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# **NTT DoCoMo's Success in Creating Mobile Contactless Payments Ecosystem**

Master's Thesis within Business Administration

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## Master Thesis within Business Administration

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### Abstract

**Background:** Recently mobile contactless payments (MCPs) have become a hot topic around the world. However, most countries are still going through their early stages or market chaos and nowhere near successful worldwide. This is mainly because MCPs have complicated business networks involving many participants from multiple industries and the business ecosystem creation is required for the development of MCPs. So far, only a few cases have realized a healthy ecosystem and a relatively widely-adopted market, of which the most successful is NTT DoCoMo, Japan's telecom giant that acts a central role in developing MCPs in the Japanese market.

**Purpose:** This study applies the business ecosystem and technology adoption theories to the deployment of MCPs to try to explain NTT DoCoMo's success of NTT DoCoMo creating its MCPs ecosystem, identify NTT DoCoMo's success factors which can be helpful for other countries to build MCPs ecosystem.

**Method:** A deductive approach and single-case research study are used in this study. The main source of data for this study is from semi-structured and in-depth interviews. The secondary data from published reports and articles as well as internet sources is also used.

**Conclusion:** NTT DoCoMo implemented a keystone strategy and a pushing strategy to build its MCPs ecosystem which is the key to its success. Additionally, an enabling environment is an important success factor as well.

**Value of the Thesis:** This thesis not only provides insights into NTT DoCoMo's success, but also is helpful for creating and developing similar MCPs ecosystem in other markets.

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# 1 Introduction

## 1.1 Background

A payment refers to the transfer of money from one party to another, usually made in exchange for goods or services, or to fulfill a legal obligation (Wikipedia). As part of people's daily life, it occurs whenever and wherever. As technological advancements, payment forms are evolving from the simplest barter, to the use of paper instruments like cash and checks to current electronic methods like credit/debit cards and online banks, which has been bringing increasing convenience, security and ease of use to individuals and businesses and changing their payment habits. The evolution would never stop. Looking at the future payments landscape, mobile phones exhibit the most potential as a payment instrument as their extensive popularity around the world. According to the latest figures from the International Telecommunication Union (ITU), nearly 90% of people in the world use mobile phones in 2011 (ITU, 2011). Also, users are so addicted to their mobiles that they check their mobiles 150 times a day on average, according to Nokia at MindTrek 2010. So the concept of "mobile payments", the convergence of payments and mobile communications, was born and just as John Philip Coghlan, CEO of Visa USA said at the CTIA Wireless Conference in March 2007, this convergence is not just logical - it is inevitable (Coghlan, 2007). Currently, mobile payments have already become a much discussed topic worldwide. By definition given by Innopay, "mobile payments" refer specifically to the use of a mobile phone as a payment alternative where the mobile phone is involved in the initiation and/or confirmation of the payment (Bel, Gaza & Liezenberg, 2012).

Mobile payments take multiple forms, among which mobile contactless payments (MCPs) (also called contactless mobile payments), are a focus of current attention generally in the mobile payments field. MCPs are defined as making financial transactions by placing a mobile device in close proximity to a point of sale (PoS) terminal or another mobile device (Smart Card Alliance, 2007). With MCPs services, consumers can pay as easily as waving their mobile phones over a PoS terminal or transfer money to other individuals by moving two phones towards each other (Bel et al., 2012). In MCPs cases, some additional features such as loyalty programs, couponing, ID cards or ticketing are offered usually as value-added services.

Now the global market is seeing various trials and pilots showcasing the increased convenience and ease of use brought by MCP services (Mobey Forum, 2011). Also, there are many optimistic predictions from industry experts and players about the imminent advent of MCPs. Stepping outside this wonderful vision, however, the reality is that most countries are still going through their early stages or market chaos and nowhere near

successful worldwide (Bel et al., 2012). This is mainly because unlike many other businesses which can be run only by a firm alone, MCPs have complicated business networks involving many participants from multiple industries like mobile operators, financial institutions, handset manufacturers, merchants and more, so the development of MCPs requires much more cooperation among participants (Ezell, 2009). So far, only a few cases in the world have realized a relatively widely-adopted market, of which the most successful is NTT DoCoMo, Japan's telecom giant that acts a central role in developing MCPs in the Japanese market. As for the value of Japanese successful experience in the deployment of MCPs, Red Gillen, Senior Analyst with Celent's Banking Group (2010) commented,

*“Although Japan obviously differs from the rest of the world, its success in the mobile contactless payments space merits examination. If one puts aside the technical and infrastructure differences of the Japanese market, there are a number of empirical, strategic business lessons that are relevant to other countries.”* (Gillen, 2010)

## **1.2 Problem Statement**

NTT DoCoMo's success in developing MCPs has drawn a great interest in the business and academic circles. About this, we conduct a literature study as well. Many previous researches show that the uniqueness of Japanese market, culture and lifestyle or NTT DoCoMo's powerful assets and capabilities are viewed as NTT DoCoMo's important success factors and then a conclusion is reached that the Japanese model of developing mobile payments cannot be exported. However, we do not agree with the viewpoint like this. We are with Gillen's that strategic business lessons are relevant and useful to other countries (Gillen, 2010). It is important and necessary to explore NTT DoCoMo's success deeply from a strategic perspective. In addition, there is a lack of English literature about NTT DoCoMo and the Japanese market in the mobile payments field. The research problem of this thesis is how to explain NTT DoCoMo's success in establishing and developing MCPs from a strategic perspective.

## **1.3 Research Purpose**

MCPs have a complex landscape where many stakeholders are involved, which makes value chain theories already not broad enough to cope with this development issue of MCPs well. Moore (1993) first introduces the concept of “business ecosystem” which is adopted in the industries like IT, biological technologies, Internet (Iansiti & Levien, 2004a; Iansiti & Richards, 2006). The business ecosystem theories offer a powerful tool in understanding the complex business networks (Karhiniemi, 2009) and opens a broader way of looking at the structure and interaction among organizations (Zhang & Liang, 2011). In this paper, we apply business ecosystem theories and Weil-Utterback dynamics model to the development of MCPs. The purpose of the study is to assess the strategy of

NTT DoCoMo to develop MCPs in the Japanese market based on a theoretical framework of business ecosystem strategy and Weil-Utterback dynamics model, and to identify its success factors.



## **2 Literature Review**

### **2.1 Key Concepts**

Our study begins with defining key concepts used which is necessary for our following works. It is all the more, because there are many misunderstandings and confusing points around the definitions of mobile payments and its relevant concepts.






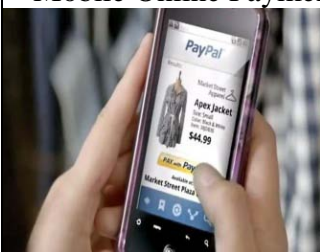
#### **2.1.1 Mobile Payments (MPs)**

In this thesis, we follow the definition given by the Mobile Payment Forum (MPF), a global cross-industry alliance of key organizations from the mobile and financial industries dedicated to the advancement of mobile commerce. Mobile payment is defined as any payment by the use of a mobile device, especially mobile phone, as a payment alternative where the mobile device is involved in the initiation and activation and/or confirmation of the payment (MPF, 2003).

Mobile payments take multiple forms. According to Federal Reserve Bank of Boston (2007), there are two basic types of mobile payments on the criteria of location: remote and proximity. When actors involved are taken into consideration, four categories of mobile payment are distinguished (Bel et al., 2012) (see Table 1).

Remote mobile payments are those that can be conducted without a PoS terminal, regardless of the location of the payer or the payee (Bel et al., 2012). Mobile online payments, referring to the use of mobile phones with an access to the Internet to make purchases like digital contents or applications from a web merchant (Smart Card Alliance, 2007), are not a new concept and already well-established in many markets. In this mobile payments solution, the mobile phone is used as a channel to process standard electronic payments (Priso, 2006). Mobile money transfers are found popular in some nations with poor quality of banking infrastructure and a large unbanked population, and this financial transaction solutions offered by mobile operators become mainstream instead of banking (Bourreau & Verdier, 2010). For example, the M-Pesa mobile payment solution in Kenya launched by Safaricom, a mobile operator, enables its subscribers, over 14 million as of November 2011, to complete P2P money transfers over the cellular network of the mobile operator by sending a SMS or something likewise (Safaricom, 2011). By and large, remote mobile payments have a simple and manifest industry chain and are relatively easy to follow and develop, because they can be usually implemented based upon a closed loop mobile payments system (e.g. M-Pesa) or the existing financial payments infrastructure (e.g. an online payment at a web merchant) (Smart Card Alliance, 2007).

In proximity mobile payments, there is a niche market for the use of the mobile phone with the help of an extra device as a PoS to accept typically card payments (Bel. et al., 2012). One typical example is the Square credit card reader (see Table 1) which is introduced in the North America. The external card readers are specifically targeted for small enterprises not large enough for traditional PoS devices. Our focus in the thesis is MCP, especially the B2C solution that is introduced in details in the subsequent section.

	<b>B2C(Business to Customer)</b>	<b>P2P (Person to Person)</b>
<b>Proximity</b>	<ul style="list-style-type: none"> <li>• Mobile Contactless Payment (our focus)</li> </ul>  <p><i>Photograph: Google Wallet</i></p>  <p><i>Photograph: Osaifu-Keitai</i></p>	<ul style="list-style-type: none"> <li>• Mobile Contactless Payment</li> </ul>  <p><i>Photograph: Google Wallet</i></p> <ul style="list-style-type: none"> <li>• Mobile as PoS</li> </ul>  <p><i>Photograph: Square Credit Card Reader</i></p>
<b>Remote</b>	<ul style="list-style-type: none"> <li>• Mobile Money Transfers</li> </ul>  <p><i>Photograph: M-pesa in Kenya</i></p>	<ul style="list-style-type: none"> <li>• Mobile Online Payments</li> </ul>  <p><i>Photograph: PayPal</i></p>

**Table 1 Mobile Payment Categories**

(Sources: Bel et al., 2012. Photographs: Relevant Press Releases)

### 2.1.2 Mobile Contactless Payments (MCPs)

The contactless or touchless payment concept is not new. For example, in the US, Visa and MasterCard have already entered this market with contactless smart cards which users can pay merely waving cards over readers labeled with “PayPass” for Visa and “WavePay” for MasterCard, instead of traditional magnetic stripe cards and touch-based smart cards that have insert, swipe though the readers. Broadly defined, MCPs refer to the use of a mobile device, particularly a mobile phone as a carrier in replace of the

plastic card, which includes some self-adhesive contactless cards or tags designed to be attached to the back of any device including mobile handsets (Mobey Forum, 2011). There are two types of stickers, passive and active, of which active stickers are usually capable of interfacing to a mobile handset's application execution environment. Here, our scope of the research does not include the cases where the mobile device is not vital when deploying stickers, or mobile phone could be substituted by other devices or objects which are not of great value to research (Mobey Forum, 2011). So we limit the scope of MCPs to the case where the mobile device should be mandatory for MCPs. In the MCPs, the mobile device refers specially to the mobile phone. Technically, MCPs use radio frequency identification (RFID) technology, particularly through NFC (near field communication), a technology international standard of RFID, to enable contactless payments. Given access to NFC, a mobile phone is a multi-functional device possessing information storage and transaction, identification and authentication, and communication functions (Mobey Forum, 2011).

### **2.1.3 Common Misunderstandings**

Some misunderstandings around mobile payments found in articles, reports and previous literatures are summarized in this section, by which we hope that our study is helpful to the future research.

First, mobile payments take multiple forms with very different business models and different challenges to develop, such as the remote mobile payments and MCPs. In much literature, they did not distinguish these forms and study mobile payment as a whole, which is not proper. Before a study, it is better to limit the research scope because the concept of mobile payments is complex. Some authors just equal mobile payments to contactless mobile payments. In some journal articles, it is often said that developing countries are ahead of developed countries in the development of mobile payment. Actually, they cannot be compared, because the focuses of developing countries and developed countries are different. The former are on remote mobile payments and the latter MCPs.

Second, a lot of researchers view contactless mobile payment as NFC mobile payments, which is not precise either. There are many existing technologies enabling MCPs, among which just NFC is the only one of international standard. However, some countries like Japan and South Korea, adopt their home-own technology. For example, Japan use Felica technology to enable MCPs which is similar technology to, but different from NFC in some aspects.

Third, technological issues are not our study focus, but it is necessary and important to have a right mindset for several frequently discussed concepts in the MCPs field which

are Radio Frequency Identification (RFID), Near Field Communication (NFC), FeliCa. Actually, there is a lack of clear understandings of the scope of these technologies in many literatures. Simply speaking, RFID has the broadest scope among the three and both NFC and FeliCa are specific subsets of RFID technology. An RFID application has three layers: radio, protocol(s), and application. FeliCa and NFC are mostly compatible on the radio and protocol level protocol, but not on the application layer, so FeliCa is a proprietary standard which currently is not fully interoperable with NFC standards (Ezell, 2009). According to the NFC Forum, NFC is a standards-based, short-range (a few centimeters typically 0-4cm) wireless connectivity technology that enables simple and safe two-way interactions between electronic devices. The NFC standard is the only one with international standard. This technology is the mainstream in the future and has got the most of attention from the MCPs field, especially in Europe and the US. FeliCa developed by Sony is widely applied to MCPs and other applications like ticketing, door control system and more in Japan.

