existing two types of e-business firms which are hard to breakthrough. They should give up imitation and follower strategy, replacing it by differentiation of innovation. This could create a new space beyond the boundary of native e-business firms and traditional service firms. In recent years, many new e-business companies gained outstanding performance. Most of them are dedicated to brand new territory and innovation activities.

In these years, there are various emerging e-business models. This article did not include entire fields. For example, new established firms composed of both virtual and physical services are out of discussion (e.g. health care devices with cloud services integration). Besides, we merely studied the firms which still exist in the market to understand why they are surviving; we have not discussed the firms which were defeated. Further, we did not discuss the firms which stayed in traditional field as well as the purely innovative e-business firms which have no equivalent physical rivals. We focus on studying the competition between native and tradition-to-e-business firms. Future scholars may study the competition and transformation between companies under different business models to interpret industrial change and management thinking on next generation.

REFERENCES

[1] Amit R., Schoemaker P. (1993) 'Strategic assets and organizational rent. *Strategic Management Journal*', Vol.14, No.1, pp. 33-46.

[2] Amit R., Zott C. (2001) 'Value Creation in E-Business', *Strategic Management Journal*, Vol. 22, pp. 493-520.

[3] Barczak, G., Hultink, E.J., & Sultan, F. (2008) 'Antecedents and Consequences of Information Technology Usage in NPD: A Comparison of Dutch and U.S. Companies', *Journal of Products Innovation Management,* Vol. 25, pp.620-631.

[4] Bakos Y., Brynjolfsson E. (2000) 'Bundling and Competition on the Internet', *Marketing Science.* Vol. 19, No. 1, pp. 63-82.

[5] Barney J. B. (1991). 'Firm resources and sustained competitive advantage', *Journal of Management,* Vol. 17, pp. 99-120.

[6] Chang Y.C., Linton J.D., Chen M.N. (2012) 'Service regime: An empirical analysis of innovation patterns in service firms', *Technological Forecasting & Social Change*. Vol. 79, pp. 1569-1582.

[7] Chen P.L., Willians C.S., Agrwal R. (2012). 'Growing Pains: Pre-entry experience and the challenge of transition to incumbency', *Strategic Management Journal*, Vol. 33, pp. 252-276.

[8] Chen P.Y., Hitt L.M. (2002) 'Measuring switching costs and the determinants of customer retention in Internet-enabled businesses: a study of the online brokerage industry', *Information Systems Research*. Vol. 13, No. 3, pp. 255–274.

[9] Anderson, C. (2004) The long tail. *Wire magazine*. October.

[10] Cohen W.M. (1990) 'Absorptive capacity: a new perspective on learning and innovation', *Administrative Science Quarterly*, Vol. 35, pp. 128-132.

[11] Creswell, J. W. (2003) *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*, Thousand Oaks, CA: Sage.

[12] Dai Q., J. Kauffman R.J. (2002) 'Business models for internet-based B2B electronic markets', *International journal of Electronic Commerc*e, Vol. 6, No. 4, pp. 41-72.

[13] Dodet G. (2008). 'Customer satisfaction and loyalty in service: Two concepts, four constructs, several relationships', *Journal of Retailing and Consumer Service*. Vol. 15, pp. 156–162.

[14] Doern R.R. & Fey C.F., (2006) 'E-Commerce developments and strategies for value creation: The case of Russia. Journal of World Business', Vol. 41, pp.315-327.

[15] Durmusoglu, S.S. & Barczak G. (2011) 'The use of information technology tools in new product development phases: Analysis of effects on new product innovativeness, quality, and market performance', *Industrial Marketing Management,* Vol. 40, pp. 321-330.

[16] Fraumeni, B.M. and Okubo, S. (2002) 'R&D in the national income and product accounts: a first look at its effect on GDP', Bureau of Economic Analysis, WP2002-01, paper presented at The Conference on Measuring Capital in the New Economy, April 26-27, available at: www.bea.gov/bea/papers/R&D-NIPA.pdf.

[17] Gallouj F. & Weinstein O. (1997) 'Innovation in service' *Research Policy*, Vol. 26, pp. 537-556.

