The Application of Dynamic Capabilities in E-commerce Innovation Context

---The Implications for Chinese E-commerce companies

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SUMMARY

This study mainly investigated how Chinese E-commerce companies should cope with E-commerce innovation with specific dynamic capabilities. E-commerce (Electronic Commerce) innovation includes three phases of innovation based on technology and time. They are web-based commerce, mobile commerce (M-commerce) and ubiquitous commerce (U-commerce). They caused not only technological changes but also organizational changes.

To cope with E-commerce innovation, a prerequisite is to understand the impacts and changes brought by the innovation. Previous researchers Afuah and Bahram (1995) have proposed a hypercube innovation model to depict the relationship between innovation entities and diverse of participants of innovation value-added chain, forcing enterprises to face what the influence from their innovation will be on their stakeholders. Wu (2004) developed a new hypercube model of E-commerce innovation, explaining that impacts of E-commerce innovation should be based on both internal factors like technological component and business model and external factors like industrial partnerships. Based on the finding, the types and details of impacts caused by E-commerce innovation have been discussed in the study.

Dynamic capabilities have been found that could help E-commerce company to identify emerging opportunities, renew its competences and keep its competitive advantages in a dynamic business environment. Further development of core dynamic capabilities that are necessary for E-commerce company transformation in different phase of E-commerce innovations were proposed in two dimensions, technological component and business model.

For scientific preciseness, we have exemplified a successful case of Japanese E-commerce company (NTT DoCoMo). It helped to examine and prove the practicability of hypercube model of E-commerce innovation and feasibility of dynamic capability in helping E-commerce companies to cope with E-commerce innovations. The similarity and relativity of E-commerce companies in China and Japan have been found based on the comparison of technology, market opportunity, E-commerce innovation, customer value and network perspectives.

In order to cope with E-commerce innovation successfully, Chinese E-commerce companies should improve five dynamic capabilities based on Chinese specific environment and conditions. They are: 1, choosing enabling technology, like 3G technologies. 2, matching with economic opportunities, like focus on entertainment market. 3, executing business innovation, like facilitate innovation of handset functions. 4, understanding customer value, like investigate more reduce switching cost for customers. 5, constructing alliance with co-opetitors, like establish safe payment mechanism with banks etc.
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1 Introduction

This is the introductory chapter where the readers will comprehend the understanding of the topic that the thesis will discuss. The problem background guides readers to the main research question which will be detailed by the purpose of this study. Further disposition will be introduced at the end of this chapter for helping to outline the whole thesis.

1.1 Problem Background

Today, as far as we concern, the business world is changing. Electronic commerce (E-commerce) as a novel business pattern is depended on the Internet and the original technology from the telecommunications and network computing (Zwass 2003, P 9-10). With the speedy expansion in ICT (Information and Communication Technologies), the development of E-commerce have been witnessed by all of us, which facilitated the changes in the development of E-commerce. If we identify the evolution of E-commerce based on technology and time, there should be three waves.

The appearance of Internet has introduced the first important wave of change. Our communication models have been changed that we have become more and more rely on Internet. We communicate with each other via e-mail and we interact with enterprises by their website. With the advent of Internet wave and rapid development of it, it has facilitated the expansion and innovations in online business. And this is referred to the first wave in E-commerce, Web-based commerce.

The second wave which is considered to change the way in our life styles, even in the whole commercial society, that is the mobile wave. “It is the explosion of applications and services that are becoming accessible from Internet-enabled mobile devices” (Soroor, 2006, P260). It also led the business transaction never be constrained by geographical locality. In this case, the commercial boundary and interpersonal confine become illegibility and the door to a slew of new applications and services are opened. We can do communication and transformation any time just as our wish. The mobile devices are enabling a service platform for E-commerce, which is called as mobile commerce (M-commerce). (Varahney et. al 2000).

In recent years, lots of researcher have took notice of one new wave of E-commerce, due to the advent of this wave, it enabling unconstrained space and time for the people in all over the world along with the ubiquitous networks and devices were applied (Fano and Gershman 2002, P64). Meanwhile, the traditional barriers of time, geography, currency and access will erode and eventually cease to exist in this wave, and it is thought as the natural evolution of Web-based commerce and M-commerce.
that we will join in a brand-new era of E-commerce that have fundamental difference with traditional E-commerce. This emerging modality of E-commerce is call as ubiquitous commerce (U-commerce) (Watson, et al., 2002, P332).

The innovation of ICT usually arose the changes within organization (Markus 2004, P5-17). Indeed, many enterprises meet many substantial challenges from the fast development of E-commerce: from Web-based commerce, M-commerce to U-commerce. New issues of management within these enterprises emerge quickly. For E-commerce companies, changes are a main problem that they have to face (Wheeler 2002, P125, Daniel and Wilson 2003, P282). Not only ICT applications but also business model and stakeholders of E-commerce companies will have essential influence caused by the E-commerce innovations (Wu, 2004, P 389). To face the challenge of the changes, understanding what the dynamics capabilities are useful and how to cope with them that is significantly important for the E-commerce company (Straub 2001, P345, Markus 2004, P19). Thus, an efficient research of E-commerce innovation is necessary.

Furthermore, as we know the E-commerce field is portrayed by rapid change. From a standing point for traditional organization, there are two kind of organizational capabilities - destroying and enhancing exist in organization when the changes happened (Afuah, 2003, P283-293). However, these capabilities can not offer the competitive advantage for the E-commerce company when they have to face the changes (Daniel and Wilson 2003, P286-293). Instead, E-commerce companies are facilitated to adapt the ICT innovations and their novel business structures by renovating the current capabilities instead of insisting them. Such capabilities are referred to dynamic capabilities of companies, which are mainly consisted by strategy management of companies, are considered as important to lead company to be successful in such fast change E-commerce environments. Therefore, to understand what the dynamic capabilities is and how to develop them to avoid negative influence will be necessary and challenge for E-commerce companies.

China, one of the fastest growing countries and biggest markets in the world, is being converted during the waves recently. It is easy to see, being affected by three waves of Ecommerce innovation, that most of the E-commerce companies in China tend to be transforming from Internet-commerce to Mobile-commerce. According to the survey of Juniper Research (2007), a market research company, there are 400 million mobile phone users in China. Thereof, 200 million of them are SMS users and more than 10 million are mobile WAP users. The number of mobile phone user is not only large but also fast growing. Based on the research, the number is keeping on increasing in 20%, particularly, the increasing rate of WAP users get to over 100% per year (Yangkai, 2006, China Internet Weekly). Moreover, along with the development of global M-commerce, the scale of M-commerce application market in China would be predicted to reach 30.65 billion (Xue Juan, 2006, China Economic Times). In China, it is believed that there are 60% of all enterprises are expecting to change business
approach into one based on wireless system, such like SMS or WAP (Zhu Quanfeng, 2006, China Computer World). All of these have showed us a huge potential power of development for Chinese M-commerce.

1.2 Problem Statement

- How should the E-commerce companies in China cope with changes and impacts from E-commerce innovation by recognizing and developing their dynamic capabilities?

1.3 Purpose

We use the expression E-commerce innovation to describe the change emerging from novel organizational application of E-commerce. Inspired by the growing impact of E-commerce innovation, our research is aimed to help business managers and IT specialists to understand, control, and cope with the impact of changing E-commerce innovation on their organization in such a specific and complicated Chinese environment. That is, the research is intended to reflect the problems, and find out the solutions facing the E-commerce companies in China.

So the objectives of our study can be referred to:

(1) Clarify the important changes and impact on the E-commerce stakeholders among E-commerce innovations by using the E-commerce innovation hypercube model. (a model used to analyze the emerged innovation of E-commerce and examine the possible impact of it);

(2) Explore and develop the core dynamic capabilities that necessary for E-commerce company transformation among E-commerce innovations.

(3) Identify specific dynamic capabilities of E-commerce companies that are necessary for E-commerce innovation in China and investigate guidelines for developing these capabilities.

1.4 Further Disposition of the Thesis

Chapter 2. Research method

This chapter will provide the readers an understanding of how our research has been approached. It also explain in what perspectives we apply to pursue our major topic and what source of literature and information we have been used to achieve this research.
Chapter 3. Theoretical framework
This chapter will present to readers with the theory of hypercube model that we thought is better to describe E-commerce innovation in all relevant literature. And it also gives readers a clear explanation of the impact to the stakeholder in E-commerce innovation and relevant literature of dynamic capabilities.

Chapter 4. A development of theory on dynamic capabilities for E-commerce companies
Dynamic capabilities are considered to be critical for E-commerce company to avoid negative impact. In this chapter, we will identify all the necessary dynamic capabilities needed by E-commerce company.

Chapter 5. Practical method
This chapter will give readers a general idea of how have we achieved our empirical study, and what source of scientific literature and information we have used. Further, it also present in what analytical way did we gain the strategy for Chinese E-commerce companies.

Chapter 6. Exemplifiable case study for Chinese E-commerce companies
We will illustrate a successful case of NTT DoCoMo in Japan for describing the influence of E-commerce innovation from Web-based commerce to M-commerce in this chapter. And also present how they transferred successfully by developing their dynamic capabilities.

Chapter 7. Analysis and implication towards the development of Chinese E-commerce companies
In order to identify the specific condition and restriction of Chinese E-commerce companies development from Web-based commerce to M-commerce and find out the suitable dynamic capabilities for them to apply and develop, we will launch a comparison of E-commerce in Japan and China. Further, in this chapter, the guideline for the development of Chinese E-commerce companies will be presented to readers.

Chapter 8. Conclusion
In this chapter, we will start with restating the problem statement as well as the purpose of this research, conclusion of our study will be following, and this chapter will be ended with the contribution of the study.
2 Research Methodology

This chapter consists of the choice of subject, preconceptions, perspectives, epistemology, scientific approach and research method, which gives readers a general understanding of why authors choose the topic of this study and how authors approached the main research problem in a scientific and investigative way.

2.1 Choice of Subject

Deciding to research in entrepreneurship field seems like a definite direction for us, since both of us have strong knowledge background and abundant interest of Business Administration, and the major of our master program is entrepreneurship as well. But to choose one of subject from such a huge and diverse field is not an “easy coming” mission.

But the authors found that the business focus of the world could be in China and one of the fastest growing business areas is considered to be electronic business. After having some information searching, the authors realized that Chinese E-commerce companies have being transferred from web-based commerce to Mobile-commerce, according to our sensitive business inspiration, there should be many unperfected knowledge could be developed in such specific environment and period. Additionally, one of us has strong interest of electronic relative field but obviously both of our knowledge was limited on nothing but definitions and descriptions of the field. The intense interest together with limited knowledge brought a strong desire and enthusiasm to challenge the domain of E-commerce.

Additionally, it is gradually more vital for E-commerce companies to understand and manage appropriately the dynamics of E-commerce innovation from both the organizational and technological perspectives during period of the revolution of E-commerce (Straub 2001, P345, Markus 2004, P19). We found an excellent meeting-point between knowledge of entrepreneurship and E-commerce, which is identifying and using dynamic capabilities of organization in E-commerce innovation to avoid the negative impact on stakeholders. We believe this research would be practical for Chinese E-commerce companies to get over the impacts from E-commerce innovation.

2.2 Preconceptions

An approaching of preconceptions of the researchers is an intricate matters based on researchers’ social background, experiences, interests, education, knowledge and skill
etc. Everyone has difference preconceptions and those could influence their estimation, opinion and behaviors, which might affect the research direction and result. Additionally, the readers could be affecting to understand the research approach as well as its analysis. (Nath & Rönnholm, 2004, P6)

Both of us come from China. It means that we have same social background and language. So we don’t have problem concerning conversation and comprehension. Additionally, we have the same education background, for we have the same bachelor’s degree in business administration in the same university and we are studying in the master program of entrepreneurship in Umeå University as well.

According to our Chinese social background and experience together with the understanding from Chinese fast growing economy, the attitude of ours has been shaped that E-commerce will keep developing rapidly and its innovation will bring many changes and impacts to the E-commerce companies and their stakeholders within such a dynamic business context. From business administration perspective, we also believe that normally these changes and impacts could appear not only in technological aspects but also administrative aspects within the companies. Inspired by theoretical foundation and knowledge of entrepreneurship, dynamic capabilities of a company could be thought that they can help to keep and enhance its competitive advantages. Therefore, we decided to approach the settlement for E-commerce companies to cope with impacts and changes from E-commerce innovation by using their dynamic capabilities.

2.3 Perspectives

When conducting research within social sciences it is necessary for researchers to choose a perspective to start their investigation. In general, the perspective is the starting point of the research. It works as a lens through the researcher views and interprets what the research reality is. Therefore, the perspective naturally from the purpose of the research, which means that different issues will be recognized and investigated depending on who is coped with the issues. A student would have vastly different perspectives to look through the issue, because the insight of students is still theoretical and depending on what knowledge they gained.