## **2.2 Development of MCPs**

### **2.2.1 Global Trends of MCPs**

For the development of MCPs, especially NFC-enabled ones, there have been a lot of highly optimistic predictions from researchers and significant business players. NFC technology, which has been already introduced in the previous section, is the only one of international standard, so it is viewed as the future by most of business players and researchers. However, some countries like Japan and South Korean adopt different technologies to NFC but with similar effect in terms of the MCPs deployment. Back to the predictions, the Pew Internet & American Life Project and Elon University's Internet Center conducted a study by surveying a total of 1,021 internet experts and other internet users, which finds that 65 percent of respondents believe that swiping a mobile phone as a form of payment will become widely adopted by the end of the decade and this study suggests that by 2020 mobile payments could become the dominant form of payment (Webster, 2012). A new forecast from Juniper Research indicates that more than 25% of mobile phone users will make NFC payments in stores in the US and Western Europe in five years time as NFC becomes standard, and that transactions via NFC-based phones around the world will exceed 180 billion dollars in 2017 (Clark, 2012a). Also, Dr Windsor Holden, one of the researcher who made the forecast says, "NFC is now impacting the public consciousness and we expect a rapid market expansion from 2012 onwards" (Clark, 2012a). Berg Insight says that the number of NFC point-of-sale terminals around the world will increase from 3.9 million today to 43.4 million in 2017 and the US is expected to have the world's highest density (Clark, 2012b). An estimated 86% of the terminals will be NFC-ready by 2017 in the US and 78% and 38% in Europe

and the rest of the world, respectively (Clark, 2012b). All in all, most of forecasters believe that MCPs or NFC mobile payments have tremendous user appeal given the increased convenience and ease of use brought by these new payment solutions, which will drive the MCPs trials to transit to commercial rollouts and accelerate the deployment the infrastructure of MCPs. Additionally, many significant business players also see the great promise of MCPs. It has become widely presumed that Apple will equip the next iPhone with NFC support and Mark Moskowitz, the JP Morgan analyst, who indicates that Apple has been working on NFC payments since at least 2010, also makes the same prediction to the next iPhone (Scott, 2012). In fact, Apple coined the term “iPay” for the NFC payments in a series of patents it owned that describe “a comprehensive mobile payments, mobile commerce and mobile marketing business based around an NFC-enabled iPhone” (Scott, 2012).

2nd NFC payments Europe 2012 was held at 13-14, June 2012 in London, with various participants including banks, operators, technology providers, handset vendors, research companies, government official and more, where some case studies are given by companies like BNP Paribas, Barclaycard, Telefonica Czech Republic, La Caixa and Landesbank Berlin, to define the big mobile payment market opportunity boost the popularity of NFC payment (NFC Insight, 2012). NFC world congress will hold the conference and exhibition from September 17<sup>th</sup> to 19<sup>th</sup>, 2012 in Nice, France to define the business strategies for the NFC market and ecosystem (NFC World Congress, 2012). The 5th NFC Congress 2012 will be held in Hagenberg, Austria, from September 11th - 12th, with a big focus on the application of NFC to mobile payment in the next years (NFC Congress 2012 Hagenberg, 2012).

The realistic world is seeing numerous MCPs trials and some full-scale service deployments. In the USA, Google opened up its NFC system by launching Google Wallet, allowing Sprint Nexus S users on to try out mobile contactless payments in September, 2011 (Google Official Blog, 2011). However, Google Wallet has been seeing slow adoption since its launch. Kim (2011) believes that Google still has many questions like how to establish cooperation with more carriers, manufacturers, cards issuers and merchants to support Google Wallet. Orange, one of the world’s leading telecommunications operators and Barclaycard, a major global financial services provider, launched the UK’s first contactless mobile phone payments service, called “Quick Tap” in May, 2011, which was accepted in more than 50,000 stores nationwide, including Subway, McDonalds, Wilkinson, Little Chef, Pret a Manger, EAT and Wembley Arena (Barclay, 2011). This service had some limitations. It works on MasterCard’s PayPass system and users have to own a Barclays debit/credit card or an Orange credit card, as well as an enabled Samsung Tocco Lite phone (Savov, 2011). For the development of MCPs, the French government shows its support with €20 million to promote commercial

NFC services (Brown, 2011). Supported by the French government, Nice has launched “Nice, mobile contactless city” in May, 2010, which is the first commercial contactless mobile service both in France and Europe and involves mobile operators, financial service providers, transport operators and retailers (telecompaper, 2010). According to the Association Européenne Payez Mobile (AEPM), France is set for a nationwide commercial rollout of NFC services to begin in 2012 (Brown, 2011). In the Netherlands, a joint venture is created by financial service providers ABN AMRO, Rabobank and ING, teaming up with telecommunications and ICT services providers T-Mobile, KPN and Vodafone, with the aims to promote and facilitate the use of NFC mobile payments in the country (Bel et al., 2012).

However, just as Bel et al. (2012) state in the report “Mobile Payments 2012”, *“stepping outside this wonderful vision of a global NFC-powered mobile ecosystem, the reality of the situation is that mobile contactless payments are nowhere near reaching mass-market adoption”*. According to the report “Business models for NFC payments” by Mobey Forum (2011), it is difficult to establish relationships between stakeholders to effectively enable widespread adoption, although NFC technology to enable mobile payments is technically clear.

### **2.2.2 Challenges in the Development of MCPs**

For deploying the MCPs, technical restriction is not a challenge any more. From a business perspective, however, the development of MCPs is still a puzzle, because mobile payments are not like other business that can be operated well in isolation. Mobile payments is a complex cross-industry business, which involves many players like mobile network operators (MNOs), handset manufacturers (HMs), card issuers, merchants, governments and end-users and more. So the development of MCPs is the product of all players’ joint action, rather than one or two, which means each one must act collaboratively in the ecosystem simultaneously, but this is not something at which markets tend to be very good (Ezell, 2009). As such, there are two central challenges for development of MCPs: a chicken-or-egg problem of terminal and handset adoption and uncertain business model (Ezell, 2009).

**Chicken-or-Egg Conundrum** The use of NFC-enabled phones requires the installation of special NFC-capable PoS terminals. Consumers are not willing to buy NFC-enabled phones without a sufficient number of locations where they can use them. The installation of a special terminal is a significant investment, so merchants won’t deploy the infrastructure unless a critical mass of users use NFC-enabled phones, by which they can recover the cost quickly and make a profit. This is the first challenge mobile players should solve. According to Mark MacCarthy, one industry observer, the cost of fully

installing NFC-capable terminals in the US is estimated up to \$10 billion (Ezell, 2009). Seen from this estimate, it is indeed a huge investment.

**Uncertain Business Model** It is difficult to define a profitable business model for MCPs, due to the diversity of players and the ways in which they may collaborate (Mobey Forum, 2011). Each player desires to play the leader within MCPs ecosystem. Many of them believe they have advantages to take the lead. Mobile operators have massive customer bases including the segments banks cannot reach. Banks insist banking license and infrastructure, financial transaction experience and retail network. As Yi Li, First Deputy Director General and secretary-general of China Moving Internet Industry Alliance states, *“The barriers to mobile payments, are the business model rather than technological limitations”*. Why is it so difficult to build a business model? Various stakeholders across the industry are involved in the proximity mobile payments system (see Figure 1). Depending on different business scenarios, both players and their degrees of involvement vary. The collaboration between relevant players is a key. No industry can expect to go it alone (Smart Card Alliance, 2007). In the report, *“NFC Mobile Payments & Retail Marketing: Business Models & Forecasts 2012-2017”* by Juniper Research, the authors warns that a fully integrated and tested customer care channel is very important for the deployment of NFC payments services. *“NFC payments are a complex fusion of mobile, financial and retail technology; a single point of contact to take responsibility for resolving a problem quickly and efficiently must be established or users will desert the service,”* say the authors (Clark, 2012). Obviously, all countries looking to deploy MCPs must solve these two challenges in their way.



**Figure 1** Stakeholders Who May Involve in a Proximity Mobile Payments System  
(Source: Smart Card Alliance, 2007)

## 2.3 Theoretical Foundation and Analytical Framework

### 2.3.1 Business Ecosystem

The “ecosystem” is a biological term, which describes by a network of interactions among living organisms like plants, animals and microbes and between organisms and their environment like air, water and mineral soil ( Schulze et al., 2005). In a biological ecosystem, each species contributes to the goodness of all species. A business ecosystem is similar to a biological ecosystem. In 1993, James F. Moore (1993) applied ecosystems to the business context to originally come up with the concept of “business ecosystem” primarily based on case studies in the high-tech industry. Moore (1996) defines “business ecosystem” in the article “The Death of Competition” as:

*“An economic community supported by a foundation of interacting organizations and individuals—the organisms of the business world. The economic community produces goods and services of value to customers, who are themselves members of the ecosystem. The member organisms also include suppliers, lead producers, competitors, and other stakeholders. Over time, they coevolve their capabilities and roles, and tend to align themselves with the directions set by one or more central companies. Those companies holding leadership roles may change over time, but the function of ecosystem leader is valued by the community because it enables members to move toward shared visions to align their investments, and to find mutually supportive roles.”*

By this definition, Moore highlights the co-evolution of a firm with others in a business environment and the importance role of “the keystone species”, the leaders, in a business ecosystem. According to Anggraeni et al. (2007), after the introduction of the business ecosystem concept, many studies used it to study the interconnected business networks (Zhang & Liang, 2011). The Business ecosystem involves not only contributors to the productions and delivery of products and services, but also indirect ones like competitors, policy makers and customers (Anggraeni et al., 2007; Iansiti & Levien, 2004, 2006; Moore, 1993, 1996). This concept of business ecosystem moves the analysis from the product level to the system level and opens a new way of looking at the structure and interaction among organizations (Zhang & Liang, 2011). Nowadays, most companies are facing the reality of a complex business environment (Peltoniemi & Vuori, 2004), and business ecosystem is already applied in various fields like IT industry, big retailers, biological industries (Iansiti & Levien, 2006). According to Zhang and Liang (2011), whether a firm operates in a healthy ecosystem and adopts an appropriate strategy in this system are essential success factors. Peltoniemi (2006) summarize the common features of business ecosystem as,

(a) consisting of a large number of organizations;



(b) interconnectedness and interdependency; and

(c) dynamic co-evolution (Peltoniemi, 2006).

In Moore's research (1993), he suggests that a firm can be treated as part of a business ecosystem consisting of various industries, rather than as a member of a single industry. Firms in a business ecosystem should work competitively and cooperatively to advocate new products and satisfy customer needs. Moore (1993) also describes the four stages of the life-cycle of a business ecosystem - birth, expansion, authority, and renewal. The life-cycle of a business ecosystem can be divided into four stages. Iansiti and Levien (2006) also do some research on the business ecosystem. They say, "*We found that perhaps more than any other type of network, a biological ecosystem provides a powerful analogy for understanding a business network. Like business networks, biological ecosystems are characterized by a large number of loosely interconnected participants who depend on each other for their mutual effectiveness and survival. And like business network participants, biological species in ecosystems share their fate with each other. If the ecosystem is healthy, individual species thrive. If the ecosystem is unhealthy, individual species suffer deeply. And as with business ecosystems, reversals in overall ecosystem health can happen very quickly.*" (Iansiti & Levien, 2006)

According to Iansiti and Levien (2006), a business ecosystem has the following features - fragmentation, interconnectedness, cooperation and competition (Iansiti & Levien 2006).

Lewin and Regine (1999) refer a business ecosystem as a network of companies where each company occupies a place on its own landscape of possibilities, and each landscape is coupled to many others like competitors, collaborators, and complementors and they also advise companies in complex environments basing their strategy on co-evolution (Peltoniemi & Vuori, 2004). Due to interconnectedness, changes in the landscape of one company cause changes in the landscapes of other members of the business ecosystem (Lewin & Regine, 1999).

### **2.3.2 Keystone Strategy**

The keystone species concept was first proposed in 1969 by the zoologist Robert T. Paine, professor of the University of Washington (Paine, 1969) who defines the keystone species as a species that has a disproportionately large effect on its environment relative to its abundance (Paine, 1995) and plays a critical role in maintaining the structure of an ecological community, affecting many other organisms in an ecosystem and helping to determine the types and numbers of various other species in the community. In all, the keystone species maintain the healthy functioning of the entire system in biological ecosystems.