[18] Gordon, S. & Tarafdar, M. (2007) 'How do a company's information technology competences influence its ability to innovate?', *Journal of Enterprise Information Management*, Vol. 20, No.3, pp. 271-290.

[19] Gulati R., Garino J. (2000) 'Get the right mix of bricks & clicks', *Harvard Business Review*. May-June.

[20] Hannan M.T & Freeman J. (1984) 'Structure inertia and organizational change', *American Sociological Review*. Vol. 49, No. 2, pp. 149-164.

[21] Hernández B., Jiménez J., M. Martín J. (2009) 'Key website factors in e-business strategy', *International Journal of Information Management*, Vol. 29, No. 5, pp. 362–371

[22] Hung S.C. (2004) 'Explaining the process of innovation: The dynamic reconciliation of action and structure', *Human Relations*, 57,11.

[23] Kotler P. (2002) 'Country as brand, products, and beyond: A place marketing and brand management perspective', *Journal of Brand Management*. Vol. 9, No. 4, pp. 249.

[24] Kotler P. & Keller K.L. (2012) Marketing Management. *Pearson Education Limitd*. 14e (Global Edition), pp. 262-290.

[25] Lee, A.S. (1989) 'A scientific methodology for MIS case studies', *MIS Quarterly*, Vol. 13 No. 1, pp. 33-49.

[26] Lee M.K.O., Turban E. (2001) 'A trust model for consumer internet shopping', I*nternational Journal of Electronic Commerce*, Vol. 6, No. 1, pp. 75-91.

[27] Liang Huigang, Saraf N., Hu Q. & Zue Y. (2007). 'Assimilation of enterprise systems: the effect of institutional pressures and the mediating role of top management', *MIS Quarterly*. Vol.31. No. 1. pp.59-87.

[28] Liebowitz S. J. & Margolis E.S. (1994) 'Network externality: an uncommon tragedy', *Journal of Economic Perspectives*. Vol. 8, No.2, pp. 133-150.

[29] Lincoln Y.S. & Guba E.G. (1985) Naturalistic inquiry: Beverly Hills, CA: Sage Publications.

[30] McKnight D.H., Choudhury V. & Kacmar C. (2002) 'Developing and validating trust measures for e-commerce: an integrative typology', *Information Systems Research*. Vol. 13, No. 3, pp. 334-359.

[31] Nambisan, S. (2002) 'Software form evolution and innovation-orientation', *Journal of Engineering and Technology Management*, Vol. 19, No. 2, pp. 141-165

[32] Nambisan S. (2013) 'Information technology and product/service innovation: a brief assessment and some suggestions for future research'. *Journal of the Association for Information Systems*. Vol. 14, Special issue, pp. 215-226.

[33] Napier N. & Nilsson M. (2006) 'The development of creative capabilities in and out of creative orgainzations: Three case studies', *Creativity and Innovaiton Manageemnt*. Vol.15, No.3, PP.268.

[34] O'Reilly Tim. (2007) 'What is web 2.0: design patterns and business models for the next generation of software', *Communications & Strategies*. No. 65, pp. 17.

[35] Pavlou P.A. & Omar A.E. (2006) 'From IT leveraging competence to competitive advantage in turbulent environments_the case of new product development', *Information Systems Research*. Vol.17, No.3, pp. 198-227.

[36] Ray S., Kim S.S. & Morris G. (2012) 'Online users' switching costs: their nature and formation', *Information Systems Research*, Vol. 23, No. 1, pp. 197–213.

[37] Sambamurthy V. et al. (2003) 'Shaping agility through digital options: Reconceptualizing the role of information technology in comtemporary firms', *MIS Quarterly,* Vol.27, No.2, pp. 237-263.

[38] Shankar V., Smith A.K. & Rangaswamy A. (2003) 'Customer satisfaction and loyalty in online and offline environments', *International Journal of Research in Marketing*. Vol. 20, pp. 153-175.

[39] Smith MD., Bailey J. & Brynjolfsson E. (1999) 'Understanding digital markets: review and assessment', in Brynjolfsson E, Kahin B (eds), *Understanding the Digital Economy*, MIT Press: Cambridge, MA; pp. 99–136.