Hence, in our opinion, to develop a theoretical perspective is an important stage to explain a phenomenon or develop knowledge. This stage does not only contribute to concretizing our research problem, but also affects the scientific ideal and the design of the strategy of research.

We are going to approach the research problem of the study along with entrepreneurial perspectives. In our opinion, the perspectives will also be interested for entrepreneurial researchers who are studying in innovations of E-commerce as well as the managers of E-commerce companies. Since the common standing point
should be: in order to keep their own competitive advantages, how E-commerce companies should utilize their internal and external resources (dynamic capabilities) effectively to match emerging market opportunities (E-commerce innovations). Based on these, we are going to provide valuable advices for the development of the E-commerce companies in China.

2.4 Collection of Theoretical Material

First of all, we established a basic brief about what the research problem we should focus, and created a criterion to search the theoretical materials. The theoretical material should serve to the research problem since it implicates what sort of theoretical materials should be clarified to approach the research problem. Thus, in order to move toward the main research problem, we divided the research problem as three criterions for searching theoretical materials. These criterions can be showed respectively as following: (1) What changes could be brought form E-commerce innovation; (2) How these changes impact the E-commerce companies and their stakeholders; (3) What dynamic capabilities could help E-commerce companies to cope with these impacts from E-commerce innovations.

Initially, we use the theoretical keywords such as E-commerce, Hypercube Innovation Model, and Dynamic Capability etc. in different searching engines and online scientific databases or the database system of Umeå University to find relevant high-reliability literatures, scientific articles and other useful information. Respectively, we used ALBUM and LIBRIS in Umeå University to obtain relevant literature. For scientific articles, we used databases such as Business Source Premier (EBSCO), Emerald Fulltext, ScienceDirect and so on. Besides, we have also used the internet to search the theoretical materials in current study.

Concerning the theoretical material evaluation, most of the scientific articles are chosen from diverse scientific journals and most of the literatures are written by researcher who has predominant achievement in this domain. Therefore, we believed our theoretical materials are reliable and relevant for current study.

2.5 Epistemology

According to Myers (1997, MISQ Discovery), the assumptions should be the basis adopted by whatever quantitative or qualitative research, which is about what validate research and which research methods are suitable. Hence, identifying what these assumptions are is vital.

“Epistemology refers to the assumptions about knowledge and how it can be obtained”. (Myers, 1997, MISQ Discovery) Relied on research epistemology there appear two types: positivist and interpretive. Positivists are based on the assumptions
that reality is properties that can be measured and it is objectively given. Positivist research is used to test theory and raise the predictive understanding of natural phenomena. In contrast with positivist study, interpretive study usually starts accessing to reality with the assumption through social constructions like consciousness and language (Myers, 1997, MISQ Discovery). In the research of IS, interpretive methods are “aimed at producing an understanding of the context of the information system, and the process whereby the information system influences and is influenced by the context” (Walsham, 1993, P 4-5).

Focusing on this study, information systems are created and used by E-commerce companies. Since they represent the relationship of information technology and organizational changes within E-commerce companies, the authors assume that the E-commerce companies and their stakeholders could be influenced by E-commerce innovation which is an innovation based on the technological changes of information and communication. Therefore, in this study, interpretive will be adopted to understand what changes and impacts are brought by E-commerce innovation. And it is also useful for incumbent E-commerce companies to choose appropriate capabilities and cope with these impacts.

2.6 Scientific Approach

According to Hyde (2000, P83), there are two general approaches to conducting any research, which is inductive approach and deductive approach namely. Inductive approach is a theory establishing process, starting with observations of specific instances, and seeking to establish generalizations about the new phenomenon under investigation (Hyde, 2000, P 83). Deductive approach is the opposite of the inductive approach, which is a theory testing process, which commences with existing theory, and seeks to understand if the theory applies to specific illustrations (Hyde, 2000, P 83).

In the current study, the authors adopt both inductive approach and deductive approach, in spite of the authors understood that the inductive and deductive approach have different function and purpose respectively. In considering issues, this study employs the NTT DoCoMo’s i-mode as a successful case to verify the practicability and applicability of E-commerce innovation hypercube model.

On the other hand, this study is also about to develop dynamic capabilities theory in both technological components and business model perspectives for E-commerce companies to adapt E-commerce innovations based on previous E-commerce dynamic capability theory. As mentioned above, the authors thus believe that both deductive and induction approach are appropriate in current study.
2.7 Research Method

Research methods can be classified in diverse ways. Here we focus on the most common distinctions between qualitative and quantitative research methods.

**Quantitative research methods** were one type of research methods developed for the study of natural phenomena. The common quantitative methods include laboratory experiments, survey methods, and formal methods such as econometrics, and numerical methods such like mathematical modeling (Myers, 1997, MISQ Discovery).

**Qualitative research methods** were referred to any types of research which use non-statistical processor other quantitative methods to obtain the examination. Qualitative research methods were invented for researchers to investigate cultural and social circumstances including people’s lives, emotions, feelings, behaviors and experiences etc. Normally, researchers often use case study, ethnography and action research as qualitative research methods. Likewise, qualitative data is used as well, for example documents, texts, interviews, observation data of partaker are taken typically, as well as the impressions and understanding of social and cultural phenomena of researchers. Organizing a theoretical illustrative system to figure out the conception and connection of primary data by using non-quantitative process can be regarded as the objectives of qualitative research (Myers, 1997, MISQ Discovery).

Considering the current study, the qualitative research method was chosen by the authors to approach the main research problem. The reason of the choice should be as following: initially, qualitative data was applied in this study instead of data collected original from primary data, such as archival (secondary) data, impressions of previous researchers’ etc. And the authors will launch a case study of NTT DoCoMo’s i-mode to explain a contemporary phenomenon (E-commerce companies’ transformation) within its real-life context (E-commerce innovation) and validate the applicability of E-commerce hypercube model in a non-quantitative procedure. Further, the comparative analysis will be used in comparison of E-commerce in Japan and China rather than a quantitative analysis with collecting data from these two countries. Hence, adopting qualitative research method in current study should be thought to be valid.
3. Theoretical Framework

3.1 E-commerce

Zwass (1996, P 3) defined the E-commerce is the business information sharing, business relationships keeping, and conducting business transactions that is buying and selling of goods and services by telecommunications networks. Schlueter & Shaw, (1997, P 20) propose that E-commerce is a conception which is integrating by technology and business modeling. However, Kalaota and Whinston (1997, P 3) argue that E-commerce has various definition, it is just a point of which lens is used to views with the E-commerce. Therefore, they suggest defining E-commerce from four perspectives:

- “From a communications perspective, E-commerce is the delivery of information, products/services, or payments via telephone lines, computer.

- From a business process perspective, E-commerce is the application of technology toward the automation of business transactions and workflow.

- From a service perspective, E-commerce is a tool that addresses the desire of firm, consumers, and management, to cut service costs while improving the quality of goods and increasing the speed of service delivery.

- From an online perspective, E-commerce provides the capability of buying and selling products and information on the Internet and other online services.”

Briefly, E-commerce could be portrayed as: in internal and external organizational environment, a wide scope of commercial activities within the value-added chain is combined with the application of computing and communication technologies. Meanwhile, the inter-organizational processes of sell-buy relationship based on market and collaboration together with intra-organizational processes form the commercial activities of E-commerce. Further, the goal of E-commerce is regarded as the generation and exploitation of business value by researchers (Kalaota and Whinston 1997, P 3).

3.2 The Development of E-commerce

As what we introduce in the first part of our research, E-commerce has been developed as one of the most important business patterns in business field. The improvement of E-commerce application resulted from E-commerce technologies
changed by network computing that we were aware of. This is exactly follow what Zwass (2003, P 9-10) has said, both compound developments related to Internet and organizational and technological evolutions coursed by the telecommunications connected with network computing are the basis of E-commerce nowadays.

According to the research of Lyytinen and Rose (2003, P 557) as well as Wu (2004, P391), web-based computing, mobile computing and ubiquitous computing are identified as the gradual development of technology in network computing. These technological changes of network computing directly have being support the evolution of E-commerce, and they could be portrayed as below:

**Web-based computing:** refers to the application of web-based technologies like Java, Hypertext Transport Protocol (HTTP) and so on. Sharing the general global information infrastructure, web-based computing could be present as global hypertext publishing, universal readership of content, and the client-server interaction. (Kalaota and Whinston 1997, P6).

**Mobile computing:** refers to using a computing device which could be portable or wireless devices while in transit. It is distributed computing that requires the activity of mobile computing be connected to and through the internet or to and through a private network wirelessly (Wikipedia, 2007). Mobile computing enables the work process such as transferring and obtaining data whenever and wherever wanted, even from somewhere where it was not previously possible. (Varshney et al. 2000, P35)

**Ubiquitous computing:** refers to an emerging branch of computing devices that are seamlessly imbedded in the background to service preconfigured purpose (Weiser, 1993). “It is also a paradigm shift where technology becomes virtually invisible in our lives. Instead of having a desk-top or lap-top machine, the technology we use will be embedded in our environment (Marcia, R., 1997)”.

According to Markus and Robey (1988, P584-586)’s point of view, new information technologies (IT) adoption often stimulates organizational changes, and the organizational changes will follow the track of IT as well. As far as we could witness, over the past decade, the innovation of E-commerce application was stimulated by powerful technological development of IT and the rapid growing demand of electronic market. Obviously, with the appearance and innovation of web-based computing technologies since 1993, the application of E-commerce has being led to a new form, which is called by most of organizations Web-based commerce.

As information technologies is developing, the application of E-commerce domain is witnessed a new significant transformation recently. As many of us may know that mobile commerce (M-commerce), which is based on the wireless and mobile computing technologies, appears as a new vocabulary of organizations’ languages. For example, i-mode of NTT DoCoMo Company could be regarded as a very
successful M-commerce applications in Japan, even in the world. According to the investigation of Juniper Research (2007), there are about 300 million users of mobile commerce in the world, and this number will reach 1.6 billion in 2009. And the relevant income of M-commerce will increase from 25 billion to 88 billion globally (Juniper Research, 2007). As Kalakota and Robinson (2002) described, the race for dominance in M-commerce has begun.

Consequently, following the track of what we discuss above, there are reasonable facts to believe that the innovation of ubiquitous computing will present a huge impact of E-commerce applications, which could be portrayed as ubiquitous commerce (U-commerce) enabling people to communicate globally in any time and any where.

As what we have discussed above, generally speaking, the developments of E-commerce applications are caused by the evolution of network computing technologies, as presented in Figure 1 below. Accordingly, following the major transformations of telecommunication and network computing, the tendency of E-commerce development should be: from Web-based commerce, M-commerce, to U-commerce.

Here, we start to explore the definition of three developing phase of E-commerce:

**Web-based commerce**: according to Gandhi’s idea (2006, P83), Web-based commerce refers to the use of the transaction and exchange of structured business information among companies and its stakeholders, as well as all kind of internal commercial activities. Using the global internet and World Wide Wed (WWW), the distribution channel of Web-based commerce become the most powerful one. and easy access to global market, reduce the distribution costs, time saving and building
customer relationship are regarded as the major advantages of Web-based commerce obviously. (Gandhi, 2006, P83)

**M-commerce:** it is referred to the E-commerce of which communication and transactions by using mobile (handheld) devices within not only pubic but also private networks. (Balasubraman, Peterson & Jarvenpaa, 2002, P348). If we conceptualize M-commerce as any phenomenon, the characteristics of it could be introduced as follow:

- It involves communication, either one-way or interactive, between two or more humans, between a human (or humans) and one or more inanimate objects (such as databases), or between two or more inanimate objects (e.g., between devices).
- At least one of the parties engaged in the communication must be mobile, in the sense that his, her, or its ability to communicate is not contingent on being at a fixed physical location at a particular point in time.
- The ability to communicate must possess the potential to be continuously maintained for at least one of the parties during a substantial physical movement from one location to another.
- The communication signals between parties must be primarily carried by electromagnetic waves, without direct sensory perception of the signals.
- If humans are communicating, at least one seeks to benefit economically from the communication, either in the short or the long run. If the communication is entirely between inanimate objects, such communication must be ultimately aimed at creating economic benefits for a human or a firm. (Balasubraman, Peterson & Jarvenpaa, 2002, P350)

From our point of view, it is very important to realize the conceptualization of M-commerce that is independent of other technologies that might have same characteristics. Furthermore, the main differences between Web-based commerce and M-commerce can be concluded as mobility, convenience, localization, personalization which still based on the different domain of countries and districts.