According to Keystone consulting firm, “like species in biological ecosystems, firms interact with one another in complex ways and the health and performance of each firm is dependent upon the health and performance of the whole.” Within a business ecosystem, the “keystone” organization naturally serves as a hub or key player that enhances the stability of the whole network (Iansit & Levien, 2006). The business ecosystem keystone strategy is led by Iansit and Levien. They (2006) present that in the business ecosystems the firms are influenced by their internal complex capabilities and by the complex interactions with the rest of the ecosystem at the same time and identify four strategies that influence ecosystem health and evolution:

- Dominators
- Niche players
- Keystones
- Commodity

Dominator firms occupy critical key players in their business ecosystem. With the aim for aggressively taking over their ecosystem by integrating horizontally or vertically directly owning and managing a large proportion of a network and expelling or defeating other players in their closest market and gradually move on to other markets. This strategy leaves no or little value for other other members within a ecosystem, which therefore reduces diversity, eliminates competition, limit consumer choices and stifle innovation (Iansiti & Levien, 2006; Göthlich & Wenzek, 2004). To sum up, it damages the health of the ecosystem and is likely to end up with the ultimate collapse of the ecosystem.

Niche players, sometimes small but representing the bulk of the ecosystem, appear to be the least influential members of an ecosystem but are responsible for most of the value creation and innovation. Niche players have narrow domain of expertise and aim to enhance their specialized capabilities to differentiate themselves from others in the network through making use of complementary resources from other niche players or from an ecosystem keystone. Niche players naturally conflict with other niche players, keystones and especially dominators (Iansiti & Levien, 2006; Göthlich & Wenzek, 2004). Innovation is critical to a niche player to keep its specialization and differentiation which are what it can depend on to get value within a ecosystem.

Keystones, exercising a regulator role, are located at the hubs control in an ecosystem, working together with other contributors to create value and share value. Keystones create a stable platform on which other ecosystem players can depend and the value of this platform goes up when the number of ecosystem members increases. They do not strive to proliferate, but contend themselves with keeping the ecosystem balance, protecting and supporting niche players, giving them room to develop in the business

ecosystem (Bond, 1993; Göthlich & Wenzek, 2004). An effective keystone strategy ensures an organization's survival and prosperity by improving the health of the ecosystem as a whole. The last one is about commodity players which focus on the lowest cost offerings.

Iansiti and Levien (2006) also state the advantages of keystone strategy: keystone firms play a significant role in a business ecosystem with the purpose of maintaining and improving the ecosystem successfully. Based on the research by Iansiti and Levien (2006), The core components of an effective keystone strategy are value creation and sharing the value with members of the ecosystem (Iansiti & Levien, 2006). Mainly based on the research by Iansiti and Levien, Zhang and Liang (2011) summarize key points of an effective keystone strategy:

***“Build and share high-value common assets:*** *The keystone strategy is usually implemented by providing a set of common assets that other organizations could use to build their own offerings. Typical examples include Wal-Mart’s procurement system and Microsoft’s Windows operating system and tools. Other organizations can attain tools, technologies, channels, specific customers, and integration effects from these assets rather than develop them by themselves. Therefore, costs are saved and value is created in a more efficient way.*

***Promote innovation:*** *To ensure a sustainable development, a keystone should improve the innovation capabilities of the ecosystem. One way is to incorporate new advanced technologies into the common assets. Another way is to promote innovations by other members. In an ecosystem, niche players are responsible for most innovations.*

***Manage the value creation process:*** *With the platform of the common assets, a keystone can leave the vast majority of value creation to others in the ecosystem. But the company has to make sure that the value of its platform divided by the costs should increase with the number of the ecosystem members that use it.*

***Share values among the contributors:*** *The individual roles within the network are positioned to create value at various levels. The health of the ecosystem suffers when a specific business utilizes more value than it creates. A keystone should share throughout the ecosystem much of the value it has created, and balance its generosity with the need to keep some of the value for itself.*

***Shape the external network:*** *If the network is too complicated to be controlled, it will be difficult for a keystone to manage the value creation process. A keystone should shape the external network by promoting competition and selecting the most valuable partners. It*

*will improve the efficiency of managing the ecosystem and promote the evolution of external resources.” (Zhang and Liang, 2011)*

Based on the five points, we will test whether NTT DoCoMo take a successful keystone strategy.

Additionally, Iansit and Levien (2006) state that business and policy leaders need to make clear that how business ecosystems and firms within them support or inhibit innovation, enhance or damage productivity, and provide healthy, sustainable environments for new firms and products. Jenkins (2008) hold the opinion that government is playing a significant role in developing mobile payments ecosystems. Government regulators are responsible for providing environments that enable ecosystem development to happen.

To sum, if your business is at the center of a complex network of asset-sharing relationships and operates in a changing environment, a keystone strategy may be the best and effective choice (Iansiti & Levien, 2006).

### **2.3.3 Enabling Environment**

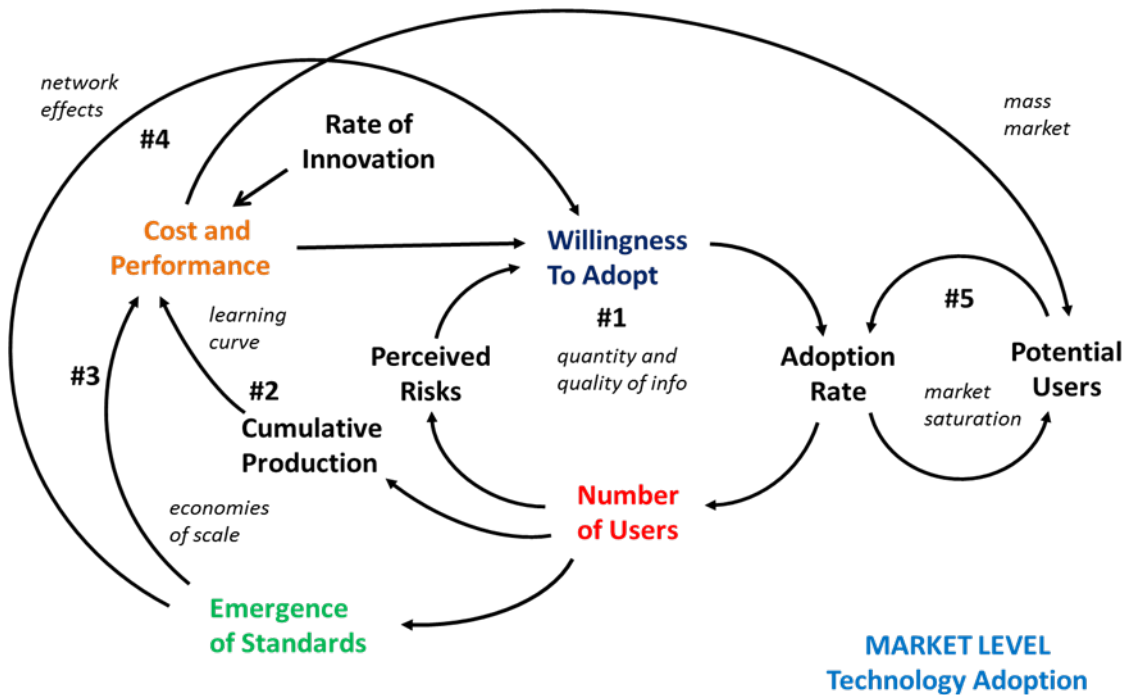
Business enabling environment is the set of policy, infrastructure and cultural conditions that govern formal and informal business activities. It contains the enforcement of government policy, and national institutional arrangements that have the influence on the players within the business ecosystem (Goodpaster, 2011).

An environment is a fundamental element of business ecosystem. It is defined as an observable surface where inhabitants encounter others to interplay (Maurer, 2005). Jenkins (2008) state that an enabling environment allows mobile payment ecosystems to take root and grow. Regulation is essential to create and maintain an enabling environment for business creation and development. Additionally, Rahl (2011) point out that when it comes to how to build a successful business ecosystem, it is important to establish effective public-private cooperation, which often involves the governments (state, federal and local) working in innovative ways with utilities, operators, insurance firms, consumer advocacy organizations and so on.

### **2.3.4 Weil-Utterback Dynamics of Technology Adoption**

In 2005, Weil and Utterback use a system dynamics model to capture and analyze the fundamental dynamics of innovative industries (Weil & Utterback, 2005). This dynamics model is designed to explain a wide range of products and services - complex and simple, physical and digital, business and consumer, early stage and mature (Weil & Utterback, 2005). They propose the dynamics model of technology adoption at the market level (see Figure 2), this model analyze the fundamental dynamics of technological adoption. As shown in Figure 2, the number of potential users and their willingness are the two factors

which decide the rate of adoption. In the following, the loops of the models will be explained in details. As we can see from the Figure 2, potential user's willingness to adoption of a new technology depends on both objective and emotional factors, like price and performance, network effects, and perceived risk (Weil, 2005).



**Figure 2:** Market Level Dynamics - Technology Adoption (Source: Weil, 2005)

*“Loop #1 Adoption of the new product/service increases the number of users and quantity and quality of information available in the market, and thus reduces the perceived risks of adoption;*

*Loop #2 Unit cost generally declines and quality improves as a function of cumulative production, thus increasing the willingness to adopt the new product/service and the number of potential users*

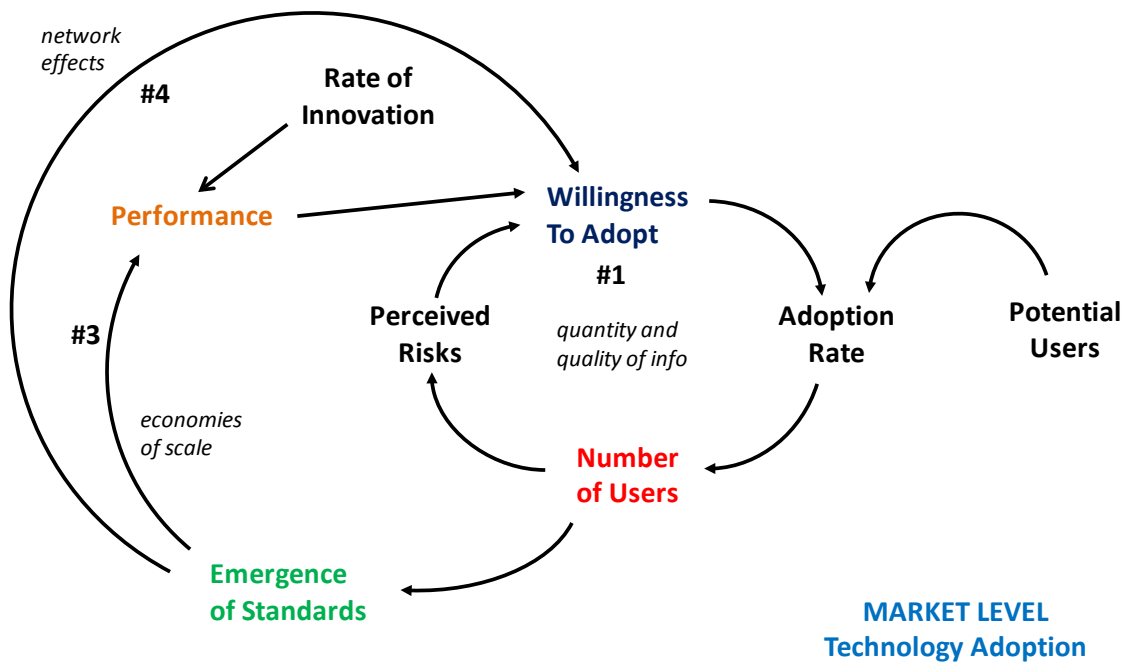
*Loop #3 Emergence of the dominant standards and design triggers industry consolidation, leading to a few large suppliers who can realize substantial economies of scale, thus increasing cost/performance and willingness to adopt*

*Loop #4 The emergence of standards also enables network effects where the value of the product/service increases non-linearly with the number of users, and thus directly affects willingness to adopt and*

*Loop #5 Adoption of the new product/service reduces the number of potential users, and thus constrains the future adoption rate ” (Weil, 2005)*

The emergence of dominance is very important in the technology diffusion. This model can explain a dynamic process from the introduction of a new product or service based on a new technology to the market saturation which is the balanced final loop. Linked this model to the development of mobile contactless payments, our focus is on the adoption especially in the early days, to be precise before a dominant industry standard emerges, because in this period the situation is uncertain. For example, the outside pushing force from some players in the mobile industry will change the result. However, when a dominant standard or design emerges, the loops can reach a balance on its own force. So in this thesis, we do an analysis of consumer adoption with a focus on the Loop 1, Loop2, and Loop 4 (Priso, 2006). (see Figure 3) Based on the model, we can analyze how the outside forces can promote the dynamics of the adoption of a new technology.

In the next sections, we will analyze Japan’s MCPs ecosystem according to this framework.



**Figure 3:** Dynamics of Technology Adoption for Mobile Payments

### **3 Methodology**

In order to fulfill the research purpose and answer the research questions, we need a clearly structured research method. In this chapter, we discuss the methodology of this research.

#### **3.1 Research Approach**

There are two main approaches in research, deductive and inductive. Simply speaking, the deductive approach is used to test theory. The deductive approach refers to developing a theory and hypothesis (hypotheses) and designing a research strategy to test the hypothesis (Saunders, Lewis & Thornhill, 2009). According to Lundahl and Skärvad (1999), “the deductive approach is based on already established theories and then draws logical conclusions and verifies these through empirical studies.” The researchers choose the deductive approach with the expectation of enriching knowledge from already existing theories (Wallén, 1993). The inductive approach emphasizes on building theory in which you would explore data and develop theory as a result of data analysis (Saunders et al., 2009). Using the inductive approach, you do not start with any predetermined theories or conceptual frameworks. This research is more of interpreting DoCoMo’s success within framed theories, verifying the usefulness of business ecosystem strategy in building a working MCPs business ecosystem based on a theoretical framework, generalizing from the findings, rather than trying to formulate new theories or proposing new business models. Our Therefore, the deductive approach better suit our research.