[40] Song L.Z. & Song M. (2010) 'The role of information technologies in enhancing R&D-marketing integration: an empirical investigation', *Journal of Product Innovation Management*, Vol.27, p.382-401.

[41] Soto-Acosta P. & Merono-Cerdan A. L. (2008) 'Analyzing e-Business value creation from a resource-based perspective' *International Journal of Information Management,* Vol. 28, pp. 49-60.

[42] Subramaniam M., Youndt Mark. A. (2005) 'The influence of intellectual capital on the types of innovative capabilities', *Academy of Management Journal*, Vol.48, No.3, pp.450-463.

[43] Teece D.J (1986) 'Profiting from technological innovation: Implications for integration, collaboration, licensing and public policy', *Research Policy*, Vol. 15, pp. 285-305.

[44] Wernerfelt B., (1984) 'A resource-based view of the firm', *Strategic Management Journal*, Vol. 5, pp. 171-180.

[45] Williamson O.E. (1979) 'Transaction-cost economics: the governance of contractual relations', *Journal of Law and Economics*, Vol. 22, No.2, pp.233-261.

[46] Yin, R. K. (1989) *Case Study Research: Design and Methods*, Sage: Newbury Park, CA.

[47] Yin, R.K. (2003) *Case Study Research: Design and Methods*, 3rd ed., Sage Publications, Newbury Park, CA.

APPENDIX

Appendix 1: Study components and sample questions

Study Components	Sample Questions
• Innovative capabilities	● Creative entrepreneur - How does your company build organizational culture of entrepreneurship? How does the innovative leader head entrepreneurs? Please list the successful cases. ● Innovative agility - How to find innovation opportunities from customer response, partner collaboration and duties running? ● Organizational routines and processes - How do routine jobs and work procedures derive innovative ideas, or do they become inflexible due to Structure Inertia? - Does tenure, scale, and operational complexity increase routine jobs and work procedures? How do you change it?
• e-Business value creation	● Novelty - What innovation services or activities does your website provide? Please describe some examples.

	● Efficiency - Does your website offer any highly efficient operation environment or service delivery? How do you measure them? ● Lock-in - How do your company luck-in customer by your website? ● Complementarities - How do you design a physical and virtual service complementarily mechanism?

• IT competence	● IT investment
	- How much does your company invest on IT annually?
	● IT capabilities
	- How many professional IT employees do you hire? Their average seniority?
	- What is the status of IT system use by employees? Do you implement training courses?
	  - How do you apply IT on business systems, customer management, supply chain management and new product development?
	  - How do you apply IT on value creation of Internet service?

• Innovative capabilities → e-Business value creation	● Creative entrepreneur - How do entrepreneurs' ideas or insights lead e-business innovation? What are the results? ● Innovative agility - How do you stimulate e-business innovation by responses from customers or collaborating partners? What are the results? ● Organizational routines and processes - How do you derive innovation ideas from routines and operation procedures? - Do routines and processes form Structure Inertia, which delays e-business innovation?
• IT competence →Innovative capabilities	● Creative entrepreneur - Do the leading entrepreneurs have strong IT capability? How do their insights realize IT application and creativity? ● Innovative agility - How do customers, collaborating partners and business systems provide feedback by using IT systems? What is the feedback mechanism? ● Organizational routines and processes - What are the internal operating procedures that have adopt IT systems?
• IT competence →e-Business value creation	● Novelty - How do you present novelty concepts to approach customers by using IT on the website? ● Efficiency - How do you utilize website to apply IT system on efficient innovation? ● Lock-in - How do you design a mechanism to lock-in customers by IT? ● Complementarities - How do you create complementarities (physical and virtual/service demo/promotion activities…) on website by IT?
• IT competence → innovative capabilities to e-Business value creation	● Creative entrepreneur - How do you inspire entrepreneurs' ideas to implement e-business value creation by using IT? What are the examples? ● Innovative agility - What is the contribution from stimulating innovation and deriving e-business value creation by applying IT system to create close relationship between customers and collaborating partners? ● Organizational routines and processes - What are the experiences of embedding IT into routines and procedures and derive improvement and innovation ideas? - Do IT systems cause rigidity of routines and processes and delay opportunity to change?
● Important event →Innovative capabilities/ e-Business value creation / IT competence →Management Strategy	● Please describe the important events (establishment, innovation, transformation, etc.) and time schedule in your company that affect e-business. ● Please describe the background and meaning of those important events. ● Please describe the roles of IT and innovation in important events based on RBV view. ● Please describe the change/barriers/effects of organization, routines, procedures based on structure inertia's view. ● How do you increase new customers, retain existing customer, attract early adopters, and motivate customers and brand loyalty? What are your strategic moves? ● Does your techniques come from self-development, outsourcing, merging, or industry cooperation? What are your strategic moves? ● Please describe the strategy/results/impacts of important events and activities.