**U-commerce:** Watson et al. (2002, P355) proposed that U-commerce is supporting constant and personalized transactions and communications among companies and their different stakeholders above, beyond, and over traditional commerce value level by using ubiquitous networks. There are four mail characteristics of U-commerce will be presented as followings:

1. **Ubiquitous:** Networked computers will soon be embedded in every corner of the world, which means low-cost microprocessors and network connections will be inserted by technicians into all consumer-durable devices. Wireless network in the community or the electrical wiring system will help all of these devices to connect to the Internet. (Watson et al. 2002, P336). In other word, sets of computing and communication capabilities could be supported by united
environment.

2. **Universal:** Consumers can use universal devices which will help them to stay connected wherever they are through a wireless network or satellite, wherever the owner is. (Watson et al. 2002, P337). That means people will be able to simply use any common devices or infrastructures which are set in same standards in anywhere and anytime in the world without any restriction of any boundary.

3. **Unique:** Information can be personalized easily to the special needs of every customers and the current situation. Uniqueness in opinion of Watson et al. (2002, P388) means that consumers will receive information that is dependent based on the time of day and the persons’ location, current role or multiplicity of roles (e.g., tourist, parent, commuter, manager), and their expressed or learned preferences (i.e., learned by the systems providing the service).

4. **Unison:** Unison referred to the there will be a meeting point or encounter in the integration of different communication systems. (Watson et al. 2002, P338) For example, all phones (work, home, mobile) have a unified and personalized voice mail system.

### 3.3 Afuah & Bahram’s Hypercube Innovation Model

Hypercube model is described by Afuah and Bahram (1995, P 52), which proposed different stages of value-added chain in innovation are reflected concerning different faces of one innovation by the hypercube of innovation. The different stages of the value-added chain in innovation are called the stakeholders. There are four categories in the value-added chain of innovation. They are providers, innovating entities, customers and complementary innovators namely. Moreover, Afuah and Bahram (1995, P 53) proposed the influences of an innovation reflect in hypercube model are not only the impact about competence, capabilities and assets of whom were involved in innovation of industries, but at least one of them are thought to be valid: “complementary innovations are critical to the diffusion and success of products; learning by customers is critical, expensive and often results in lock-in; positive network externalities at customers are common and equipment and critical components from providers can be innovations in their own right” (Afuah and Bahram, 1995, P 53).

In hypercube model, the four stages of value-added chain in innovation are represented by four cubes, the qualification of innovation in each cube is based on how intensive and radical the innovation is. The intensity of innovation could be ordered as incremental, modular, architectural, and radical (disruptive), which increases from incremental to radical (Afuah and Bahram, 1995, P 53-55). As we can see the Figure 2, the hypercube model consists of four dimensional innovation and three directions. Innovations are classified by X and Y axes representing the impact on competence, capabilities etc. And Z axis is representing the different stakeholders in value-added chain of innovation (Afuah and Bahram, 1995, P 53-55).
In sum, hypercube model is used to describe the relationship of multidimensional actors which include innovation entities and their various stakeholders in the value-added chain of innovation. On the other hand, the hypercube model inspire companies to face the impact brought by their innovation will also influence their stakeholders. Moreover, the hypercube model also enables companies which are innovating to track their complement and competitors (Afuah and Bahram, 1995, P 53).

### 3.4 The New Hypercube Model for E-commerce Innovation

#### 3.4.1 Hypercube Model of E-commerce Innovation

The E-commerce innovation hypercube model is according to the hypercube model of Afuah and Bahram (1995, P 53), and is ameliorated from this model. However, to understanding what the E-commerce innovation is important to comprehend the E-commerce innovation hypercube model. Following Zwass (2003, P14-20), E-commerce innovation is referred to a business technological transformation, which is including technological component and business model changes internally and industrial relationship changes externally. In other word, E-commerce innovation is constructed in three dimensions. There are technological components, business model, and stakeholders repetitively. The reciprocity of three constructs which we used to analyze what the impact of E-commerce innovations on the each of stakeholder is from Web-based commerce to U-commerce. And what kind of innovation could be impact the E-commerce innovation on the stakeholders are described subsequently.

As mentioned, there are three aforementioned constructs of E-commerce innovation hypercube model, which are technological components, business model and stakeholders. Firstly, from Wu’s idea, the technological components should be described as the concept of core design and or the main defined function of the product. Hence, the technological component within the E-commerce innovation is represented by the network technologies, a basis of E-commerce (Wu, 2004, P391). In the technological side, the technologies of E-commerce include three domains: infrastructure, content, and services. The three domains are described by Wu (2004, P 391) as below:

- “Technological infrastructure refers to consisting of a network infrastructure, application platform, and devices.”
- “Content refer to consisting of content creation, content packaging, and content distribution.”
- “Services were described as consisting of the nature and facility for supporting the consumer decision-making process.”

Secondly, business model can be regarded as the main framework which integrate and
connect all the components as a whole, as far as we know. As Chesbrough and Rosenbloom (2002) mentioned, the business model is like a producer, which produce business outputs in the market place with all of the technological and potential factors as or raw material or inputs. Moreover, Afuah and Tucci (2003) also mention that “a series of technological components of internet business model, which involve customer value, revenue sources, implementation, capabilities, and sustainability etc.” In sum of the theories, we believe the business model is important to enable the vital value of E-commerce innovation can be delivered to customer. Therefore, the detailed business model in our point of view could be described as: facilitating the customer value, differentiating the segment of market, estimating the structure of cost, evaluating the potential revenue, identifying the E-commerce value chain and make sure the relationship of cooperating with their stakeholders for the E-commerce companies.

The last one is the E-commerce stakeholders. Developing and exploiting E-commerce activities, the E-commerce stakeholders are playing much important role in the value chain of E-commerce as business units. And the E-commerce activities consist of the relationship of sell-buyer, as well as the cooperation of inter- and intra- organization. (Schlueter & Shaw, 1997, P 23-26) On the other hand, from our understanding, the competitive advantage of E-commerce company should be tacit on the related knowledge and technology, unique collaborative relationships with other business participants. That means the E-commerce stakeholders are the business partners relate to the E- business enterprise. According Wu (2004, P 390) mentioned, “the E-commerce stakeholders can be divided into four groups: provider, E-commerce company, customer, and complementor”. Provider should be thought as the industries which connect with E-commerce companies and their complementors by providing services and products they need. It consists of “content provider, software or application provider and hard ware provider” (Wu, 2004, P390). For example, IBM, Microsoft etc.. E-commerce company is referred to the unit such as Amazon that sells products or services via online channel. The customer is the accessible or possible final user of E-commerce. The complementor is the firm which support and complement E-commerce companies with its service or product.

The impacts of E-commerce innovation on the stakeholders are based on the technological components and business model dimensions (Wu, 2004, P390). With the change overturns from existing technological components and business model, the E-commerce innovation could be bring into four-dimensional innovations: incremental, modular, architectural, and disruptive (Wu, 2004, P390). So, if the business model remains the same as before, the technological components are changed, then the E-commerce innovation should be Incremental. And the E-commerce innovation could become Modular if the fundament change happen on the technological components, but the business model still remains the same. While the alteration from the architectural innovation influence the current business model but not the technological components. Eventually, both technological components and
the business model will be changed dramatically and radically in the disruptive innovation of E-commerce.

The E-commerce innovation hypercube model is showed by the figure 2 as below:

![E-commerce Innovation Hypercube Model](image)

**Figure 2: E-commerce Innovation Hypercube Model (Wu, 2004, P 390)**

### 3.4.2 Analyzing the Changes amongst the Development of E-commerce

To analyze the major changes in technological components and business model amongst three phases of E-commerce innovation from Web-based commerce to M-commerce and from M-commerce to U-commerce is much significant to understand what and how the E-commerce innovation on stakeholders to be impacted. According the mentioned above, the E-commerce value chain model consists of three core technological components: the technological infrastructure, services provided, and content. Therefore, we prefer use the tables to formulate what the changes existed on these components and the business model from Web-based commerce to M-commerce and from M-commerce to U-commerce. For better understanding, here the table 1 from Wu (2004) about the changes of the Technological infrastructure is showed as example.
Table 1: The Change of the Technological Infrastructure (Wu, 2004, P393)

<table>
<thead>
<tr>
<th>Factors</th>
<th>Web-based commerce</th>
<th>M-commerce</th>
<th>U-commerce</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network infrastructure</td>
<td>1. Wired networking</td>
<td>1. Mobile/wireless networking</td>
<td>1. Ubiquitous networking</td>
</tr>
<tr>
<td></td>
<td>2. Connectionless-based</td>
<td>2. Connection-based</td>
<td>2. Connection-based</td>
</tr>
<tr>
<td></td>
<td>4. Internet channel</td>
<td>4. Mobile phone network</td>
<td>4. Multiaccess channel</td>
</tr>
<tr>
<td></td>
<td>5. Unlimited bandwidth</td>
<td>5. Limited bandwidth by spectrum</td>
<td>5. Broadband network</td>
</tr>
<tr>
<td>Application platform</td>
<td>1. Desktop computing</td>
<td>1. Mobile computing</td>
<td>1. Mobile computing and pervasive computing</td>
</tr>
<tr>
<td></td>
<td>4. Easy to integrate with other systems</td>
<td>4. Difficult to integrate with other systems</td>
<td>4. Seamlessly integrate with other systems</td>
</tr>
<tr>
<td></td>
<td>2. Stationary location</td>
<td>2. Mobile location</td>
<td>2. Ubiquitous location</td>
</tr>
<tr>
<td></td>
<td>3. Dominated by PCs</td>
<td>3. Dominated by handheld devices (e.g., mobile phones, PDAs)</td>
<td>3. Heterogeneous device</td>
</tr>
<tr>
<td></td>
<td>4. Powerful CPU, large memory, and big screen</td>
<td>4. Limited CPU, Small memory, Small screen, and Slow bearers</td>
<td>4. Combination of handheld devices and remove control devices (e.g., sensors and effectors)</td>
</tr>
<tr>
<td></td>
<td>5. Full input model</td>
<td>5. Limited input model</td>
<td>5. Multiple input model</td>
</tr>
</tbody>
</table>

In the table, for example, it formulates the change in aspect of Network infrastructure. The technologies of Web-based commerce are agglomerated by the standard Transformation Control Protocol/Internet Protocol (TCP/IP) and global wired networking infrastructure (Wu, 2004, P393). However, with the advent of M-commerce, M-commerce application development and system integration are more complex than those of Internet. For instance, mobile transmission devices are wireless and the mobile technologies which include General Packet Radio Service (GPRS), Code Division Multiple Access (CDMA), wireless LANS, Bluetooth and 3G etc. are supported by wireless networking (Wu, 2004, P393). In contrast with the M-commerce, ubiquitous networking facilitate every computer-embedded device is seamlessly connected to other devices in a multifarious broadband channel rather than the devices of wire and wireless networking are connected to other devices in a single channel. (Wu, 2004, P393)

In addition, In contrast with the changes in the other core technological components (including the content and the service) and business model that have the same evolutive situation will be described by tables attached in Appendix.

3.5 The Qualification of E-commerce Innovation

3.5.1 From Web-based commerce to M-commerce

As we discussed the changes of E-commerce innovation above, the technologies based on mobile perspective has directed to a fundamental change in the internet-based technological infrastructure though the core content and service
components are thought to be much closed in M-commerce and in Web-based commerce. But according to Wu’s (2004) point of view, there are significant differences between Web-based commerce and M-commerce in the business model dimension.

Obviously, we can see from providers’ perspective, the majority of the technological components have been reconstructed or revamp with the business model remains unchanged during the evolution from Web-based commerce to M-commerce. Therefore, the current M-commerce can be considered to match a Modular innovation. (Wu, 2004, P399) it refers to an innovation with business model unchanged and technology component overturned as we mentioned before. On the other hand, Noheri and Leestma (2001, P104) argued that new value propositions and market opportunities can be built by M-commerce. Hence, if we stand from E-commerce company perspective, M-commerce should be an architectural innovation of E-commerce. From the customer stand point, M-commerce also an architectural innovation, “because the terminal devices, networking fees, cost structure and value propositions are different from those of Web-based commerce” (Wu, 2004, P399). And Wu also thought that in order to match the methods of the market opportunities and novel value within M-commerce, the complementors have to use technologies and criteria which could reconstruct or redesign the services, products, sales channels and partnerships of theirs. Therefore, Wu (2004, P399) thought it is disruptive for them in Hypercube model.