#### **3.2 Research Strategy – Case Study**

Case study is widely used in business and management research (Blumberg et al., 2005). Yin (1989) defines case study as “an empirical exploration that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon on and context are not clearly showed; and in which multiple sources of evidence are implemented”. Robson (2002) refers case study to “a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence” (Saunders et al., 2009). According to Morris and Wood (1991), the case study is particular useful to understand well the context of the research and the processes being enacted (Saunders et al., 2009). The case study strategy is also able to answer to questions concerning “why”, “what” and “how”, so the case study strategy is most often applied in both explanatory and exploratory research (Saunders et al., 2009).

This thesis uses the qualitative single case study that can be used where it represents a critical case, an extreme or unique case (Yin, 2003). Single case can support significant findings that devote to the development concerning knowledge and theory (Yin 2007). We choose the NTT DoCoMo's success of creating MCPs ecosystem as our case because it is the most successful case in the deployment of MCPs in the world and so far no countries have surpassed Japan. Therefore, NTT DoCoMo is a typical case and through our study, we can answer our research questions and provide practical implementation and helpful suggestions to other countries in the deployment and promotion of MCPs or similar situation in the future.

### **3.3 Research Choice**

Saunders et al. (2009) refer the way in which the researcher chooses to combine quantitative and qualitative techniques and procedures as the research choice. In our research, we choose to collect qualitative data through in-depth interviews and observations and analyze these data by corresponding non-numerical analysis procedures, which belongs to the multi-method qualitative study according to Saunders et al. (2009).

### **3.4 Data Collection**

Data can be collected from primary and secondary sources.

#### **3.4.1 Secondary Data**

The secondary data relates to any materials like books, articles, reports and news, which have been published previously (Myers, 1997) or have already been collected and recorded by someone else, usually for other purposes (Blumberg et al., 2005). We also use the secondary data from published reports and articles as well as internet sources and choose the reliable resources like government agencies, market research firms, the official website and reports of the case company.

#### **3.4.2 Primary data**

In general, the primary data are gathered from insights or information provided by relevant persons or organizations about an examined object without any intervention and also is unpublished (Myers, 1997). The main source of data for this study is from semi-structured and in-depth interviews.

Interviews are the most widely used for collecting information and data usually face to face, by phone or email (Blumberg et al., 2005). The purpose of interviews is to get fulfilling and specific information and data the study requires (Polkinghorne, 2005). In order to carry out interviews efficiently, the information on the interviewees' background, values and expectations should be kept in mind by interviewers (Ghauri & Gronhaug, 2005). In qualitative research, the interview can be structured, semi-structured



or unstructured. In structured interviews, every respondent answer the same questions and the interviewer uses a very specific interview guideline similar to a questionnaire to carry out the interview (Williamson, 2002; Blumberg et al., 2005). The structured interviews are also called “quantitative research interviews”, because they are used to collect quantifiable data (Saunders et al., 2009). While unstructured interviews are informal (Saunders et al., 2009) and do not have any detailed questions or topic lists to be answered by respondents who can answer freely according to their own opinions (Ghauri & Gronhaug, 2005). According to Blumberg et al. (2005), in qualitative studies, researchers most often apply semi-structured interviews in which the researcher has a list of questions or themes to be covered, but some questions are deleted or added in particular interviews when encountering a specific organizational context or the order of questions may also vary, depending on the flow of the conversation (Saunders et al., 2009). In order to ensure the data complete, audio-recording or note taking is often used during the interviews.

In this research, we conduct in-depth semi-structured interviews by telephone and email to gain our primary data. Interviews by phone cost lower than face-to-face interviews, and interviewees in different places could be reached within a short time. Meanwhile, the interviewees may feel more comfortable when talking on the phone than face to face. However, the response rate is lower than face-to-face interviews. The interview questions are prepared before the interviews (see Appendix 1). We conduct semi-structured interviews where we the researchers discuss with interviewees on the prepared questions and interviewees can answer the questions freely and flexibly and sometimes some additional questions could be asked during the interview process. The interviews involved seven persons all of whom work in NTT DoCoMo for many years as well as three users of the Osaifu-Keitai by NTT DoCoMo. The questions are designed according to the theoretical framework to try to extract useful and meaningful information and data. The interview time by phone is approximately from 40 minutes to 60 minutes. During the interviews, we use the audio-recording device to record and take notes during the whole interviews and afterwards transcribe carefully to the notes to get a clear understanding of the information and avoid missing and misunderstanding details. As for interviews by sending emails, we verify the email addresses every time and do send each email twice to confirm sometimes if necessary.

When choose the respondents for interviews, it is critical to make sure the ones possessing relevant and abundant knowledge about research issues, which can avoid useless data. Considering the specific area of our research, we select the interviewees with at least 10 years’ working experience in NTT DoCoMo, and working in the department relevant to Osaifu-Keitai to make sure they can understand our questions accurately and then provide informative answers. The seven interviewees include the top

management in different departments, engineers and common employee, which is also helpful to get a full understanding of the research issues to be studied. Due to the geographic issue, we give calls and send emails when it is available for the interviewees and contact them before by email to confirm the interview time. Additionally, in Japan, most employees choose to work in one company throughout their life. This unique culture makes us easy to find interviews with a thorough understanding of NTT DoCoMo. The contents of the conversations are confirmed by us through sending back our notes to the interviewees. Those all give bonus to the results of our work. The details of interviewees are shown in the Table 2. As for ethical issues, we have already clearly informed the interviewees that the data collected from the interviews would be used only for the academic research at Jönköping International Business School and have got the agreement of all interviewees with our data collection and analysis procedures.

**Table 2** Details of the Interviewees

	Name	Position	Department	Working in DoCoMo	Time NTT	Interview Date
Interview 1	Shigeru Taba	Senior Vice President	Network Department & Global Business Department	1984-2001 DoCoMo 2008/07- now NTT DoCoMo USA	NTT	2012/05/12
Interview 2	Johnny Wang	Manager	Product Section Development	NTT DoCoMo 1997- now		2012/05/11
Interview 3	Takashi Arano	Senior Manager	Business Department Promotion	NTT DoCoMo 1986- now		2012/05/12
Interview 4	Keijiro Murayama	Vice Senior Manager	Global Business Division	1993/04- now		2012/05/12
Interview 5	Yuko Watanabe Sasahara	Engineer	Product Section Development	NTT DoCoMo USA 1995- now		2012/05/12
Interview 6	Masashi Yoshimoto	Vice Senior Manager	Application & Content Service section	NTT DoCoMo 2000/04- now		2012/05/11
Interview 7	Makoto Koizumi	Employee	Corporate Sales Department	NTT DoCoMo 2002- now		2012/05/11

### 3.5 Data Analysis

After the data and information are selected, the following is to interpret it. Data analysis is the process of summing up and presenting the data. Therefore it should have a good structure to make readers easy to understand (Repstad, 1999). The data is to be interpreted and essential for the researchers to perform with objectivity, with the purpose

of information to be recognized by respondents (Halvorsen, 1992). The authors performed a deductive approach to qualitative analysis in which the authors seek to use existing theories to shape the approach adopted to the qualitative research process and to aspects of data analysis (Saunders et al., 2009). Yin (2003) suggests that, existing theory can be used to formulate the research question and objectives and the theoretical propositions can also be used as a means to devise a framework to help organize and direct the data analysis.

### **3.6 Trustworthiness**

The trustworthiness of the research includes two parts: reliability and validity, which is very important in scientific research. Saunders et al. (2009) state that reliability and validity are two particular emphases the attention should be paid in order to reduce the possibility of getting the answer wrong.

#### **3.6.1 Reliability**

Reliability of the research means that if an investigation is repeated exactly in the same way, it should generate the same results (Yin, 1990). According to Easterby-Smith et al. (2008), reliability can be assessed by three aspects below:

- 1 Will the measures yield the same results on other accessions?
- 2 Will similar observations be reached by other observers?
- 3 Is there transparency in how sense was made from the raw data?

In order to increase the reliability of this research, we conduct structured and specific research method together with sufficient materials we used in a clear and consistent way and the research procedure is documented and the research design described in details. Moreover, we are very careful with our interviews, where select the suitable interviewees, correct the interview questions again and again to make them easy to understand and avoid misunderstandings of interviewees and use the audio-recording device if available. All these above make this research reliable.

#### **3.6.2 Validity**

Validity of a research means that the findings are really about what they appear to be about (Saunders et al., 2009). Factors like as errors or faults in the research process, bad sampling, and inaccurate measurement can threaten the validity of the research (Collins & Hussey, 2003). In this research, we conduct seven in-depth interviews from which plenty of data is gained, and we also use other data sources like the company' official websites and research reports from the company. By comparing all the data from different sources, we can improve the internal validity of this research. Additionally, in

order to maintain a high internal validity, both of the two authors attend each interview and take notes. Therefore, information losses, misunderstandings and misinterpretations are reduced to the minimal level. The authors have tried to reflect on the answers of the interviewees with the broad theoretical framework. External validity refers to generalisability, which is concerned with the extent to which your research findings are equally applicable to other research settings, such as other organizations (Saunders et al., 2009). However, Saunders et al. (2009) indicates, “*as long as you do not claim that your results, conclusions or theory can be generalized, there is no problem*”. Since we only analyze typical one case in this research, the authors do not claim that their findings are generalizable for countries to building the MCPs ecosystem.

## 4 Empirical Finding

### The Case of NTT DoCoMo

Without NTT DoCoMo’s leadership role in driving the mobile contactless payments (MCPs), Japan would not lead the world in this field. NTT DoCoMo, Japan’s largest mobile operator, is acting as a critical leadership role in the creation and development of Japan’s MCPs ecosystem. The development of NTT DoCoMo’s MCPs services is viewed as a great success in terms of its technology infrastructure, consumer adoption and market value. Following DoCoMo’s model, other mobile operators in Japan came into MCPs field as well. Now DoCoMo’s integrated mobile operator-led model is called the “Japanese Model” in mobile payments field.

#### 4.1 Introduction of NTT DoCoMo MCPs Services

DoCoMo, founded in 1992 (NTT DoCoMo, Inc, 2011), has over 60 million subscribers as of end-March, 2012, accounting for more than 50% of Japan’s cellular market (NTT DoCoMo, Inc, 2010a). In July 2004, DoCoMo launched MCPs services, called “Osaifu-Keitai™” (mobile phones with wallet functions), which adopts FeliCa® contactless IC card technology developed by Sony (Mobility 12, 2007). Also, Osaifu-Keitai can be regarded as a mobile wallet platform for contactless applications for cash and credit, ID, transit passes and more (NTT Docomo, INC, 2011).

Figure 4 provides an overview of NTT DoCoMo Osaifu-Keitai services and clearly defines the scope of several easily confusing concepts when coming to Japan’s mobile payments market, like Osaifu-Keitai services, NTT DoCoMo’s credit mobile payments and NTT DoCoMo’s MCPs.

DoCoMo		Services Available through Osaifu-Keitai phones/ Osaifu-Keitai services				
Provider		Third Party Services available through DoCoMo as a platform	DoCoMo’s Own Service Provision			
Payment Services	Types	E-money (Pre/post paid) Edy, Suica, nanaco, WAON, QUICPay, VisaTouch/Smartplus	SMBC, UC, Season, Ion etc. 67 credit card companies	DCMX mini	DCMX	DCMX GOLD
	Settlement	Pre/post paid	Post paid <i>Credit card bill from the card issuer</i>	Post paid <i>Along with monthly mobile bill</i>	Post paid <i>DCMX credit card bill</i>	
	Platform		FOMA E-Mobile Wallet			Plastic Magnetic Card
	Brand	Their own systems	DoCoMo’s Branded iD™ Credit Payment Service Platform 11.84 million Users, 420k R/W terminals (Sep, 2009)			VISA/ MasterCard
		Other Felica-based services	DOCOMO’s credit mobile payments/ DOCOMO’s MCPs			out of this study scope

**Figure 4** Overview of NTT DoCoMo Osaifu-Keitai Services

(Sources: NTT DoCoMo, Inc; Interviews with Osaifu-Keitai users and DoCoMo’s employees )

We also want to clarify the concept of “Osaifu-Keitai” which has multiple usages in Japanese daily life. For example, in “an Osaifu-Keitai and my Osaifu-Keitai”, it refers to a FeliCa-embedded mobile phone brought from NTT DoCoMo. People also can say like “the mobile phone has Osaifu-Keitai, or the phone is capable of Osaifu-Keitai.” Next up, based on Figure 4, we will introduce NTT DoCoMo’s Osaifu-Keitai’s services including NTT DoCoMo’s MCPs and other FeliCa-based contactless services.