Appendix 2: A summary of interview questions

Themes	Questions
- Innovation activities and e-business	● Please describe some examples of innovation activities that influence your online services (e.g. group establishment, new product or services development, corporate collaboration transformation…)? What is the origin of the innovation? And what is the impact?
- Contribution by innovation - IT investment and use	● What is the contribution of IT in those innovation activities? ● How do you apply IT systems to online services (e.g. integration with customer relationship system)? Please describe some events.
- Organization routines and processes - Agility - Entrepreneurship	● In what circumstances does the change of routines and procedures stimulate or delay those innovation activities? ● What are the roles of customers, collaborating partners, and competitors in those innovation activities? ● Is entrepreneurship in your organizational culture? Does it influence the motivation of innovation activities?
- IT competence with routines and processes - IT investment	● What are the applications of IT in your routines and operating procedures (e.g. customer relationship, supply chain, signature/knowledge system)? How do they help stimulate innovation activities?
- e-business value creation	● Does your IT come from self-development, outsourcing, partial outsourcing, or strategic collaboration? What are the pros and cons?
- Strategy development	● Some researches indicated that e-business value includes four dimensions: novelty, efficiency, luck-in and complementarities. What is the direct contribution of IT on each dimension in your company? ● How does your company consider selecting IT capabilities and innovation capability in strategic selection?

Appendix 3: Interview Survey

<div align="center">

Interview Questionnaire
</div>

This questionnaire is to understand the respondents' perception of research questions, strengthen researchers' exploration depth and avoid cognitive biases by interview. Please select your answer in the proper □ from our interview that you talk about the innovation activity or project.

Innovation activity or project: _____

	Not very important → Very important						
	1	2	3	4	5	6	7
1. The entrepreneurs' ideas, insights, and strategies influence value innovation in this project.	□	□	□	□	□	□	□
2. Customer relationship and systems trigger the value innovation agility in this project.	□	□	□	□	□	□	□
3. Routines, internal procedures and systems trigger and derive value innovation in this project.	□	□	□	□	□	□	□
4. Routines and internal procedures delay value innovation in this project.	□	□	□	□	□	□	□
5. The scale, seniority, and complexity delay our e-business value innovation.	□	□	□	□	□	□	□
6. IT capabilities influence our entrepreneurs' idea, insights and strategic concepts.	□	□	□	□	□	□	□
7. IT capabilities influence our application of customer relationship systems and the ability of innovation.	□	□	□	□	□	□	□
8. IT capabilities influence our business systems application and innovation agility.	□	□	□	□	□	□	□
9. IT capabilities influence novelty design in this project (activity).	□	□	□	□	□	□	□
10. IT capabilities influence benefit design in this project (activity).	□	□	□	□	□	□	□
11. IT capabilities influence customer luck-in design in this project (activity).	□	□	□	□	□	□	□

12. IT capabilities influence complementarities design in this project (activity).	☐	☐	☐	☐	☐	☐	☐
13. IT capabilities influence entrepreneurs' ideas, insights and strategic concepts in this project (activity).	☐	☐	☐	☐	☐	☐	☐
14. IT capabilities influence the triggering of value by customer agility in this project (activity).	☐	☐	☐	☐	☐	☐	☐
15. IT capabilities influence the triggering of value by routines and processes in this project (activity).	☐	☐	☐	☐	☐	☐	☐

Appendix 4: Data sorting and keywords