Summing up the innovations from Web-based commerce to M-commerce phase, it is thought to be primarily a process of supplement rather than a process of substitute. Here is the zone map is shown as figure 3 as below:

![Zone Map for Innovation from Web-based Commerce to M-commerce](image)

**Figure 3: Zone Map for Innovation from Web-based Commerce to M-commerce**

**(Wu, 2004, P399)**

### 3.5.2 From M-commerce to U-commerce

The innovation from M-commerce to U-commerce is thought to be not a simple supplement process as the one from Web-based commerce to M-commerce. The changes will be widely influence for the E-commerce even the whole society.
According to Wu’s (2004, P399) opinion, firstly, for providers, the innovation from M-commerce to U-commerce should be a radical change. From technical perspective, to achieve U-commerce, providers need the “adaptive networking, pervasive computing, ubiquitous device, heterogeneous content and context-aware service” features. Additionally, U-commerce will affect many business model aspects involving when and how it is constructed. Likewise, U-commerce is also a disruptive change for incumbent E-commerce companies in not only the relationship administration of customer but also the operation of companies and the partnership with alliance based on Fano and Gershman’s (2002) idea. Additionally, Schapp and Cornelius (2002) also supplement that to develop the services and products or to explore the distribution channels, it is very important for E-commerce companies to develop the branded settlement in value both inside and outside the markets they are standing on through insights of customer. From E-business standpoint, Norheria and Lesstma (2001) had further explanations, to attract the target group of customer, they need to work well with their partners like content providers, product distributors, network arranger etc. Therefore, constructing new business models of cooperation and partnership will be one of the most vital issues for E-commerce companies.

For customers, although U-commerce will change the way customers use terminal devices, “it will be considered as a modular innovation because it can be considered an integration of wired and wireless commerce” (Wu, 2004, P400). On the other hand, Wu also thought U-commerce is architectural innovation for complementors. Because different and various industries will be participate in the market of U-commerce, which force complementors to reconsider and rebuild the strategic relationship and collaboration with other participants. At the point of view, Schapp and Cornelius (2002) also had further explanation which is found in Wu’s article that “coordination between multiple partners is necessary to address challenges such as standards, interoperability and security” (Wu, 2004, P400). In sum, the zone map as figure 4 is clearly shown for the innovation from M-commerce to U-commerce:

![Zone Map for Innovation from M-commerce to U-commerce](image)

**Figure 4: Zone Map for Innovation from M-commerce to U-commerce**

(Wu, 2004, P400)

### 3.6 Impact of E-commerce Innovation on E-commerce Stakeholders

We have discussed respectively and finally realized from Web-based commerce to M-commerce and from M-commerce to U-commerce the typology of innovation the
stakeholders should be by using Hypercube model of E-commerce innovation. Subsequently, we will investigate the possible impact of E-commerce innovation on E-commerce stakeholders.

As we discussed above, the whole E-commerce business could be thought as the network relier, and the collaborative relationships are playing more and more important role for them to keep the competitive advantages. Based on what we presented above, it is obviously to see that the co-opetitors of an E-commerce company should be the ones they cooperate and compete, which is including customers, providers and complementors (stakeholders). And Wu also argue that “an innovation that impacts the capabilities of a business’s co-opetitors should have an impact on the performance of the business” (Wu, 2004, P400). Accordingly, we will introduce the impact of E-innovation on the capabilities of E-business and their co-opetitors.

1. **Providers:** From Web-based commerce to M-commerce, it is a modular innovation for providers. But according to Wu’s (2004) point of view, providers have commercial capabilities which are developed from Web-based commerce. Hence, they would hold these competitive advantages and not be strongly threatened by new entrants in a short term, and they should invest in novel wireless technology in a long run. On contrary, from M-commerce to U-commerce, providers will face a disruptive innovation. During this “competence-destroying” change, there will be difficulties for providers to sustain their current advantages. Meanwhile, this may give new entrants new opportunities in the industry, because they can exploit new technology without caring about experience (Wu, 2004, P400).

   “More providers’ capabilities are rendered obsolete when innovating from M-commerce to U-commerce than from Web-based commerce to M-commerce.” (Wu, 2004, P401)

2. **Customers:** The relationship with its current customers of a firm could bring competitive advantage to them. However, from Web-based commerce to M-commerce, it is an architectural innovation for customer, which indicates that “M-commerce is capability-enhancing due to the use of mobile devices but capability-destroying due to the need to adopt new mobile applications for customers” (Wu, 2004, P401). Accordingly, Wu suggested that it is vital to improve the comprehension of possible customer concerning the value propositions from mobile technologies (Wu, 2004, P401). On the other hand, Wu proposed that from M-commerce to U-commerce is a modular innovation for customers. The capabilities and value of customer are enhanced by the change of technological components when they upgrade their devices. (Wu, 2004, P401) And from using M-commerce, the lower costs in switching for new device and the successful practice are critical factors in U-commerce adoption (Wu, 2004, P401).

   “More customers’ capabilities are rendered obsolete when innovating from
Web-based commerce to M-commerce than from M-commerce to U-commerce” (Wu, 2004, P401)

3. Complementors: because the innovation from Web-based commerce to M-commerce is radical for complementors as mentioned, that means the experience of they should not be used any more. And the novel mobile technologies, new resources and latest partners will become the foundation of M-commerce. At this situation, it is possible for new entrants to have more opportunities to develop themselves (Wu, 2004, P402). However, from M-commerce to U-commerce is an architectural innovation with largely unchanged traditional technology (i.e., wireless technology) and changes in business models. But new entrants may be attracted by integrated digital convergence (Wu, 2004, P402).

“More complementors’ capabilities are rendered obsolete when innovating from Web-based commerce to M-commerce than from M-commerce to U-commerce.”(Wu, 2004, P402)

4. E-commerce company: Based on Wu’s idea, there are two aspects affecting E-commerce companies’ performance. The impairment or improvement of their capabilities could be thought as the direct power, and the impact from innovations on their co-opetitors could be the indirect power (Wu, 2004, P402). Since moving from Web-based commerce to M-commerce is an architectural innovation and moving to U-commerce is a disruptive change, Wu (2004) compare three different perspectives, such as technology, relationship with providers and with complementary in both phases. And his suggestion is presented as below:

“More E-commerce company’s capabilities are rendered obsolete when innovating from M-commerce to U-commerce than from Web-based commerce to M-commerce.”

“Innovating from M-commerce to U-commerce an E-commerce company with a strong capability that builds tight relationship with new providers will perform better than ones that stay with an old provider.”

“E-commerce companies with strong capability holding more new complementary resources due to the innovation will perform better than those that do not.”

3.7 Dynamic Capability Perspective

To approach an integrated theoretical framework of our research, we will go on tracking the literature of dynamic capability which is addressed how E-commerce companies adapt to their external environment for keeping their competitive advantage in strategic management.

Standing on the point from Barney (1991), human, specific physical, and
organizational property, or resource are thought to consist of firms from strategic paradigm. Firms can use these properties to execute value-creating strategies that will sustain their competitive advantage if these properties are valuable, uncommon, unique and non-substitutable. Additionally, Wernerfelt (1984) proposed that dynamic capabilities are based on the firms’ RBV (resource based view). Based on these views, we would like the following definition of Dynamic capability: “The term ‘dynamic’ refers to the capacity to renew competences so as to achieve congruence with the changing business environment; certain innovative responses are required when time-to-market and timing are critical, the rate of technological change is rapid, and the nature of future competition and markets difficult to determine”(Wheeler, 2002, P127). The term ‘capabilities’ is referred to the competences of strategic management in a company, which is including adjusting, assimilating, integrating, and reconstructing the ability, resources and functional competency of the company to adapt the diverse environment (Teece et al. 1997, P515). In a word, dynamic capabilities can help firms to identify emerging opportunities, develop and renew its competences in a dynamic business environment. Dynamic capabilities are vital for keeping competitive advantage of firms.

Narrowly, as the appearance and development of which from geographic commerce to electronic commerce, the concept of dynamic capability has been put onto a strategic position in this field. As Teece et al (1997) proposed that that strategy can rapidly recreate the options of innovation as a dynamic tool to obtain and maintain the competitive advantages due to the network computing support business processes with a high speed. Further, the study of Rindova and Kotha (2001) led us into E-commerce company domain with a rare application of dynamic capabilities. They found that dynamic capabilities which generate strategic flexibility could be regarded as a prerequisite for E-commerce companies competing in dynamic E-commerce environment.

Additionally, a Net-Enabled Business Innovation Cycle (NEBIC) was recommend by Wheeler (2002, P130-134), using to evaluate, identify and forecast the ability of net-enabled business (E-commerce) for creating customer value by using the IT innovation. He defined four critical capabilities in NEBIC, and pointed out it is very important for E-commerce companies to avoid failure in creating customer value from their efforts. Here are the four sequence capabilities presented as figure 5 as below:

- **Choosing Emerging/ Enabling Information Technologies**: Both of Emerging and Enabling technologies are New IT, representing commercial and not yet commercial aspects respectively. They involve patterns in identifying, assessing, sorting out and finally deciding connected to the timing and viability of New IT.

- **Matching with Economic Opportunities**: Further assist to the first capability, it involves organization capability and current business strategies can be combined with surrounding opportunities to predict and serve customer’s needs.

- **Executing Business Innovation for Growth**: It focuses on an organization’s
capability to reconfigure its products, services, sales channels, supply chain and so on in timely manner or its ability to get the change done.

- **Assessing Customer Value:** It represents an organization’s capability that to achieve customer value in timely manners by identifying, measuring, and communicating value signals.

![Diagram of Net-Enabled Business Innovation Cycle](image)

**Figure 5: Net-Enabled Business Innovation Cycle** (Wheeler, 2002, P131)
4. A Development of Theory on Dynamic Capabilities for E-commerce Companies

In this chapter, a development of dynamic capabilities for E-commerce companies will be proposed based on analysis and study of previous research. Dynamic capabilities that necessary for E-commerce companies to cope with M-commerce and U-commerce will also be introduced detailedly and respectively.

In the period of innovation, the capability of adapt and exploit the innovation of the companies could help companies to face and deal with the obsolete of current capabilities caused by innovation. (Afuah, 2000, P392-404). Hence, to cope with an innovation, firms need new capabilities. According to (Tripsas, 1997, P343) propose that when an innovation is 'sustaining', it should be regarded to meets the needs of current customers, knowledge and skills then incumbents will invest in order to keep their competitive advantages. If, on the other hand, the innovation is 'disrupting', that means it does not address the requirement of present customers, knowledge and skills, then incumbents will fail to invest and lose their competitive advantages. Similarly, if organizations are not able to cope with the fresh network computing technical capabilities which brought by E-commerce innovations, they will fail to create to organizational capabilities and sustain their performance (Rindova and Kotha, 2001, P1272).

Accordingly, during the innovation of E-commerce, firms must identify the type of innovation and develop the necessary capabilities they are lacking. Based on the idea from Afuah (2003), if a company lacks the abilities to achieve their goal, it should be thought to have a ‘capability gap’. Further, Wheeler’s (2002, P127-129) idea also support that to exploit an E-commerce innovation, be aware of the capability-destroying (disruptive) innovation and fill up the potential capability gap are vital for E-commerce companies, otherwise, they may be predestined to fail.

As the introduction of E-commerce innovation hypercube model we presented above, it contains two main components, technological component and business model. They are used to examine which types the E-commerce innovation should be and predict the possible impacts on the stakeholders of E-commerce company. On the other hand, they indicated the capability of E-commerce company that used to cope with an E-commerce innovation base on its technological and commercial knowledge and capabilities. These two basic capabilities, technological and commercial, combine along with the organizational routines to form the dynamic capabilities of E-commerce companies’ transformation (Wheeler, 2002, P130)
Based on the previous relevant literatures and NEBIC theory (Wheeler, 2002) we reviewed in Chapter 3, we would like to further identify and analyze dynamic capabilities that needed by E-commerce company which is transforming in specific E-commerce innovation: from Web-based commerce to M-commerce, and from M-commerce to U-commerce, respectively. Meanwhile, we will divide dynamic capabilities into two aspects, technological capabilities and commercial capabilities. Thereof, technological capabilities include: constructing technological infrastructure, continuing or creating content, providing new services. Commercial capabilities involve: matching with economic opportunities, executing business innovation, understanding customer value and constructing alliance with co-opetitors.

4.1 Analyze the Critical Profile of M-commerce

We have discussed above, the innovation from Web-based commerce to M-commerce is qualified as an architectural innovation for E-commerce company through E-commerce hypercube innovation model. According to the previous theories of dynamic capability, we realize from Web-based commerce to M-commerce, it is important for E-commerce company to recognize and develop its commercial capabilities to cope with a new and different business model of M-commerce.

As the mobile computing technology is growing, more and more single user or small group of people move their preference to M-commerce. B2C and B2E are becoming a niche and opportunity of M-commerce from our point of view. Generally, most of them are workforce rely on mobile device and limited by time using. Lifestyle, specialized application or segment uses dominate their main application of M-commerce. Narrowly, based on the previous research and our thoughts, whether E-commerce company could catch these potential opportunities depend on the flexibility and adjustability of services and contents they provided to satisfy customers’ diverse requirement towards their individual or cluster life and work.