### **NTT DoCoMo’s MCPs**

1) iD Credit Payment Service NTT DoCoMo launched iD™ in December 2005, which is a branded open platform under which various cards of credit card companies and other issuers are stored in Osaifu-Keitai phones and are used on the NTT DoCoMo network (Mobility 12, 2007). Today up to 67 credit card companies has cooperated with DoCoMo and made their cards compatible with iD. (NTT DoCoMo, Inc, 2010a). An early user of “iD” payments services from 2006, said,

*“... Initially, DoCoMo’s iD service is just available for Mitsui credit card holders. I am a user of Mitsui credit card and I am always willing to try new functions of mobile phones. ... In early days, this new service brought me convenience. But, unlike today so many places accepting Osaifu-Keitai payments, the use was limited then.”*

2) DCMX In April, 2006, NTT DoCoMo entered the credit card issuing market with the launch of its own DCMX™ consumer/mobile credit services (Mobility 12, 2007). NTT DoCoMo-issued DCMX™ credit cards can be used with an “Osaifu-Keitai” via iD platform or with a DoCoMo plastic credit card via Visa/MasterCard (Mobility 12, 2007). The latter form is beyond our study scope. The details of DCMX Service lineup are summarized in Table 3. DCMX mini is a lite version of the DCMX series; a user of DCMX mini commented,

*“It is very convenient. If you have an Osaifu-Keitai, you can just apply it through i-mode™ site yourself and do not have to go to a DoCoMo Shop. It is especially suited to small purchases. To pay, I just wave my mobile over a reader without signatures or passwords. Kids can use it as well.”*

After the initial offering DCMX mini, DoCoMo launched DCMX. Johnney Wang from DoCoMo said,

*“DCMX is a separate mobile credit service offered by DoCoMo, with a cap from 200,000 JPY. Cash advance is available. Just like usual credit cards. As a user, I like its increased convenience, because I take my mobile phone with me wherever I go. Purchases via DCMX can earn DoCoMo points.”*

Like DCMX mini and DCMX, DCMX GOLD is compatible with iD™ platform as well. Compared with the standard DCMX, more rewards and benefits accruing to DCMX GOLD (NTT DoCoMo, Inc).

**Table 3 DCMX Service Lineup**

	DCMX mini™	DCMX™	DCMX gold™
<b>Issuing Date</b>	April 28, 2006	Late May, 2006	April 23, 2007
<b>Application</b>	Via the DCMX i-mode™ site	Either via the DCMX i-mode™ site or written applications, after which subscribers will be screened. (Users under age 20 will require a guardian's consent, and must apply at a DoCoMo Shop, accompanied by a guardian.)	Same to DCMX or Move DCMX up to DCMX gold
<b>Age From</b>	12	18	
<b>Annual Fees</b>	No	No fees during the first year (A fee of 1,312 JPY in subsequent years if no transaction has taken place within 12 months.)	10,500 JPY
<b>Monthly Credit Line</b>	10k JPY (about \$85)	Over 200k JPY (to be increased, depending on usage conditions)	
<b>Signature or Password Required</b>	No Signature No Password unless user require	No Signature A four-digit password required when purchases costing over 10k JPY	Same to DCMX
<b>Settlement</b>	Monthly mobile bill	DCMX credit card bill	
<b>DoCoMo Points</b>	No	100JPY = 1p	
<b>Features</b>	a) Easy to subscribe b) Available for the unbanked	a) Accumulated DoCoMo points can be used for <ul style="list-style-type: none"> <li>• Discounts on products and services from DoCoMo and other participating merchants/ establishments</li> <li>• The purchase charge of a handset or exchanged for the products</li> <li>• To Exchange points for miles, gift certificates, and DCMX (iD) coupons</li> <li>• Bonus point programs at selected retailers or DOCOMO's online shopping mall</li> </ul> b) Various insurance services	a) The highest stage of DoCoMo Premier Club with other exclusive rewards and benefits, besides what the standard DCMX provides b) to provide DCMX's Visa/ MasterCard magnetic card

Sources: NTT DoCoMo, Inc; Interviews

*i-Mode™: the Internet and email capability of the mobile phone*

### **Other FeliCa-Based Contactless Services/Applications Though Osaifu-Keitai**

Before DoCoMo's launch of FeliCa-Based mobile payments, there are already a wide use of FeliCa-based smart cards including transit passes, digital money, ID cards and more. NTT DoCoMo's Osaifu-Keitai introduces "Mobile FeliCa" to the market. NTT DoCoMo forges the combination with prior contactless applications by opening its Mobile FeliCa platform, which promotes the popularity of Osaifu-Keitai phones and gets increased potential customers of its credit payments services. A user of Osaifu-Keitai said,

*"My mobile phone has Osaifu-Keitai and I have been using the "Mobile Suica®" service since 2010. Before when I was going to go outside, I had to check whether I took my Suica card, and sometimes I forget it if in a hurry. But now I just make sure I take my mobile phone. .... I have not yet used credit payment function, but I'd like try the DCMX mini."*

## **4.2 Deployment Process of NTT DoCoMo's MCPs Services**

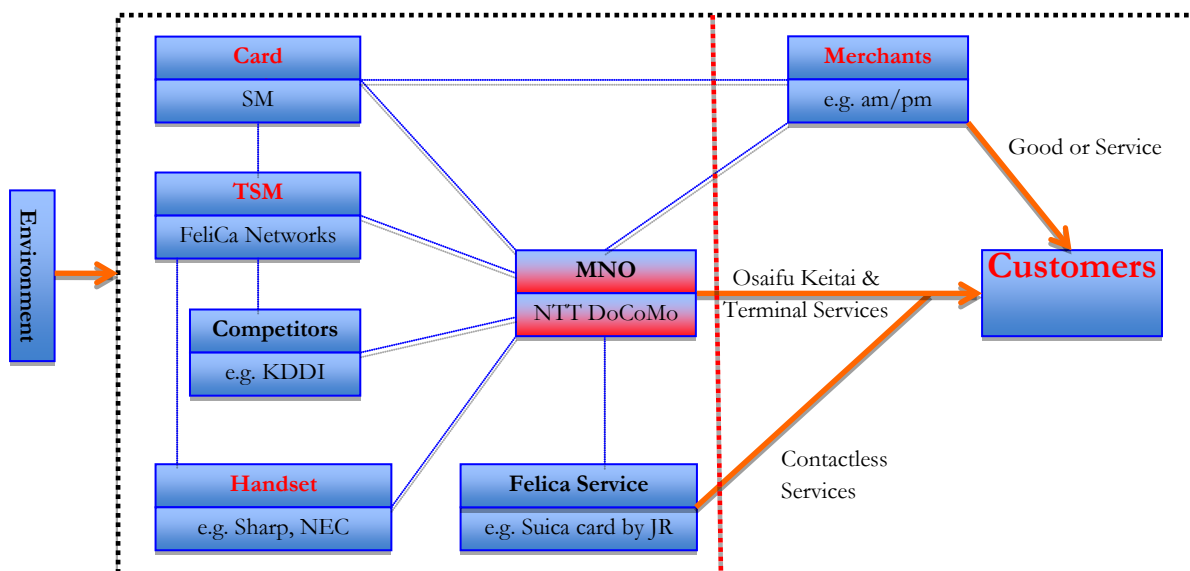
### **4.2.1 Connection Establishment**

According to our previous study on the MCPs, the deployment of MCPs requires collaborative action from cross-industry players. This is a great challenge facing other countries, but NTT DoCoMo successfully solve this challenge. In this section, we focus on the deployment

process of NTT DoCoMo's MCPs services and try to find the ways it collaborates with other main players. In order to deploy these services, NTT DoCoMo has to build relationships with other players. According to the infrastructure of the services it launched, we need define what players NTT DoCoMo need.

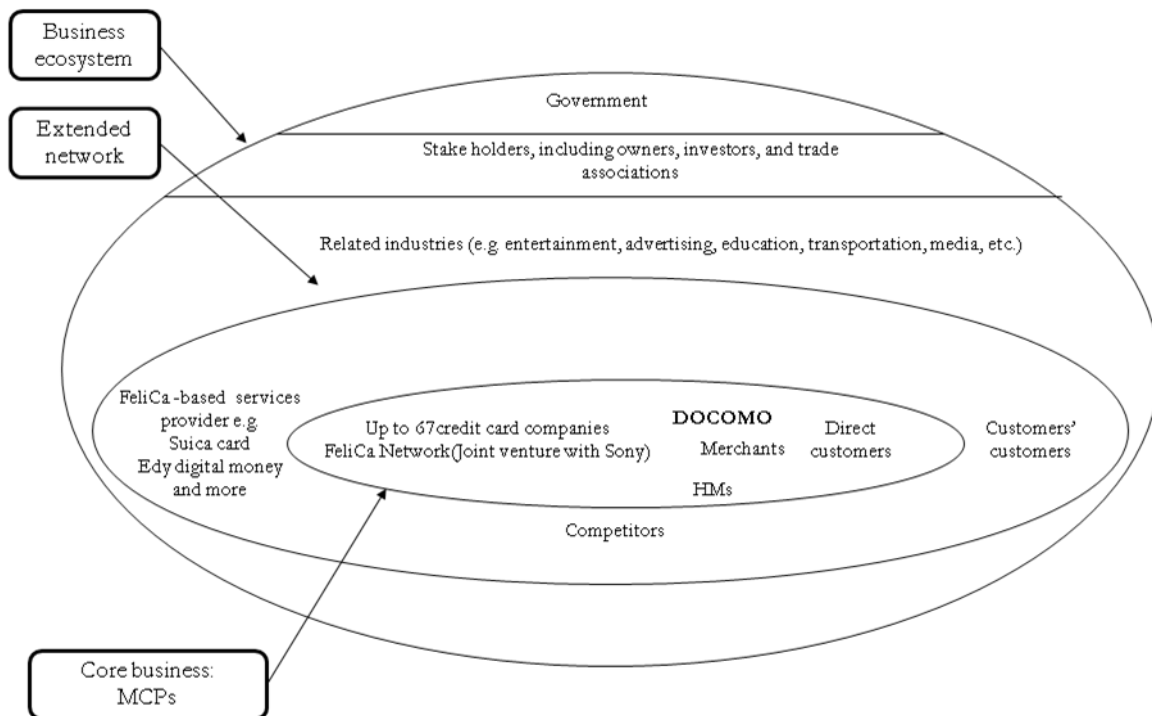
Infrastructure needed	Main Player Involved
Felica-based solutions	Technology Provider (Sony)
Osaifu-Keitai phones	Handset Manufacturers
Financial service expertise	Banks
To install compatible "iD" terminals	Merchants
To reach a mass market	Consumers

Based on our data collection, we describe their connection and the ecosystem they formed in Figure 5 and Figure 6.



**Figure 5** NTT DoCoMo's Connections between Key Players





**Figure 6** MCPs Business Ecosystem around NTT DoCoMo

**NTT DoCoMo and Technology Provider** NTT DoCoMo decided to use FeliCa as the technology enabling Osaifu Keitai service and created NTT DoCoMo-Sony joint venture, FeliCa Networks. Now, commuter rail operator East Japan Railway (JR East), also owns a small share of FeliCa Networks. Sony acts a technology provider in developing the MCPs ecosystem and FeliCa Networks also license FeliCa to other rivals of NTT DoCoMo. Here, there is an interesting issue that FeliCa is not of international standard for mobile MCPs and Sony owns many of patents of core technologies of NFC, the only one with international standard for MCPs. NTT DoCoMo was able to develop MCPs based on NFC but actually not. When asked the reasons why NTT DoCoMo decided to use FeliCa, rather than NFC, all interviewees agreed that Felica technology was already widely used on the Japanese market and the compatibility of service is very important. Specifically, before the introduction of FeliCa-capable Osaifu Keitai phones, there were already many FeliCa-enabled contactless applications like transit ticketing, digital money, ID cards and more. Under this condition, Osaifu Keitai has better potential compatibility. Just as Shigeru Taba, commented on the cooperation with Sony, *“When Osaifu-keitai was introduced, other NFC technologies including type A and B are not matured and Felica was only technology that is certified by Japanese railroad companies to be used at their over-crowded, extremely high performance, ticket gate. DOCOMO has no option but Sony’s Felica.”* (Interview 1)

**NTT DoCoMo and Handset Manufacturers (HMs)** As for the relationship between NTT DoCoMo and Handset Manufacturers, Johnny Wang, Keijiro Murayama and Shigeru Taba commented,

*“... Like many counterparts in America and Europe, Japan’s mobile operators typically adopt exclusive sales model in which mobile operators sell mobile phones directly to consumers. However, the difference is that Japan’s mobile operators have much stronger control over handset manufacturers that have to implement customized productions according to operators’ precise specification. ... You even cannot find manufacturer’s logo on mobiles, but ‘NTT DoCoMo’ .”*(Interview 2)

*“... We do specify functions and capabilities, but each manufacturer decides on design, color variation, etc. So, when services and/or functions are newly offered, we have full line-up of capable handsets in the market. ”* (Interview 4)

*“DOCOMO don’t have to convince them, just commits to buy a certain amount of the product.”* (Interview 1)

Their answers show the uniqueness of Japanese mobile phone market, characterized by a powerful control of Japan’s mobile operators over mobile phone industry chains. Takeshi Natsuno, former Senior Vice President of NTT DoCoMo, in an interview said, *“They (handset manufacturers) didn’t have to take an inventory risk. They didn’t have to take any risk of non-sales. Their profit is almost guaranteed. So for Japanese manufacturers, this is an easier job because they didn’t have to take any risk.”* (Amoroso & Ogawa, 2011)

**DoCoMo and Banks** Johnny Wang said, *“... Providing financial services is not where DoCoMo’s expertise lies. So financial experience and techniques from financial institutions are important and necessary to DoCoMo’s developing mobile payments services and its own mobile credit. A deep collaboration with banks is created by purchasing shares of Mitsui Card and UC card.”* (Interview 2) In April 2005, NTT DoCoMo took a proactive strategy by investing nearly \$1 billion to acquire a 33.4% share of Sumitomo Mitsui Card Co. (a Visa member), the nation’s second largest card issuers with 13 million cardholders. As this strategic alliance creation, NTT DoCoMo launched its mobile payment services via “iD” which was initially just available for Mitsui cardholders. Sumitomo is also involved in the deployment of FeliCa PoS terminals. Additionally, the role of Sumitomo includes marketing and R&D of the compatible ATM as well. In March 2006, NTT DoCoMo shared the reader with UC card by acquiring 18% shares of Mizuho Financial Group UC Card Co.. NTT DoCoMo has been actively enticing more cards to use iD platform, by which add more opportunities to consumers. Up to 67 credit card companies are currently offering credit payment services via iD (NTT DoCoMo, Inc, 2010). As for the fee NTT DoCoMo might charge for the participation of the third party credit card companies, Takeshi Ichikawa, Assistant Director of E-commerce Technologies Group, Multimedia Services Department of NTT DoCoMo, said, *“... As a mobile contactless platform provider, DoCoMo does not collect any fees from banks that want to deploy their services. As a credit card service provider, DoCoMo adopts the fee collection rules typical of a standard credit card business scheme.”* (Bounie et al, 2007)

Keiijiro Murayama also said, “*No monthly or registration fee required.*” (Interview 4)

During the interview, Sasahara talked of the banks’s willingness to cooperate with NTT DoCoMo. “*Of course banks and credit card companies have willingness to “support” the development for mobile payment services in Japan because the service benefits them as well as DoCoMo. Credit card usage of Japan is very low compared to other countries. The crime rate in Japan is extremely low. People actually carry a lot of cash in this country.*” (Interview 5)

Now, NTT DoCoMo also serves as a credit issuing institution itself by the launch of DCMX series services. Natsuno ever discussed DoCoMo’s DCMX service in an interview: “*The credit card business was interesting for DoCoMo. Ninety-nine percent of mobile subscribers in Japan were actually post-paid so it actually wasn’t that much of an expansion for us to move into credit. While making money on the credit transactions was nice, the key for DoCoMo was that the service dramatically decreased our subscriber churn rates.*” (Ezell, 2009)

#### **4.2.2 Acceptance of NTT DoCoMo’s MCPs Services**

**Osaifu-Keitai Users and iD Subscribers** The concepts of “Osaifu-Keitai users” and “iD subscribers” should be distinguished. Sometimes consumers purchase an Osaifu-Keitai phone rather than a common one not for an interest in trying out this mobile wallet function, rather many other reasons like good-looking appearance. However, Osaifu-Keitai users will be more likely to become iD subscribers than common mobile users. As of March, 2012, DoMoCo subscribers reach over 60 million, 60% of which (over 37.5 million) have Osaifu-Keitai phones. (NTT DoCoMo, Inc, 2010a). Obviously, “iD” credit mobile payments is NTT DoCoMo’s core services. Other contactless services via Osaifu-Keitai is the extended network of NTT DoCoMo’s core services. How does NTT DoCoMo push to lay out the infrastructure? We discussed this questions with our interviewees and got some findings.

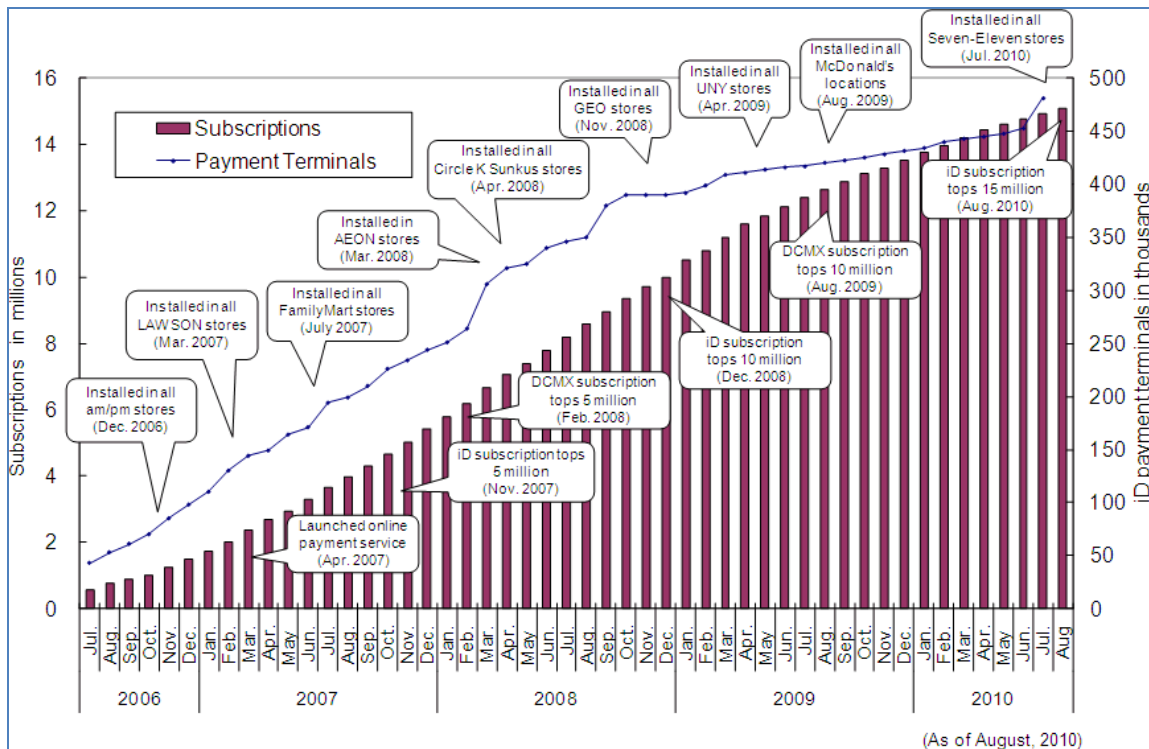
*1) From the supply side* First, “the ratio of Osaifu Keitai in all mobile phones sold in NTT DoCoMo shops is increasing since its introduction to the market” (Interview 2). To date, “I think it is 90% or more.” Shigeru said about the percentage of Osaifu Keitai in all mobile phone sold by NTT DoCoMo (Interview 1). Second, NTT DoCoMo gave the access of Mobile FeliCa to its competitors by charging certain licensing fee. As then-NTT DoCoMo CEO Masao Nakamura said in 2004, “*We did not inhibit KDDI from participating in FeliCa. Even if Softbank enters the mobile phone business, we will not create any obstacles.*” (Ezell, 2009) So NTT DoCoMo’s rivals, AU, KDDI, and Softbank came into mobile payments field with the use the same technology “Mobile FeliCa”, and introduced their Mobile FeliCa-enabled mobile phones, by which “Osaifu Keitai” has become a standard on the Japanese market (InnovaAsia, 2009). Consequently, the supply volume of Osaifu Keitai phones is keeping rising and to date, almost all the mobile phones on Japanese market are Mobile FeliCa-enabled.

2) *From The Demand Side* According what Nakamura said in 2004, the replacement rate for mobile phones in Japan is rapid (Ezell, 2009). In our interview with Shigeru Taba, he said, “*after some point of time (around 2005), almost all DOCOMO’s new handset models are equipped with Osai-fu-keitai function and within 3 years that model’s penetration rate in DOCOMO customers would be more than 80%.*” (Interview 1)

So NTT DoCoMo exerts a strong pushing force to enlarge the number of potential users on the market. According to Johnney Wang, “*With such a large number of potential users, I believe that it is a time matter to get our credit payments (iD mobile credit payments including DCMX) popular. And now we do see an increasing number of subscriber.*”(Interview 2)

**“iD” Terminals Acceptance** The performance of NTT DoCoMo’s credit payment services to a large extent depends on the number of locations where the payments via mobile phone can be accepted. All the interviewees believe that it is a large challenge to convince a critical mass of merchants to deploy special “iD” terminals. Just as Makoto Koizumi said, “*... but DoCoMo has to. At the beginning, DoCoMo paid all the cost of installing iD terminals for merchants (in most instances).*” (Interview 7) According to Bradley et al., (2005), NTT DoCoMo set aside close to \$22 million as the subsidization for merchants’ deploying the “iD” compatible terminals. In addition, three out five interviewees mentioned the helpful role of NTT DoCoMo’s acquiring stakes in a couple of Japan’s big convenience-store chains in encouraging the widespread deployment of iD terminals. The Economist (2008), NTT DoCoMo acquired 2% of Japan’s second-largest convenience-store chain, Lawson, and afterwards 3% of FamilyMart, the No. 3 chain. Terry Graham, an analyst at the Telecoms Research Project, thinks that NTT DoCoMo’s investments can be used by these companies to subsidize the rollout of terminals in the stores (The Economist, 2008).

Figure 7 and Figure 8 show the consequences of the NTT DoCoMo’s deployment of MCPs. According to Figure 7, the number of iD-enabled payment terminals is around 481,000 as of end-Aug, 2010. Figure 8 shows the growing installation of iD™ Reader/Writer Terminals, including more than 90% of all convenience stores like all am/pm and Seven-Eleven stores, large retailers, shopping malls, taxis, McDonald’s locations, Coca-Cola vending machines and more in Japan. At the end of August, 2010, subscribers to iD™ for the use of mobile payments with DCMX services and compatible credit cards, topped 15.09 million in Japan. Over 16 million transactions were made in June 2010 alone (NTT DoCoMo, Inc, 2010a).



**Figure 7: Numbers of iD Subscribers and Payment Terminals**

(Source: NTT Docomo, INC. <http://www.nttdocomo.com/pr/2010/001484.html>)



**Figure 8 Growing Installation of iD Reader/Writer Terminals**

(Source: NTT DoCoMo INC.)

### 4.2.3 Openness of NTT DoCoMo's MCPs System

NTT DoCoMo makes its system open, which is helpful to create a business ecosystem. We can see its openness from two aspects.

**Open Osaifu-Keitai Platform to FeliCa-Based Service Providers** FeliCa, developed by Sony, is an RFID-based standard technology which can enable contactless payments (Ezell, 2009). Before DoCoMo, FeliCa technology is already used widely in other applications. We have made a summary below,

- Suica card for train ticketing or purchases within stations
- many brands of e-money card like Edy and others.
- ID cards in many places for check-in also use FeliCa

Now DocoMO has cooperated with these contactless services providers to migrate them to their Osaifu Keitai. Johnny Wang commented, *“These existing and well-established services give DoCoMo an extensive commercial basis to develop its contactless payments via mobile phones quickly and widely by integration of such services. ... DoCoMo has already cooperated with JR East to launch ‘Mobile Suica’ in 2006, by which DoCoMo’s Osaifu-Keitai can replace the Suica card.”* (Interview 2)

Keijiro Murayama also said, “as more services integrated, they will give more options and more convenience for the users.” (Interview 4)

Makoto Koizumi, gave an answer from a win-win perspective, “Osaifu Keitai can reduce the cost of making real card or ticket. It is benefit for them.” (Interview 7)

The question is how to partner well with these major service providers. According to Natsuno (2011), the focus is not on the revenue, but the volume in the early days of mobile payments. More value given to partners is good strategy to get more support to NTT DoCoMo’s leadership. (Amoroso & Ogawa, 2011)

By this vision, NTT DoCoMo’s Osaifu-Keitai becomes a more open application platform making users store more accounts and applications for e-money, rail fare, boarding pass, or ID card.

**Open Mobile FeliCa Mobile to Its Competitors** Masao Nakamura, DoCoMo CEO, said in an interview in 2004, *“We did not inhibit KDDI from participating in FeliCa. Even if Softbank enters the mobile phone business, we will not create any obstacles. ... We must never abuse our position.”* (Ezell, 2009).