Further, when compared to Personal Computers, “the mobile devices is far from ideal and is suffering from some drawbacks, such as small screens and small key pads, and complicated input mechanisms” (Siau et al. 2001, P5-7), though many demonstrations of mobile value are proved by researches in order to raise the understanding of usability of M-commerce for customers (Javenpaa et al. 2003, P41-44). Moreover, there is a widely common agreement that refers to the most well-known barriers for M-commerce adoptions were high start-up and operating cost, as well as unsteady benefit. Thus, providing added value and benefits to M-commerce users could help to really executive this innovation of business model when E-commerce company faces this uncertain market. In our opinion, the most prevailing value proposition must be suggested to E-commerce companies should be: mobility, localization, personalization, and flexibility. To achieve this, Clarke (2001, P143-147) proposed that the flexible and appropriate market segments could facilitate to achieving the benefit from marketing strategies of M-commerce.
Providing novel services and diverse contents of products, E-commerce companies would gain their benefit from changes of M-commerce. But, from our point of view, this is not only profit for single E-commerce company. With the increment of service in location aware, more and more dynamic information exchange and transaction will be raised result in increase of value and profit in different stakeholders. Hence, it is necessary for E-commerce companies to reconsider the new collaboration and network of co-opetitor relationships and develop the relevant capabilities, so as to build a commercial environment of M-commerce with diverse stakeholders.

4.2 Identification of Dynamic Capability for M-commerce

Base on what we have discussed above, the analysis of the profile in which M-commerce would be, we are going to identify and develop the commercial dynamic capabilities which from our point of view could help E-commerce company to cope with innovation from Web-based commerce to M-commerce. Here, we will present them into five groups:

1. Choosing emerging or enabling technologies
   ♦ Identify and develop new mobile technologies by sorting out the potential technologies and turning them into commercial application.
   ♦ Improve the existing technologies based on the requirement of mobile technologies to reduce the technological cost.
   ♦ Keep the technological first mover position by developing novel mobile technologies with co-opetitors.

2. Matching with economic opportunities
   ♦ Categorize different markets by recognizing the lifestyle, specialized application or segment use of customers.
   ♦ Centralize attention on the B2C and B2E markets and develop them in an effective way.
   ♦ Treat customer of time-limited, professional and common mobile relier as a target group, and attract young people.
   ♦ Narrow down the market segment that never be found.

3. Executing business innovation
   ♦ Lock-in the feature of mobility for all services and products.
   ♦ Design new and diverse mobile services or product contents match different requirement of customers.
   ♦ Focus on mobile technologies development to differentiate from other technological service or competitors
   ♦ Exploit profit potential by enhance diversity of novel and current services.
   ♦ Establish price mechanism of transaction to differentiate mobile commerce and traditional commerce.

4. Understanding customer value

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Reduce the costs of transiting and exchanging information for customers, especially when they move geographically.

- develop customers’ understanding of the advantages of M-commerce,
- Facilitate the customers’ usage rate of mobile device and service by promoting prevailing features they like.
- Convey to customers with new value propositions of M-commerce including mobility, personalization, localization, and flexibility.

5. Constructing alliance with co-opetitors.

- Understand the new value chain of M-commerce, control the key complementary sources by collaborate with co-opetitors.
- Reconfigure an appropriate position with in a diverse value network (e.g. mobile content or service providers).
- Hold the key components of new technologies, knowledge and expertise by reconsidering the current relationship within the industry
- Rebuild relationships of new alliance with different stakeholders.

4.3 Analyze the Critical Profile of U-commerce

Although E-commerce companies only need to improve their dynamic capabilities in commercial perspective from Web-based commerce to M-commerce, innovation from M-commerce to U-commerce could be totally different from it that E-commerce companies should prepare to face this fierce and radical challenge by developing the necessary dynamic capabilities. As we have discussed before, the innovation from M-commerce to U-commerce is a disruptive innovation. That means both technological component and business model will be changed fiercely. Here, we will analyze them respectively:

4.3.1 Technological Perspective

As we introduce before, U-commerce is based on the network technology of ubiquitous computing, presenting four main characteristics: ubiquitous, universal, unique and unison. To achieve these features, E-commerce company will be required a solid and upgrading IT-infrastructure to be able to match the requirement of customer, which based on the usability of wired and wireless network technology, by exploiting right products and service. Meanwhile, creating a global agreement and universal network stander could be thought as vital and prerequisite for E-commerce company to transform to U-commerce. Further, according to Zwass (2003, P7-37), development platform support the infrastructure of E-commerce-based innovation. Hence, to integrate common computing platforms which should rely on a transparent information system and fit all type development of software could not be ignored in building infrastructure.

According to the characteristics of U-commerce, there will be numerous and diverse
services and content deliver to customers though different device and equipments in
global scope. Therefore, the main technological difficulties of U-commerce should be
building and developing new infrastructure in products, services, layout, and
encounter of customer (Banavar and Bernstein, 2002, P92-96).

4.3.2 Commercial Perspective

Base on Yoo and Lyytinen (2003)’s idea, U-commerce applications often challenge
the current theory of organizations practices and business processes that related to
traditional E-commerce. Meanwhile, a huge change of productivity and capability
would be created. Therefore, catch and match these opportunities with commercial
capabilities are critical for E-commerce companies. However, because of
U-commerce is a novel phase of E-commerce, many questions or problems need to be
solved. For instance, the way those apply to identify potential market value and
opportunities. On the other hand, establish a privacy mechanism and reduce the
conflicts of multi-channels (virtual and physical channels) is necessary besides
transparency (Stenifield et al. 2002, P117). Furthermore, find a right and favorable
position amongst diverse stakeholders become critical for E-commerce companies to
rebuild strategic alliances and collaborate with co-opetitors.

4.3.3 Identification of Dynamic Capability for U-commerce

Based on the analysis above, we are going to propose some technological and
commercial dynamic capabilities respectively for E-commerce company to transform
into U-commerce:

**Technological dynamic capabilities**

1. Constructing technological infrastructure
   - Build a solid and upgrading infrastructure combining wired and wireless
     network technology.
   - Create a global agreement and universal network standard to support
     appropriate services and products.
   - Construct common computing platforms with transparent information system
     and development of software

2. Continuing or creating content
   - Continue the current interesting content that accepted by customer, develop
     them into universal accepted.
   - Use different channel for delivering multimedia content to customers (such
     as, music, figures, and movies.)
   - Design new content with the interest of customer and information context.
     (Such as, geographic location, weather report, important event).
   - Design novel layout of content and encounter of user for diverse services.
3. Providing new services
   ♦ Develop devices with appropriate services that support off-line usage.
   ♦ Deliver novel and contextual service based on customers’ preference with developing time-to-market system.
   ♦ Develop privacy mechanism and security protection of transaction.

Commercial dynamic capabilities
1. Matching with economic opportunities
   ♦ Recognize potential market opportunities which have not been covered.
   ♦ Identify new market value that profitable globally.
   ♦ Provide unique products and services by using the strength of current physical or virtual channels.

2. Executing business innovation
   ♦ Differentiate and enhance the strength of each channel respectively to eliminate channel conflicts.
   ♦ Obtain advantageous global position by developing current and novel channels.
   ♦ Invent new channel capability based on ubiquitous network computing.
   ♦ Investigate a universal and flexible pricing mechanism.

3. Understanding customer value
   ♦ Identify the potential added value that unique from U-commerce.
   ♦ Approach customer value in a fresh way by reconfiguring criteria.
   ♦ Deliver propositions in ubiquity, universality, uniqueness, and unison to customers with emphasizing the novel value brought by U-commerce.

4. Constructing alliances with co-opetitors
   ♦ Understanding the new value network within the whole industry and find a right position in it.
   ♦ Rebuild strategic alliances and collaborate with co-opetitors to gain key complementary source in a harmonious way.
   ♦ Build intra- and inter-organizational commitment to strategic change.
5 Practical Method

This chapter will provide the reader with an understanding of the how we chose the company in our case study as well as how the information was collected. After having read this chapter, the reader should be able to understand how the empirical material was gathered.

5.1 Empirical Method

There are various methods which can be used in qualitative research. A research method is a research strategy which involves several steps from the potential theoretical hypothesis to research design and data collection. The research method which the researcher chose that could influence the researcher to collects data (Myers, 1997, MISQ). The unique skills, hypothesis and research practice are often used for specific research methods (Myers, 1997, MISQ). The authors believed that case study research would be most suitable for our research amongst various qualitative research methodologies. According to Hyde (2000, P83), case study is the most common method be used by qualitative research. A case study not only represents a single research approach, but also as a qualitative method. Case study also is one kind of the in-depth study of a specific illustration (Hyde, 2000, P83). Moreover, a case study is an empirical inquiry that: “investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident and in which multiple sources of evidence are used” (Yin 2002, P 3).

We determined to adopt the case study of Nippon Telephone and Telegraph (NTT) DoCoMo’s i-mode, which is the classic example of E-commerce’s innovation from Web-based commerce to M-commerce around the world to formulate the a contemporary phenomenon within its real-life of E-commerce. Through case study of NTT DoCoMo’s i-mode, we compare with the development situation of E-commerce innovation in China and suggest the E-commerce companies in China how to coping with the impacts from E-commerce innovation by applying dynamic capabilities and successful transformation from Web-based commerce to M-commerce.

5.2 Choice of E-commerce Company

In the early 1990s, the mobile telephone market grew tremendously in Japan and is nearing saturation. This led the operators, DoCoMo in particular, which leading mobile telecom operator in Japan, to break new ground of the development of mobile packet-switched services. However, with the advent of mobile voice market would
soon saturate, and search for other sources of revenues, DoCoMo want to develop innovative from Web-based commerce to M-commerce services for customers. In February 1999, DoCoMo started up i-mode service. Now, it has been an amazingly successful example of M-commerce in Japan, because it is outstandingly suitable for demand of subscribers through applying new technology, and depending on its exclusive business model. By March 2006, i-mode has attracted more than 52.3 million active subscribers (NTT DoCoMo, 2007), indisputably, that is most advanced and successful M-commerce service in all over the world. In reality, more than half of mobile subscribers of Japanese are using i-mode.

We choose NTT DoCoMo’s i-mode for our case study, because the development of i-mode is coherent with applicability of hypercube model and examines the results of the analysis as before. For illustrative intention, it is important to show a real example to elucidate the realities and to support our inferences. Moreover, NTT DoCoMo’s i-mode is the typical example of E-commerce innovation for Web-based commerce to M-commerce around the world. Simultaneously, it is vital to observe the success of i-mode in order to gain real insight into the innovation of M-commerce. However, we can not offer the real application of U-commerce, because none of the E-commerce company has transformed into U-commerce by this time. On the other hand, we also choose NTT DoCoMo’s i-mode that were profitable and had a clear E-commerce innovation oriented approach. The reason is that the purpose of the study is to draw support from certain experiences of NTT DoCoMo’s i-mode and compare with the developmental situation of E-commerce innovation in China. Through the comparison and analysis what difference in industries are between Japan and China, and that can help the Industries of China have positive and significant development-oriented in development of E-commerce innovation, because the Industries of China are being on evolutive phase from Web-based commerce to M-commerce.

5.3 Collection of Empirical Material

Since NTT DoCoMo’s i-mode is a very successful example in Japanese M-commerce even in the world, i-mode as a case has been used by many of previous researchers. Thus, numerous of the empirical material about the case study of i-mode can be used by the authors.

Initially, we collected the relevant source about NTT DoCoMo’s i-mode. Since i-mode as case study to examine the practicability of the E-commerce innovation hypercube model, we collected the source about NTT DoCoMo’s i-mode between its technological components and its business model. We use the keywords such as i-mode, technological components, and i-mode business model etc. in different searching engines and scientific databases to obtain relevant scientific articles about previous case study of i-mode and other useful information. In order to obtain the high-reliability articles, we also used databases as Business Source Premier (EBSCO), Emerald Fulltext, ScienceDirect etc., because these databases were recognized as
critical and high-credibility databases. We also obtain sources from the official website of NTT DoCoMo as well.

On the other hand, as we intend to launch a comparison of E-commerce companies in Japan and China by using NTT DoCoMo as an example, the collection of data of Chinese E-commerce is necessary. To achieve this, we also use the keywords such as E-commerce in China, the development of Chinese M-commerce, and restriction or limit factors in Chinese M-commerce etc. in the diverse searching engines and relative database to obtain the relevant sources such as the annual report of E-commerce or relevant reports in China. For high-credibility source, we methodically browsed lots of Chinese E-journals such as IS Journal, China Academic Journal etc., and used the scientific databases such as CNKI, VIP Information database, and Wan Fang database etc..