Afterwards, DoCoMo’s competitors, AU, KDDI, and Softbank, came into mobile payments with the use the same technology “Mobile FeliCa”, highlights DoCoMo’s not seeking exclusive rights of Mobile FeliCa as a clear illustration of DoCoMo’s collaborative approach in specific. Our 7 interviewees believe that, this decision is more of a beneficial approach than collaborative one. Three of seven interviewees have mentioned the licensing fee

DoCoMo charges for other firms' using the Mobile Felica. Other interviewees' comments on what benefits this decision will bring to DoCoMo are listed in the following,

*“With the previous large-scale usage of FeliCa-enabled services like Suica and others, now coupled with the launch of DoCoMo’s FeliCa-enabled mobile payments, FeliCa has already become Japan’s standard. For other operators, it is still a better choice to cooperate with FeliCa Network, despite the necessary licensing fee since applications in handsets must be activated through FeliCa Networks.”* (Interview 2)

*“It is not always right to have exclusive rights in terms of development of the market; however, we did have first mover advantage over the other operators.”* (Interview 4)

*“In addition to the licensing fee, DoCoMo can benefit as well from the increased number, reputation, and usage of Osaifu-Keitai in the whole Japanese market.”* (Interview 2)

Shigeru Taba, pointed out *“The more it prevails, the more it is convenient. If DOCMO was only one mobile Felica provider, not so many merchants join Osaifu-keitai network. It is a social infrastructure.”* Yuko Watanabe Sasahara considered this question from another perspective, *“It would be wrong for the mobile industry to ask merchants to adopt 3 different platforms depending on the company. ‘Mobile FeliCa’ market will not grow if we insist on developing different technologies.”* (Interview 1)

Now, in Japan, each mobile carrier’s FeliCa is based on Mobile FeliCa technology. Now the Osaifu-Keitai has already become the standard on the Japanese market, which makes a national mobile payment system formed.

### **4.3 An Enabling Environment**

The success of a business is not possible, without an enabling environment and NTT DoCoMo is no exception. NTT DoCoMo’s success in the development of MCPs could never happen without an enabling environment. Also, an enabling environment is an important component in MCPs ecosystem. What environment NTT DoCoMo’s MCP happens in? With this interest, we got some findings mainly from our interviews with employees from NTT DoCoMo and observations from government agencies. We can summarize the following four aspects of Japanese MCPs’ enabling environment from the following four aspects:

- Competition
- Security
- Government’s support

Next up, we look at each aspect in details.

#### **4.3.1 Competition**

**Intense Market Competition** In the interviews, we discussed with 5 interviewees about the reasons why DoCoMo drives Felica-based mobile phone payments (Osaifu Keitai) in Japan. They give various reasons and they all mentioned that intense market competition is a reason.

*“DoCoMo’s competitors like KDDI and Softbank introduced some new services and functions and price to their customers, which resulted in an increase in their market share. ... Despite in the No.1 place in Japan, it is still important for DOCOMO to keep its own initiative to maintain and expand its market. Intense market competition is one reason for DOCOMO’s entering this payment industry.”* (Interview 3)

*“At any time, competition is always a driving force for a business to move forward and DoCoMo is no exception. Mobile payments could bring DoCoMo new revenue sources, increased customer attraction and a new field.”* (Interview 6)

So the intensely competitive competition in national mobile market drives DoCoMo’s the deployment and development of MPCs in Japan.

**Lack of Competition** This point seems to be a contradictory version of the viewpoint above, actually not. Lack of competition is stated from another angle.

First, in 2004 DoCoMo was in a dominant position in Japan’s mobile market. Just as Yuko Watanabe Sasahara commented, *“DoCoMo had more than 50% (to be precise, 56%) of the market share at the time. We have a strong customer base and distribution channels. ... DoCoMo did have strong financial resources and connections at the time.”* (Interview 5)

In terms of DoCoMo’s resources available, no counterparts in Japan can match. The large market shares DoCoMo can control can ensure more access to end-users (60 million individuals). Second, as for other competitors from other industries, no other player considered similar services at that time. Some powerful financial institutions have no interest in this market opportunity in the micropayment area, which made the DoCoMo’s launch easy.

#### **4.3.2 Security**

**Mobile Phone Real-Name System** Due to past criminal abuse of prepaid phones, phone sellers are required to verify the identity and place of residence of their customers. Typical proof can be in the form of a Japanese driver’s license, a Japanese passport or an alien registration card. Some stores will accept foreign passports along with a hotel address as verification.

Japan realized the problem of mobile phone crime as early as 2000 when five Japanese mobile operators including NTT DoCoMo jointly announced that CDMA standard - the unity of the mobile phone and SIM card - was used to inhibit the growing mobile phone crime. Consumers cannot buy the mobile or SIM card separately. If you want to have a mobile phone and use it, the only way is to apply to the mobile operators with your valid documents. According to the agreement with mobile operators, only after the information in the application forms is confirmed can the subscribers join the network. If the provided information is not in conformity with the prescriptions like bogus or incomplete information,



operators will terminate the service. What's more, in 2006, "Prevent Improper Use of Mobile Phones Act" came into practice, under which consumers have to provide their real personal information for the usage of mobile phones and the illegal transfer of mobile phones is prohibited.

With mobile operator's specific model and government policy, more than 99.7% subscribers are registered with their real names today, resulting in the safe and secure usage of mobile phones in Japan. Comprehensively and strictly implementing the mobile phone real-name system can bound effectively the personal certification, mobile phone numbers, and mobiles together. Therefore, nobody steals mobile phones in Japan and even nobody picks up the discarded ones because operators can shut down all the applications of the mobile phone remotely, after receiving a report the loss of the mobile phone, usually by call. Overall, the effective implementation of the mobile phone real name system not only inhibit relevant crime, but also ensure the communication security, which provides a much safer and more secure environment for the deployment of mobile payments in Japan.

In other countries, the implementation of the mobile phone real name system varies. China has implemented the real name system since 2009, this system is not going well, according to the investigation of the IT Times (2010). By now, it is still pretty easy to buy a SIM card without giving your actual information at a number of locations like kiosks or convenience stores.

**Trust to DoCoMo** J.D. Power Asia Pacific, conducted a "2009-2011 Japan Mobile Phone Service Studies" to examine customers' satisfaction, based on 31,200 responses from mobile phone subscribers in Japan. In this study, customers' satisfaction is measured based on four factors (listed in order of importance): based on six factors: handset, service offered, network quality/coverage area, cost, handset purchase experience and customer care. Overall satisfaction is based on a 1,000-point scale. NTT Docomo earned the highest in 2010 and 2011. DOCOMO scored the highest in four of the six categories: service offered, network quality/coverage area, handset purchase experience and customer care. This indicates DOCOMO is evaluated by customers very highly in Japan (J.D. Power Asia Pacific, November 2011; NTT DOCOMO, INC., 2010b; DOCOMO Factbook ).

### **4.3.3 Government's Support**

As we can seen from other successful cases of MCPs in the world, like South Korea, Singapore and Britain, the actively engagement and great visible support from governments make the environment enabling for the launch and development of MCPs. In Japan, the government also plays a helpful role in the development of MCPs, but it seems not so obvious and active.

*“DoCoMo’s developing mobile payments in Japan is sure supported by the government, otherwise it is impossible for DoCoMo to make it. ... Japan hold an over 30% share of DoCoMo, so from this point, DoCoMo is government-backed.”* (Interview 2)

Other interviewees commented on the role of government that the government did help, but not visibly. (Interview 7)

*“Not so much support from in terms of regulatory or policy aspect. We just needed a license as a financial service.”* (Interview 4)

Next up, we analyze the role of Japan’s government in creating an enabling environment for Japan’s mobile payments ecosystem.

**Government Policy and Strategy** Relevant policy permit is the precondition for DoCoMo to enter the financial field to develop the mobile payments. In Japan, financial administrative policy is relatively liberal, which lowers the barriers for mobile operator entering the financial field. In May 2000, Japan's Financial Services Agency explicitly announced that other industries are allowed to participate in the banking market, in relevant policies issued. Seen from the whole area of Japan’s IT (Information Technology) industry, the government’s strategy has a clear vision and determination promoting IT revolution like promoting research and development (R&D), commercial roll-out of technologies, as well as basic guidance on collaboration and direction (E-Japan Strategy series I- II, 2001, 2003).

*“The government's role is, therefore, to implement an environment where markets function smoothly through the promotion of fair competition and revision of regulations. In addition, an environment that enables the private sector to use its potential to full extent shall be established by eliminating obstacles caused by sectionalism of bureaucracy and by enhancing collaboration between the central and local governments.”* (Japan IT Strategy Headquarters)

## 5 Analysis

The deployment of mobile contactless payments is an across-industry business. It cannot be operated only by a firm, even a powerful organization. A set of players involved must be in place for the business to take root, proliferate, and go to scale. As we can see from the findings in the previous sections, Docomo have already built a working and efficient working ecosystem for Japan's MCPs, where all players interact with a common goal to maintain the ecosystem working. Based on our findings, including the ways DoCoMo establish the cooperative relationships with other main players, and the components of its enabling environment, we propose a mobile operator-led integrated mobile contactless payments ecosystem, using business ecosystem theory in terms of the connections between all relevant players. In NTT DoCoMo's MCPs ecosystem, there are two circles, "core business" and "extended network". DoCoMo's MCPs is its core business, where the third party credit card companies are involved and make contributions to the creation of core values. In the other circle, DoCoMo forms relationships with other FeliCa-based contactless application providers and even its competitors to offer value-added services to consumers, which results in the creation of DoCoMo's extended network.

### 5.1 Ecosystem Strategy- Keystone Strategy

According to the theoretical framework of the keystone strategy we presented in the Chapter 2, we discuss NTT DoCoMo's strategy to develop the MCPs to figure out whether it is a keystone strategy. The 5 key points of keystone strategy are,

- Build and share high-value common assets
- Promote innovation
- Manage the value creation process
- Share value among the members
- Shape external network.

Next up , we assess DoCoMo's strategy to create and develop its MCPs ecosystem by these 5 points.

**Build and Share High-Value Common Assets** As mentioned previously, as to the developments of NTT DoCoMo's credit mobile payments, the "OsaiFu keitai" platform and "Mobile FeliCa" are the most important assets. NTT DoCoMo did not keep them exclusive, rather opened them to other FeliCa-based contactless services providers and even to its competitors. OsaiFu-Keitai opening "OsaiFu keitai" platform to various FeliCa-based service providers, like Suica cards, Edy e-money and more, which makes those providers offer their services via mobile phones. For example, the usage of Edy e-money is increased by 40 percent when it was introduced on mobile phones (Ezell, 2009). NTT DoCoMo opened "Mobile FeliCa" to its competitor, so that KDDI, softbank, Au afterwards entered this market with the use of "Mobile FeliCa" to compete with DoCoMo.

**Promote Innovation** NTT DoCoMo is the first one in the world to introduce MCPs according to the definition of MCPs given in our study. Innovation is defined as a new combination by Schumpeter (1934). The launch of mobile contactless payments is right a new combination of mobile phones and payments. Also, it is the first one to combine the credit service with the mobile payments. As we mentioned previously, the deployment of MCPs requires action from all players involved to form an effective mechanisms to increase consumers adoption. As the leader within the MCPs ecosystem, NTT DoCoMo acts a driving force to encourage this ecosystem working and going forward. First, NTT DoCoMo actively establishes with other main players to form an effective value network, based on the proper value-sharing mechanisms. Second, NTT DoCoMo set aside 10 billion yens (73 million euros) to strongly pushed for the merchants' installation of terminals. Third, to consumers, in addition to various marketing activities, NTT DoCoMo increases the user of "Osaifu keitai" by making almost all mobile phones FeliCa-enabled which are sold in NTT DoCoMo shops. Lastly, NTT DoCoMo combines many priorly existing felica-based contactless services and applications with "Mobile Felica", which expands the functions of mobile phones and gives consumers more opportunities to use Osaifu keitai" service and then use its own MCPs services. To sum up, NTT DoCoMo sets up an effectively mechanisms based on close cooperations with other main players and promotes its innovative mobile payments services very actively. NTT DoCoMo has created a working ecosystem for mobile contactless payments services, where all members have a common goal and are willing to take actions to promote mobile payments services together with NTT DoCoMo.

**Manage The Value Creation Process** Within the ecosystem, NTT DoCoMo takes a leadership role and as the builder of the whole value network, it manages the value creation process. In the early days of the development of credit mobile payments, NTT DoCoMo takes a heavy financial risk to take more responsibility to manage its partners to make sure other player's value.

**Share Value among The Members** In this aspect, NTT DoCoMo has set up proper and fair value-sharing schemes. NTT DoCoMo gives value to its partners. To banks, now up to 67 credit card companies have joined NTT DoCoMo's "iD" platform to offer their credit services. NTT DoCoMo does not charge any fees for the participation of the third party credit card companies, according to Keijiro Murayama (Interview 4). Credit card companies can increase their market by offering consumers the option to make payments via mobile phones. So banks or credit card companies are willingness to support the development for mobile payments services in Japan because the service benefits them as well as NTT DoCoMo. Credit card usage of Japan is very low compared to other countries (Interview 5). So banks can get value from joining NTT DoCoMo's mobile payment ecosystem.

To application providers, NTT DoCoMo is willing to provide them more value, compared with other counterparts. For example, NTT DoCoMo just take 10% of the revenues the

applications bring and left the 90% to the application providers. According to Takeshi Natsuno, former Senior Vice President of NTT DoCoMo, the focus of NTT DoCoMo is not on the revenue, but the volume in the early days of mobile payments. More value given to partners is good strategy to get more support to NTT DoCoMo's leadership (Amoroso & Ogawa, 2011).