5.4 Reliability of Material

Reliability refers to the extent to which a scale generates the same results when repeating the study again (Bryman & Bell, 2003, P288-292). To ensure (or at least enhance) the reliability of our empirical study and gather information and knowledge in an appropriate way, we as authors of this study have tried, by all means. As we mentioned in empirical method, we described the research process of empirical study in details, which we believe could raise the possibility to apply the study to the real business context than only in this thesis, such as for E-commerce in China.

During our empirical study, literature on business research and specific material of our case, NTT DoCoMo, has been examined and the credibility of them have been taken into consideration in our work. In the current business context, as the increasing intense competition, new technology, new products and services are continuously being developing and renewing, we decided to choose materials and sources which are generally written in less than ten years, so as to enhance the reliability of them. Additionally, most of the literatures we used are scientific articles chosen from diverse famous database and journals both in English and in Chinese and these articles are written by famous researcher, which we believe they are credible. However, we have realized the limitation of choosing literatures written in Chinese, which would have misunderstanding when translating them into English because our mother language is not English. Considering the choice of our topic, it is difficult to avoid using material in Chinese. Therefore, several Chinese people who are versed in English have been consulted by us to make sure the correct translation.

Furthermore, besides scientific literatures, we also use some materials and reports from Internet, which we think are necessary. And we are aware of that sources from Internet would be not critical enough for the current study or with commercial purpose in it. To enhance the reliability of our study, we generally choose materials from official websites or website of large and credible publishers or newspapers as
well as the sub website of government, for example official website of NTT DoCoMo and China Economic Times. Likewise, we only use these sources to describe general and illustrative matter instead of deep analysis to increase the reliability of our study.
6 Exemplifiable Case Study for Chinese E-commerce Companies

This chapter will provide the reader with exemplification of Japanese i-mode to validate the practicability of E-commerce innovation hypercube model which include the technological components and business model, and exemplify our illative results of dynamic capability of E-commerce companies. In this chapter, we only illustrate and validate the inferences on the M-commerce innovation, for the development of E-commerce has not turn into the era of U-commerce in all over the world. Finally, we will present the general profile of M-commerce in China for readers.

6.1 I-mode Technological Component

I-mode used wireless terminal to connect internet and gain the various online service (NTT DoCoMo, 2007). For the success of i-mode, on the aspect of technological components, there are two significant innovational technical components are applied on i-mode service. The First one is changes the data transmission on the application of internet communication to the packet-switched network that is essentially connectionless from circuit-switched network. Secondly, through collaboration with third-way developers, obtaining the advanced application technologies on the mobile application platform (NTT DoCoMo, 2007). For the subscribers, the packet-switched network plays affirmative effects on the technology application. The packet-switched network allows i-mode users continuously to be connected with the online service such as managing and storing users’ information and content providers’ information, and also allows consumers pay the bills on more flexible billing schemes such as calculating how many packets are exchanged by consumers rather than the connection on each minute (Geoff, 2001, P14-16). The packet-switched network provides a comfortable and effective environment for the consumers operation on M-commerce that is an important factor to attract new consumers.

Traditionally, service providers and the subscribers are two-party business relationship for telecommunications (Geoff, 2001, P15). However, i-mode adds a third actor in terms of the content provider. With the third-way developers participate in, which bring some important application technologies for i-mode (Geoff, 2001, P15). For example, since to adapt the screen of mobile phone and the wireless bandwidth, NTT DoCoMo collaborated with Access which is a global provider of advanced software technologies to the mobile and beyond-PC markets to developed the compact HTML (cHTML) – a subset of HTML, but it is only useful in the wireless environment(NTT DoCoMo 2007, Access 2007). Additionally, through cooperated with other third-way developers, i-mode obtained more technical supports to its
service, such as pictures (JPEG, GIF), music (MP3, MIDI), and online movie, etc. (NTT DoCoMo, 2007)

In other word, by employing the technologies from the third-way developers, NTT DoCoMo and its subscribers get pleasure from various online services and led NTT DoCoMo more effectively upgrade the quality and value of its services. Furthermore, since i-mode obtained more technical supports from third-way developers, NTT DoCoMo could more concentrate on the development of its business model and increase more value-added services for its subscribers in the M-commerce innovation.

6.2 I-mode Business Model

I-mode has been extraordinarily successful in Japan, because of its outstanding convenience and its unique business model that include content quality control and new source of revenue (NTT DoCoMo, 2007). The reliance of business model on this system offers a new innovative approach to the M-commerce value-added chain and to wireless service (NTT DoCoMo, 2007). The business model of i-mode efforts to develop the “win-win” relationship with their partners and shareholders, such as “to collaborate closely with equipment manufacturers, content providers, and other platforms to ensure that wireless technology, content quality, and subscribers experience evolve jointly” (NTT DoCoMo, 2007). This collaborative business model enables NTT DoCoMo a main competitive advantage in the markets of global communications in the era of M-commerce.

6.2.1 Service Category

The service of i-mode was divided into four main content categories. The first one is entertainment that is most main content of i-mode, such as games, images, music, ring tones, and online video and movie and so on. The second one is information category that is the basal information for the daily life of subscribers, such as news, weather, and traffic, etc.. The third category is synchronized transactions that include online trading, E-wallet (e-banking), and stockjobbing, and so on. The last one is the value-added services, for example, the travel guide, dictionary translator, and the world clock, etc.. In fact, these services are selected seriously by NTT DoCoMo. NTT DoCoMo believe that the provision of high-quality content is a vital means of attracting customers, because the value of mobile Internet services is judged by subscribers according to the content quality. Furthermore, quality is maintained by setting high operability standards and offering quality services. The service of i-mode is thus energized by enabling added high-quality content, attracting more subscribers, especially, to attract young teenagers. (NTT DoCoMo, 2007)
6.2.2 Sources of Revenue

As mentioned above, i-mode adds the third actors in the form of the content provider into the traditional two-way business relationship between the service provider and the subscriber. It does not only provide the flexible technology for i-mode, but also offer new sources of revenue for NTT DoCoMo. First, NTT DoCoMo’s revenues sources from mobile communication and charging subscribers on the basis of the amount of information traffic. The basic i-mode subscription is USD 2.46 monthly, beside the low information traffic charge, such as downloading a image cost about USD 7 cent, checking a bank balance costs around USD 16 cent, etc. (Geoff, 2001, P15-16). Secondly, NTT DoCoMo collects payments that acting on behalf of content providers for value-added service. In spite of these payment added the charges on the bill of subscriber monthly, but for the return, the content providers pay 9% commission to NTT DoCoMo, which is set at a relatively low level (Sven & Erik, 2004, P 350). However, because of this low commission, increasing content providers are attracted to access to i-mode. In March 2003, there were 3450 content providers, increased from 67 when i-mode was launched, such as navigations facilities and the overall editorial direction (Sven & Erik, 2004, P349). Those become huge revenues for NTT DoCoMo. Simultaneously, all the content providers more willing to exploit increasing high-quality services, due to they obtain 91% return. As a result, all parties have benefit from each other. NTT DoCoMo called this relationship as a “virtuous circle” (Figure 6)

![Figure 6: Virtuous Circle (Geoff, 2001, P 16)](image)

6.2.3 I-mode Value-added Network

Mutual coordinating with coopetitors is a feature of value-added network of business model innovation of i-mode on the M-commerce. NTT DoCoMo play very positive role in whole value-added network of i-mode, it collaborates with all actors, including platform suppliers such as Access; content providers, for example, Cybird, Bandai, and Index; and terminal equipment manufacturers such as Nokia and Sony Ericsson

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Sven & Erik, 2004, P349
Geoff, 2001, P15-16
Collaborating with its stakeholders and its coopetitors to ensure that wireless technology, content quality, and user experience evolve jointly, simultaneously NTT DoCoMo also enable “all parties to maximize value and to continue improving the quality of products and services connected with i-mode” (NTT DoCoMo, 2007). Thereof, collaborating with the coopetitors, such as, Cybird and Access have grown very large and are expanding internationally, which redound to facilitate the prestige of NTT DoCoMo among coopetitors (Sven & Erik, 2004, P 349). In addition, NTT DoCoMo is expanding by introducing i-mode in cooperation with partners such as telecom operators, network operators and ISPs in Europe and Asia (Sven & Erik, 2004, P350, Shi & Zhang, 2003, P 146). These collaboration relationships have made for NTT DoCoMo to expand market share, R&D for new and high-quality products and services for the subscribers around the world. For instance, NTT DoCoMo collaborated with more than 200 banks all over the world for offering a secure payment system to customers of i-mode (Shi & Zhang, 2003, P 146).

6.3 I-mode Impact for NTT DoCoMo and its Stakeholders

6.3.1 Impact for Providers

For the providers, i-mode was a modular change in M-commerce, because the technological components only has enhanced by original one in Web-based commerce. For example, NTT DoCoMo is the first one that applied the new technologies for wireless technologies such as cHTML and wireless communication technology, which have developed from HTML and web-based application of the internet technologies (NTT DoCoMo, 2007). However, a main challenge for the content and platform providers was changing the service and software depend on the multiple protocols standards such as microbrowser for i-mode, which applies the cHTML technology and wireless communication technology to display the content on the limited screen (NTT DoCoMo, 2007). Furthermore, due to i-mode enhance the standard of protocols and data transmissions, simultaneously, NTT DoCoMo signed agreements with handset manufacturers to exploit the uniform handset adapting to i-mode, thus the handset manufacturers have to develop new and uniform handset and enhance its function to adapt the new service of i-mode (Shi & Zhang, 2003, P 146).

6.3.2 Impact for Customers

As Wu mentioned that the competitive advantage of firm can be produced by the relationship with its existing customers (Wu, 2004, P400). From Web-based commerce to M-commerce, i-mode was an architectural innovation for the customers, because the tenet of NTT DoCoMo is make sure that to provide outstanding convenience for the customer. Moreover NTT DoCoMo also plays more attention about the change of technological components to make sure that the customers do not difficult to relearn the usage of wireless equipment, handset or service. Therefore, for
customers, the technological components were reinforced from original technologies on Web-based commerce (NTT DoCoMo, 2007). On the other hand, most customers give their attention to what the novel value of the new services are brought for themselves. Convenience, low usage fees, and high-quality content of service are novel value propositions for i-mode customers (Wang, 2007, P69-71). These value propositions impel the customers to change their habit in internet services, thereby accept and relearn the novel mobile services even though the mobile services are not for free. In sum, for the users of i-mode, since the business model of i-mode was changed and the technological components were reinforced on M-commerce innovation. Therefore, all of those prove M-commerce innovation as Wu’s proposed is an architectural innovation for the customers of i-mode.

6.3.3 Impact for Complementors

For the complementors of i-mode such as wired network operators and telecom operators, the one main impact for them is the changes of technological capabilities from circuit-switched network or web-based (wired) infrastructure to the packet-switched network infrastructure and wireless technology. When NTT DoCoMo has been a telecom operator in Web-based commerce market, NTT DoCoMo has overturned its infrastructure successfully, because NTT DoCoMo is the earliest company to develop the packet-switched technology, and it had applied to wireless technology gradually and explored new business opportunities from changing of circuit-switched or web-based technology (NTT DoCoMo, 2007). However, NTT DoCoMo is being E-commerce Company in market of M-commerce when it launched i-mode. NTT DoCoMo collaborated with its complementors such as handset manufacturers (Nokia and Sony Ericsson) to sign agreement and ensured that handset manufacturers exploit the new and uniform handset adapting to the service of i-mode (Wang, 2007, P69-71). It means the business model of i-mode also has been overturned when i-mode launched. As Wu (2004, P 401) mentioned, M-commerce technology capabilities and business model are overturned, that means the M-commerce is a disruptive innovation for i-mode complementors.

6.3.4 Impact for NTT DoCoMo

When i-mode launched, NTT DoCoMo has successfully changed itself as E-commerce Company. On the aspect of technological capabilities, the new wireless technologies such as wireless LANS are being a new value proposition for i-mode customer. With this new value proposition, NTT DoCoMo kept on reinforcing its technical network and its mobile services to attract the customers and stimulate their maximal demand for customers on the aspect of services. For instance, FOMA which is third-generation mobile communication service based on W-CDMA technology, and i-motion which is one of i-mode service that distributes video-clips to FOMA terminals and allows the sending and receiving of video-clips via the FOMA system
(NTT DoCoMo, 2007). On the other hand, through establishing the mutual coordination relationship with the coopetitors of NTT DoCoMo, NTT DoCoMo obtained new value proposition that developed its new business model ceaselessly. Simultaneously, this new value proposition indicates NTT DoCoMo changed their commercial capabilities and created new business opportunities for NTT DoCoMo (for example, to collaborate with large number of content providers and explore more and more new services, such as to establish alliance with JAVA for i-appli service, different telecom operators in all over the world for International Roaming service, etc.), for satisfying the maximal demand of customer (NTT DoCoMo, 2007). Due to the technological components had overturned from original technological capabilities, and the commercial capabilities have been changed for new business model, NTT DoCoMo as an E-commerce company therefore faces the architectural innovation on M-commerce.

6.4 Identification of NTT DoCoMo’s Dynamic Capabilities

NTT DoCoMo’s i-mode has remarkably succeeded, since NTT DoCoMo has adequately integrated its capabilities and resources of inside and outside to develop its unique business model. Inside, NTT DoCoMo focused on wireless communication technology of i-mode, which helped NTT DoCoMo obtains opportunities to entry market of M-commerce earlier. Outside, through collaborating with stakeholders in value added network, NTT DoCoMo not only gains new complemental technologies, but also has its business model innovation facilitated in evolution of M-commerce. Meanwhile, customer value has been rightly achieved by providing matched services with coopetitors. All of these dynamic capabilities above assist NTT DoCoMo to conduct M-commerce smoothly though M-commerce innovation brought impacts to it and its stakeholders.

We will further discuss in details about how NTT DoCoMo applied its dynamic capabilities in next chapter, for helping Chinese E-commerce companies to cope with M-commerce innovation. For better understanding, the development of M-commerce in China now, we will present the general profile of it in chapter 6.5

6.5 General profile of M-commerce in China

According to the survey of Juniper Research (2007), a market research company, there are 400 million mobile phone users in China. Thereof, 200 million of them are SMS users and more than 10 million are mobile WAP users. On the other hand, base on the market research done by iResearch (2006) which is a heading market consultant company of China, the mobile phone users are increasing by the rate of approximate 20% per year and the scale of M-commerce has reached 260 billion at the end of 2005. They further predict that the income of M-commerce will achieve a peak 328 billion in 2008 thanks to the Olympic Game (iResearch, 2006). Although the
scale of M-commerce in China now seems to be very large, Chinese M-commerce market is not a mature one and need to be guided and developed (Shi and Zhang, 2003, P144). Meanwhile, experts believe that currently there are about 60% of all enterprises are expecting to change business approach into one based on wireless system, such like SMS or WAP (Xue, 2006).

Currently, there are two main mobile operators in China. They are China Mobile and China Unicom, which are two monopoly companies of Chinese mobile market for they are accounting for about 65% and 35% market share respectively (Shi and Zhang, 2003, P144). From the type of services provided by E-commerce company perspective, it could be mainly divided into: information service (traveling information etc.), personal information management service (e-mail etc.), business transaction service (ticket purchase etc.), entertainment (mobile game etc.), specialized application service (professional information exchange etc.) and location-based service (local weather etc.) (Shi and Zhang, 2003, P144-145).

From all of above and our case study, we notice that there are some similarities but still many differences between Japanese and Chinese M-commerce. We would like to launch a further comparison of E-commerce companies in these two countries to identify those specific restrictions for Chinese E-commerce companies in next chapter.
7. Analysis and Implication towards the Development of Chinese E-commerce Companies

In this chapter, we will use Japanese E-commerce company NTT DoCoMo as an example to compare with E-commerce companies in China. So as to identify the specific conditions and restrictions for Chinese E-commerce companies to transform from Web-based commerce to M-commerce and try to find out what the suitable dynamic capabilities they should apply and develop to cope with the impacts from M-commerce innovation.

7.1 Comparison of E-commerce companies in Japan and China

As we mention before, NTT DoCoMo could be thought as the representative of Japanese E-commerce companies for it accounts for more than half of the whole domestic market share and it is also the most well-known successful E-commerce company in Japan. Therefore, we will mainly use the performance detail of NTT DoCoMo in five different perspectives which relate its dynamic capabilities to compare with Chinese E-commerce companies.

7.1.1 Technology Perspective

We have introduced in our case study, NTT DoCoMo represent the leader of mobile technology in Japan even all over the world. Firstly, they create packet-switched network to accelerate information exchange with Internet (NTT DoCoMo, 2007). Secondly, they make application technology for third-party providers. Thirdly, they succeed to modify the existing technology which settled limitation of wireless bandwidth (NTT DoCoMo, 2007). Fourthly, 3G (the third generation of mobile technology) has been developed to be rather mature. The whole mobile industry has been ready towards the forth generation of mobile technology (NTT DoCoMo, 2007).

On the other hand, the mobile technology has not been developed to the 3G in China so far though all of leading companies of M-commerce are working hard towards it. The main foundation mobile technology framework still remains in 2.5G represented by GPRS (General Packet Radio Service) technology (Wang, 2007, P69-71). Further, Chinese E-commerce companies start to develop application technology with third-party providers like NTT DoCoMo did. For example, UFIDA, one of the Chinese heading E-commerce company, has been developed an M-commerce platform “Mobile Business Street” for transaction of million of E-commerce company (Sina, technology new, 2007).
From our point of view, as the development of mobile technology, Chinese E-business will be pushed undoubtedly towards new 3G era. The company which transforms smoothly into the 3G first, it will has the highest advantage in developing M-commerce even would monopolize the market for a short periods. On the other hand, developing application technology with third-party providers could be a good example for Chinese E-commerce companies to follow, since the competence and technologies will be integrated from two side of the collaboration, and the development of their own would be facilitated as well.

7.1.2 Market Opportunity Perspective

After studying into NTT DoCoMo, we notice that they focus on exploiting opportunity of M-commerce market. By creating different type of contents and services, they successfully caught lots of interest and curiosity among different group of people (Geoff 2001, P15-16, Sven & Erik 2004, P349-350, NTT DoCoMo, 2007). On one hand, they won the wide range of customer. Simultaneously, they also established “content quality control” mechanism (NTT DoCoMo, 2007). It helps them, on the other hand, to deepen the satisfaction and loyalty of customer. Further, young teenager was set as the main target group by NTT DoCoMo. Most of them are interested in entertainment content and service, therefore, the demand of young teenager was matched by NTT DoCoMo’s entertainment content which accounts for more than half service of their whole (NTT DoCoMo, 2007, Wang 2007, P69, Shi and Zhang, 2003, P144-145).

Likewise, early attention of wireless technology, terminal equipment standard and payment mechanism enable them to catch the non-developed M-commerce market faster than other competitors (Sven & Erik 2004, P348-349).

In China, due to the factors of geography, culture and custom are different from Japan, currently, people’s interest of M-commerce in China now mainly focus on information searching service and business transaction, such as news, weather information, e-mail manage etc. (Wang, 2007, P69-71) However, as living level is increasing, entertainment content and service are predicted to be main rising point of M-commerce. For example, according to the market research from iResearch, the number of mobile game player is increasing by the rate of 48.2% during 2005-2006. Likewise, the usage of MMS (Multimedia Messaging Service) is growing by the rate of 98% (2005-2006), it would be continue fast growing in three years (iResearch, 2006).

Additionally, the customer foundation for M-commerce transaction in China is similar with it in Japan. Most of the mobile phone users are in age 15-40 (Shi & Zhang, 2003, P145). And young users around 10 years old should be thought as the biggest potential group of consumers (Shi & Zhang 2003, P145, Wang 2007, P69). How to attract theses people’s attention and interest and how to be the first mover of 3G
technology become the key question for Chinese business.

7.1.3 M-commerce Innovation Perspective

As far as we know, one of the key factors for NTT DoCoMo to gain such a big market share of M-commerce in Japan should be that i-model they developed have brought to customers the needs and benefit they want from M-commerce, which they can not obtain from traditional E-commerce, such as application of mobile technology (NTT DoCoMo, 2007). Additionally, handset manufactures have adapted M-commerce innovation through NTT DoCoMo. Since the restriction and limitation for customers to use handset has been smoothed by the solid relationship with other stakeholders built by i-model. For example, NTT DoCoMo integrated the mode standard adopted by different handsets (Shi & Zhang 2003, P146). Consequently, i-model was well-known and enlarged the market share in Japan.

On contrary, most of the people in China do not really perceive and understand the innovation of M-commerce and the benefits from it though some of them are using services of it. For example, based on the market research from Shi and Zhang (2003, P145), nearly half people who accepted interview showed not as much interest in M-commerce as it was predicted by mass media, about 20% people showed careless about when they could use service from M-commerce, such as WAP (Wireless Application Protocol). On the other hand, the restriction and limitation of handset also confine the evolution of M-commerce innovation in China, such as input difficulty and different mode standards.

Hence, from our point of view, to executive M-commerce innovation well, Chinese E-commerce companies should help to raise the understanding in usability of products and services from M-commerce. The people who are willing to use products and services from M-commerce should be thought as the potential market of M-commerce. The more people know, the more they are willing to use, and the bigger the market becomes. Therefore, it is necessary to catch these potential customers by raising their understanding of M-commerce. Besides, the functions of handset could be another barrier for the development of M-commerce in China. As far as I know, it would cause the restriction when E-commerce companies deliver novel products or services to customers. To settle this issue is also another prerequisite challenge for Chinese E-commerce companies.

7.1.4 Customer Value Perspective

As we mention above, NTT DoCoMo could catch the M-commerce market opportunities because they recognized that different group of customer has different demand and needs, and what service and content could attract their attention and curiosity. To fulfill different customer’s value, NTT DoCoMo deliver more benefit to
content provider rather than earn for itself, so as to attract more different content created by content providers. For example, NTT DoCoMo only charges 9% commission from income, and return the rest to content providers. On the other side, customer’s values are matched with a reasonable price ((Geoff 2001, P15).

In China, although there is a general understanding that customers have different needs, most of E-commerce companies are using more or less the same type of content from content providers due to the role-model impacts. However, lack of characteristic in service would lead to disadvantages for E-commerce company’s further development (Wang, 2007, P69-71). Moreover, there is obvious problem in Chinese M-commerce that content providers face a high cost for offering contents to E-commerce companies. For example, the largest mobile operator and E-commerce company, China Mobile, charges 15% commission from income (Wang, 2007, P69-71). The rest of income is not totally return to content providers but charge more as extra fee. That would not only mangle benefit of content providers but also raise customers’ using cost.

Based on the analysis concerning the customer value of M-commerce in China and in Japan, we think most of the E-commerce companies in China still remain in a passive position of M-commerce market and they also have not realized that characteristic service could bring potential customers, since they provide the same content of service. Therefore, to create a group of customer which is attracted by special service of theirs is necessary for Chinese E-commerce companies. Meanwhile, understanding the position of cost among diverse customers should be considered as the approach of catching customers in our opinion. It is a basis of setting up the strategies towards exploiting markets.

7.1.5 Network Perspective

From chapter 6, we could easily find that NTT DoCoMo treat itself as the bridge among customer and other stakeholders of the whole M-commerce industry, such as content providers etc. They also succeed in building a solid relationship with the key stakeholders which stand in a strategic position of M-commerce in Japan. For example, NTT DoCoMo collaborated with Nokia and other main handset manufactures to standardize the mode of mobile phone adapt to i-model and develop 3G technology (NTT DoCoMo, 2007).

Meanwhile, through collaborating with more than 200 banks, NTT DoCoMo provides customers fast and safe payment of transactions that customers feel convenient and are willing to use more services from i-model (Shi and Zhang 2003, P146). Moreover, NTT DoCoMo’s alliances are not only constructed in domestic market but also built towards international market recently to enlarge the coverage of transaction, such as cooperate with Chinese E-commerce company UFIDA for developing an M-commerce platform.
On the other hand, in China, due to numbers of different E-commerce companies turning transaction into M-commerce currently and each of them has their own M-commerce platform and standards, customers have to adapt different standards and platforms when they use service from different E-commerce companies (Wang, 2007, P69-71). Further, most payment of transaction in M-commerce of China still remained in conducting by cash except some simple deal like purchase phone ring from E-commerce company (Shi & Zhang, 2003, P146). All of these will not only obviously increase the transaction amount of customers, E-commerce companies and banks, but also raise the cost of relevant co-opetitors.

Besides, in China, the structure of M-commerce industry appears to be loose currently (Shi & Zhang, 2003, P146). In our opinion, the main reason should be E-commerce companiess haven’t constructed a solid relationship with relevant co-opetitors as well as manage them perfectly within the whole industrial chain. It would definitely cause problems that slow down development of M-commerce in China. For example, content providers complain that they haven’t got what they should profit, as well as wrong or unhealthy information spread by handset.

Compare with NTT DoCoMo, Chinese E-commerce companies that within M-commerce innovation still have many problems to be settled, we will have further discussion and suggestion in 7.3.

7.2 Suggestions and Implication for Chinese E-commerce Companies

Based on the comparison and analysis above, from our point of view, NTT DoCoMo should be definitely an excellent example for Chinese E-commerce companies to study during the innovation from Web-based commerce to M-commerce. To make sure the evolution of M-commerce innovation being conducted smoothly, identifying the right dynamic capabilities should be the key point. And we will provide our suggestion as below. Further specific implication will be presented following.

7.2.1 Suggestions for Identification of Dynamic Capability

Here, we would expound our suggestion towards Chinese E-commerce companies for identification of dynamic capabilities integrating the dynamic capabilities we have identified and summarized in Chapter 4 and current problem of them. These suggestions will be presented by five types of dynamic capabilities:

1. Choose enabling technology
   - Conduct 3G technology into Chinese market smoothly by integrating existing resources and matching series technology.
   - Enhance development of application technology with third-party providers.
   - Upgrade and modify the existing technology (like internet-based technology)
to be applied in M-commerce.

2. Matching with economic opportunities
   ♦ Segment different markets based on the identification of different customers’ interests and lifestyle.
   ♦ Shift focus from traditional information exchange service market to potential fast growing market of entertainment
   ♦ Focus on satisfying young teenage customers and inducting 10 year old potential customers.

3. Executing business innovation
   ♦ Design and exploit new services which lock-in customers from other technology (like internet).
   ♦ Facilitate innovation of handset functions to adapt new service and avoid the handset restriction from M-commerce innovation.
   ♦ Implement marketing strategies to raise the understanding of customers towards mobile technology and advantages of service base on M-commerce.

4. Understanding customer value
   ♦ Extend diversity of existing services and invest more characteristic service based on different market segment.
   ♦ Integrate using the advantages of charge and free-charge service with a proper way.
   ♦ Invest in reducing switching costs and transit cost for customers.

5. Constructing alliance with co-opetitors
   ♦ Figure out the way to standardize different mode of handset with co-opetitors.
   ♦ Collaborate with banks in establishing payment mechanism for reducing amount and cost of transactions.
   ♦ Raise profit for content providers for set up a solid relationship.
   ♦ Enhance capability of managing co-opetitors and stakeholders within the whole industrial chain.

7.3 Further Implication

Besides those dynamic capabilities that we propose above, base on the specific environment and market condition in China, we suggest that Chinese E-commerce companies should recognize the advantages and disadvantages of their own, as well as settle problems integrating with own conditions rather than follow fashion blindly. The following could be implication for Chinese E-commerce companies as examples.
Firstly, as we mentioned above there are thousands of different E-commerce companies appear in Chinese M-commerce market, many of them have their own platforms and standards, none of them could standardize the whole industrial chain so far even China Mobile the biggest mobile operator and E-commerce company account for 65% M-commerce market share. Therefore, in order to attract more customers and reserve the loyalty of current customers, building a creative and top-quality brand should be vital and prerequisite.

Secondly, although we suggest Chinese E-commerce companies to enhance collaboration with bank for payment, the usage of credit card will not be able to permeate so fast in a short run due to the level of living (Wang, 2007, P69-71). In this specific case, we would suggest E-commerce companies to integrate payment through bank and telecom that customer familiar and easy to follow.
8. Conclusion

This chapter provides the readers with the conclusions that are achieved in our study. The conclusion is structured follow the purpose of the whole research.

Before we present the conclusions we would like to return to the purpose of this study:
(1) clarify the important changes and impact on the E-commerce stakeholders among E-commerce innovations by using the E-commerce innovation hypercube model
(2) Explore and develop the core dynamic capabilities that necessary for E-commerce company transformation among E-commerce innovations.
(3) Identify specific dynamic capabilities of E-commerce company that are necessary for E-commerce innovation in China and investigate guidelines for developing these capabilities.

Following, we will present our conclusion in three aspects: practicability of E-commerce innovation hypercube model, feasibility of E-commerce company’s dynamic capabilities, guidelines for Chinese E-commerce companies.

8.1 Practicability of E-commerce Innovation Hypercube Model

Hypercube model of E-commerce innovation is constructed by three dimensions: technological components, business model and stakeholders. Thereof, technological components and business model represent two main factors that are used to analyze the impact of E-commerce innovations on stakeholders. Consequently, the type of innovation on different stakeholders can be qualified respectively into incremental, modular, architectural and disruptive innovation.

We have used case of NTT DoCoMo to examine its practicability. In our opinion, this model reflects the reality of E-commerce innovation in two different dimensions, technological components and business model. Meanwhile, this model also provides a practical tool for manager or specialist of E-commerce company to analyze and evaluate the types and impacts from E-commerce innovations. Especially, it indicates how E-commerce innovation influence on E-commerce stakeholders which include providers, customers, complementors and E-commerce company. According to this, E-commerce company has to figure out ways for coping with E-commerce innovation rather than simply treat it as an extension of last phase.
8.2 Feasibility of E-commerce Company’s Dynamic Capabilities

Based on previous study, we have developed dynamic capabilities that necessary for E-commerce company to cope with innovations from Web-based commerce to M-commerce and from M-commerce to U-commerce in our research. Dynamic capabilities used by E-commerce company include two main dimensions: technological dynamic capabilities and commercial dynamic capabilities. Thereof, constructing technological infrastructure, continuing or creating content and providing new services comprise technological dynamic capabilities. Commercial dynamic capabilities contain: matching with economic opportunities, executing business innovation, understanding customer value and constructing alliances with co-opetitors.

From the practical perspective, in the case study NTT DoCoMo used only its commercial dynamic capabilities in transforming to M-commerce successfully since it is architectural innovation from Web-based commerce to M-commerce for E-commerce company. Furthermore, the finding of E-commerce company’s dynamic capabilities from the case study of NTT DoCoMo will facilitate and encourage E-commerce companies to improve their dynamic capabilities for keeping their competitive advantages.

8.3 Guidelines for Chinese E-commerce Companies

Due to most of Chinese E-commerce companies are transforming from Web-based commerce to M-commerce, we have only conducted the guidelines how E-commerce companies in China should cope with M-commerce innovation by identifying and developing their specific dynamic capabilities. By comparing to Japanese E-commerce company NTT DoCoMo and using it as a successful example, we propose along with five aspects of dynamic capabilities we have developed with specific content for Chinese E-commerce companies. And these five dynamic capabilities are: choosing enabling technology, matching with economic opportunities, executing business innovation, understanding customer value, constructing alliance with co-opetitors.

Specifically, from our point of view, several contents of these five dynamic capabilities should be highlighted for Chinese E-commerce companies. Currently, it is very important for Chinese E-commerce companies to concentrate on conducting 3G technology smoothly and satisfying young teenage customers which represent the potential amount of future revenue. Meanwhile, the prerequisite for the development of M-commerce in China should be raising customers’ understanding of usability of M-commerce and figuring out to standardize handset mode, as well as settle the payment issue.
Since China is a specific country with complicated environment and numbers of E-commerce company, it is suggest that Chinese E-commerce companies should recognize advantages and disadvantages of their own, as well as integrate own conditions and restrictions to cope with innovations rather than following fashion blindly.
References

Books

Articles


**Internet**


may amount to 88 billion US dollars” Available from: http://news.chinabyte.com/166/1842666.shtml [accessed 22 March 2007]


## Appendix:

### Table 2: The Changes of the Content (Wu, 2004, P394)

<table>
<thead>
<tr>
<th>Factors</th>
<th>Web-based commerce</th>
<th>M-commerce</th>
<th>U-commerce</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3. Transaction information</td>
<td>3. Transaction and location information</td>
<td>3. Transaction and context information</td>
</tr>
<tr>
<td>Content packaging</td>
<td>1. Hyper text (e.g., HTML, XML)</td>
<td>1. vCard (e.g., WML, cHTML, XSL)</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>2. Hyperlink navigation model</td>
<td>2. Inter-card navigation mode</td>
<td></td>
</tr>
<tr>
<td>Content distribution</td>
<td>1. Client/server (three tiered) distribution model</td>
<td>1. Mobile distribution model</td>
<td>1. Ubiquitous distribution model</td>
</tr>
</tbody>
</table>

### Table 3: The Change of the Service (Wu, 2004, P396)

<table>
<thead>
<tr>
<th>Factors</th>
<th>Web-based commerce</th>
<th>M-commerce</th>
<th>U-commerce</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2. Passive service</td>
<td>2. Proactive service</td>
<td>2. Proactive service</td>
</tr>
<tr>
<td>Need recognition</td>
<td>1. Worldwide range of products and services offered</td>
<td>1. Regional range of products and services offered</td>
<td>1. Specific range of products and services offered</td>
</tr>
<tr>
<td></td>
<td>2. Geographic dispersed</td>
<td>2. Location-specific services</td>
<td>2. Location-specific and temporal-critical services</td>
</tr>
<tr>
<td></td>
<td>2. Virtual navigation search</td>
<td>2. Virtual navigation search</td>
<td>2. Virtual and physical navigation search</td>
</tr>
<tr>
<td></td>
<td>2. Facilities: cross sites comparisons, intelligent agents, or discussions in newsgroups</td>
<td>2. Facilities: discussions in charts via WAP or iMode.</td>
<td>2. Facilities: multi-discipline</td>
</tr>
<tr>
<td>Purchase</td>
<td>1. Digital payment</td>
<td>1. Digital payment or Bill</td>
<td>1. Multi-discipline digital payment and traditional payment</td>
</tr>
<tr>
<td></td>
<td>2. Third party payment systems</td>
<td>2. Build-in carrier payment system</td>
<td>2. Build-in carrier payment system or physical stores</td>
</tr>
<tr>
<td>Post purchase</td>
<td>1. Easy connection to backend system</td>
<td>1. Limited connection to backend system</td>
<td>1. Seamless connection to backend system</td>
</tr>
<tr>
<td></td>
<td>2. Services deliver to fixed location</td>
<td>2. Services deliver to mobile customers</td>
<td>2. Services deliver to mobile customers</td>
</tr>
<tr>
<td></td>
<td>3. Irregular feedback</td>
<td>3. Instantaneous feedback</td>
<td>3. Ubiquitous feedback</td>
</tr>
</tbody>
</table>
### Table 4: The Changes of Business Model (Wu, 2004, P397)

<table>
<thead>
<tr>
<th>Factors</th>
<th>Web-based commerce</th>
<th>M-Commerce</th>
<th>U-Commerce</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value proposition</td>
<td>1. Low cost</td>
<td>1. Mobility</td>
<td>1. Transparency</td>
</tr>
<tr>
<td></td>
<td>2. High speed</td>
<td>2. Localization</td>
<td>2. Pervasion</td>
</tr>
<tr>
<td>Market segment</td>
<td>1. Global market</td>
<td>1. Regional market</td>
<td>1. Universal market</td>
</tr>
<tr>
<td></td>
<td>2. PC's users with Internet connection</td>
<td>2. Mobile device users</td>
<td>2. Heterogeneous users</td>
</tr>
<tr>
<td></td>
<td>3. Most of users are highly educated</td>
<td>3. Business mobile workers and young people</td>
<td>3. Unlimited demographics</td>
</tr>
<tr>
<td>Cost structure</td>
<td>1. Low technology, application development, networking, and content delivery cost</td>
<td>1. High technology cost, application, development cost, networking and content delivery cost</td>
<td>1. High technology cost, application development, and content creation cost</td>
</tr>
<tr>
<td></td>
<td>2. High content creation cost</td>
<td>2. Low content creation cost</td>
<td>2. Low networking and content delivery cost</td>
</tr>
<tr>
<td></td>
<td>3. High logistic cost for physical goods and low logistic cost for information goods</td>
<td>3. Low logistic cost for physical goods and high logistic cost for information goods</td>
<td>3. Low logistic cost for physical goods, and information goods</td>
</tr>
<tr>
<td>Profit potential</td>
<td>1. Lower transaction, labor, promotion cost, service and inventory cost</td>
<td>1. Improve efficiency of mobile workforce and task</td>
<td>1. Lower cost, improved trust, enhanced differentiation, and market extension</td>
</tr>
<tr>
<td></td>
<td>2. Revenues of servicing, advertising and content subscribing are major profit source</td>
<td>2. Revenues of mobile servicing and networking fee are major profit source</td>
<td>2. Revenue of value-added servicing and product selling are major profit source</td>
</tr>
<tr>
<td></td>
<td>3. Low networking and service charge</td>
<td>3. High networking and service charge</td>
<td>3. Low networking and high service charge</td>
</tr>
<tr>
<td>Value network</td>
<td>1. Backbone operators</td>
<td>1. Telecom operators</td>
<td>1. Network operators</td>
</tr>
<tr>
<td></td>
<td>2. Internet service, application, and content providers</td>
<td>2. Mobile service, application, and content providers</td>
<td>2. Ubiquitous service, geo-positioning service, application, and content providers</td>
</tr>
<tr>
<td></td>
<td>4. Internet portals</td>
<td>4. Internet and mobile portals</td>
<td>4. Internet and mobile portals</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5. Bricks-and-mortar stores</td>
</tr>
</tbody>
</table>