To merchants, NTT DoCoMo sets aside close to \$22 million as the subsidization for merchants' deploying the "iD" compatible terminals (Bradley et al., 2005). So merchants can attract more consumers without any investment.

To handset manufacturers, NTT DoCoMo has a powerful control over handset manufacturers, as we mentioned previously and it can provide sustainable revenue sources for handset manufacturers. According to Natsuno, handset manufacturers have no inventory risk and do not need to worry about non-sales (Amoroso & Ogawa, 2011). Handset manufacturers's profit is almost guaranteed and they can get more value from the increasing order of the FeliCa mobile phones. To NTT DoCoMo, the powerful control over handset manufacturers is helpful to the deployment of MCPs. First, this model makes NTT DoCoMo's execution effective and powerful; Second, NTT DoCoMo are the provider of both hardware and software design of products, which not only simplifies the working-out and the management of relevant rules, but also avoids many problems probably occurring in the implementation and management of the MCPs services. Thus, the service and product are more capable, safer, and more reliable. For example, if consumers encounter problems during the usage of NTT DoCoMo's MCPs, they can just turn to NTT DoCoMo, no matter the problems are caused by the hardware or software. Last but not least, under this model, the affiliated manufacturers do not have to take a risk during the development of NTT DoCoMo's MCPs services, so convincing them to produce Osai-fu-Keitai (FeliCa-embedded phones) is straightforward.

The cooperation between NTT DoCoMo and Sony is a win-win strategy. To Sony, the launch of NTT DoCoMo's Osai-fu Keitai could bring FeliCa from the traditional plastic card form to "Mobile Felica". Also, definitely Sony could benefit from this cooperation. Sony can get value from two aspects with the popularity of Mobile Felica, the income brought both by the production of FeliCa chips and by licensing the Mobile Felica to NTT DoCoMo's competitors and more other foreign firms. The cooperation between NTT DoCoMo and Sony is a win-win strategy. To Sony, the launch of NTT DoCoMo's Osai-fu Keitai could bring FeliCa from the traditional plastic card form to "Mobile Felica". Also, definitely Sony could benefit from this cooperation.

So to sum up, NTT DoCoMo's partners all can share a large part of the value brought by the development of NTT DoCoMo's mobile contactless payments services.

**Shape External Network** Within NTT DoCoMo's ecosystem, the external network mainly refers to the cooperation with various Felica-based contactless applications to move these

applications to “Mobile Felica”. We can analyze several important cooperations with its selected partners.

1) With JR East Railways Suica is operated by JR East Railways, the country’s largest railway line. It is mainly issued as contactless commuter passes and sometimes used as e-money in some merchants. In 2009, more than 27 million Japanese use Suica for the transportation services. Suica users alone make more than 200 million contactless transactions per month in Japan. (Ezell, 2009)

2)With Seven & I Holdings Seven & I Holdings owns 7-Eleven stores, the Japan’s NO.1 convenience store chain. Nanaco is a contactless smart card and e-money service which can be used in all national 7-Eleven stores.

3) Waon is a contactless smart card and e-money service from the AEON group (one of Japan’s largest retail chains).

4) Edy E-money Edy provided by bitWallet, Inc. is a prepaid contactless smart card. The four above are the largest contactless services in Japan.

There are many other applications combined with Mobile Felica like McDonald’s “Kazasu Coupon” and more. To sum up, it is because of NTT DoCoMo’s creating its external network successfully with so many already popular applications, NTT DoCoMo can reach a mass market.

Based on our analyses, NTT DoCoMo is implementing a keystone strategy to create and develop mobile contactless payments successfully, which makes sure the ecosystem grow healthly.

## **5.2 Dynamics of Consumer Adoption**

Seen from the previous analyses, NTT DoCoMo has built an effective and efficient MCPs ecosystem to deploy such innovative services by using keystone strategy. For a technological innovation, a critical mass consumer adoption is viewed as the criteria of success. If an innovation cannot finally commercially go to scale, it is a failure. All relevant players involved in this mobile payment network to cooperate to launch, operate and market these services, with an commonly ultimate goal of a critical mass consumer adoption. Many people argue that consumer adoption of a new product or service is a matter of time. This viewpoint is right, to some extent, but is passive. Indeed, a certain period of time is necessary and inevitable, but good and sophisticated strategy especially by the leader within this business ecosystem can change this situation and enhance the consumer adoption actively. There is a large body of literature conducting a study on consumer adoption/acceptance of mobile payment, especially empirically and proposing many consumer adoption models. However, in the business world, what the business should do in terms of some practical moves or activities based on this model. So in this point, our case study appears helpful, because NTT

DoCoMo is the first one to launch MCPs in the world and is the most successful one. Japan's market indeed is seeing a quick increase since the launch of Osaifu-Keitai services. So it is of great value to learn from NTT DoCoMo's strategies. In this thesis, the standing point is from a service provider's perspective, rather than from the consumer's perspective and our analysis is conducted by using the Weil-Utterback dynamics model of technology adoption to explain why DoCoMo can reach a mass market adoption.

### **5.2.1 Two Pushing Forces**

In the previous, we have discussed the two pushing forces NTT DoCoMo exerts to increase the potential users and the installation of terminals. The performance of NTT DoCoMo's credit payment services mainly depends on the number of locations where the payments via mobile phone can be accepted. As we talked in the previous section, NTT DoCoMo set aside a large amount of money to subsidize the installation of the compatible terminals and make investments in a couple of convenience store chains, in order to expand the range of merchant acceptance of the terminals. Additionally, NTT DoCoMo improved the performance by offering a vast range of contactless services, like suica card (transit cards), Edy (digital money) and more; as well as many contactless marketing applications like DoCoMo loyalty points, Mileage plan, McDonald's "Kazasu Coupon" (kazasu = go over) and many others (InnovaAsia, 2009).

So, we can see two pushing forces NTT DoCoMo exerts to increase the potential users and the service performance, they are

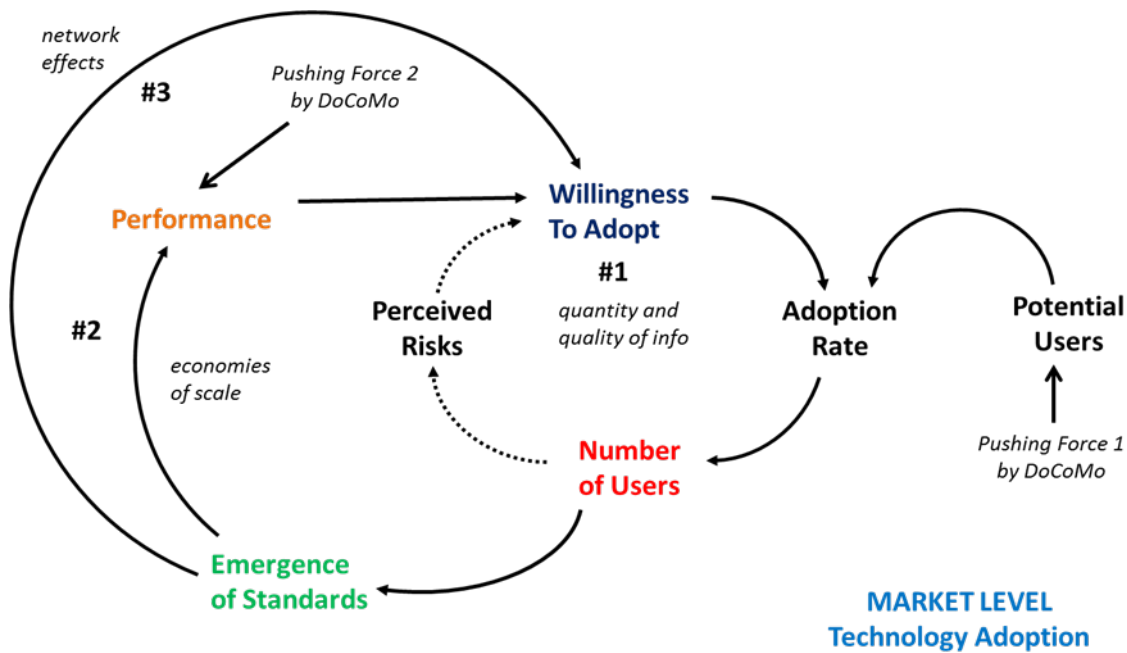
Pushing Force 1: increased the number of potential users

Pushing Force 2: increased the service performance

Now, we put the two forces into the dynamic model of technology adoption for mobile payments. (see Figure 10)

### **5.2.2 Three Feedback Loops**

Pushing Force 1 can increase the number of potential users and Pushing Force 2 can enhance the potential user's willingness to adopt the service because of an increased service performance. In the early days, the network effect still cannot have an influence on the willingness of adoption because of a small number of users. The adoption rate depends on the numbers of potential users and their willingness to adopt (Weil, 2005).



**Figure 10** Dynamics of Technology Adoption for NTT DoCoMo’s Service

**Loop#1:** In the early phase, the perceived risks of a new service or product based on the new technology may be high because the potential users are cautious and skeptical. However, this viewpoint is just a hypothesis and is not proven right. (Weil, 2006)

In Japan, the perceived risk is not high according to our interviews and observations for the Japanese environment. In the enabling environment part, we have discussed Japan’s environment for the usage of mobile phones. Japan has been implementing the mobile phone real name system strictly. “Japan use W-CDMA model. When you lose your mobile phones, you can remotely lock all functions of your mobile phones by mere make a call by dialing your personal identification number, so in Japan there is a low rate of mobile phone thief.” (Interview 2) Because Felica is already widely used in Japan and also in the digital money, it is not new to Japanese. Technically, the service is high security and provided by Sony which is reliable (Takashi Arano). In the real implementation of the credit mobile payments, even for the small-value purchases, if you require, you can set a pin for payment. “Influential marketing will make potential users get access to more information about this new payment service”, (Interview 2) which can reduce the perceived risk of potential users. All these aspects reduce consumers’ perceived risk of adoption of this new payment service in the terms of market. In all, the perceived risk in Japan is the low.

*“I don’t think the perceived risk is a very big problem. In Japan, it is more of a habit problem. People have a preference to carry cash. Additionally, Japanese generally have not yet formed a habit of using credit service. What we focus more is on how to convince more consumers to try out it.”* (Interview 2)



The other six interviewees, plus 3 consumers all agree this statement that the perceived risk is not an influential factor for people's unwillingness to use the NTT DoCoMo's mobile contactless payments services. Therefore, we think, in Japan, loop#1 does not have a significant effect.

**Loop#2:** Under the joint actions of the two pushing forces by NTT DoCoMo, the number of users of its contactless payments service is increasing to reach a critical-mass. By this, NTT DoCoMo's "Osaifu Ketai" and "Mobile FeliCa" becomes the industry dominant standards. Its competitors came into the mobile payments field with the use of the same technology "Mobile FeliCa". As we have mentioned, NTT DoCoMo and Sony created a joint venture-Felica Network, which provides the Mobile FeliCa by getting the licensing fee. Then the dominant standards and design triggers NTT DoCoMo's industry consolidation, which leads to more collaborations establishment with banks, merchants and service providers. Thus, the performance and willingness to adopt is improved accordingly.

**Loop#3:** NTT DoCoMo's "Osaifu Ketai" and "Mobile Felica" becoming the industry standards enable network effects where the value of the service will increase the number of users non-linearly, and thus directly affect the willingness to adopt the service.

As we can see from the three Loops' working processes, the two pushing forces by NTT DoCoMo promote the consumer adoption greatly.

### **5.3 Summary to NTT DoCoMo' Success**

This research explain how a mobile network operator established and developed a complicated business network by implementing effective strategy. In this section, we make a summary to NTT DoCoMo's success factors in creating a MCPs ecosystem.

#### **5.3.1 NTT DoCoMo's Keystone Strategy**

NTT DoCoMo is implementing a keystone strategy successfully in Japan. As the keystone of the ecosystem, NTT DoCoMo has been doing well in the value creation and sharing to ensure the enhancement of the ecosystem's value, so a complete and healthy ecosystem with effective partner relationship management and active innovations is created to promote the development of MCPs greatly. There are two important points in implementing a keystone strategy that are shown by NTT DoCoMo.

**Risk-Taking** NTT DoCoMo developed vertically integrated eco system for Osaifu-keitai by its own risk. The initial risk for developing MCPs is heavy. In Japan, NTT DoCoMo's risk-taking spirit is found the main impetus for the huge success of Japan's MCPs ecosystem. Investments in the acquisitions of banks and convenience stores, subsidy plans to merchants bring a heavy risk to NTT DoCoMo. Just as Natsuno comments the risk-taking aspect, "*All the risk to make services popular was taken by the mobile operators. Some say this is a terrible business model and that they are taking a heavy risk. But as a result, I could get huge*

*returns coming out pushing innovative technologies. If you don't take a risk in the market capitalist economy, you would not get a huge return"* So in the mobile payments field, nobody could make it successful if nobody take a risk. (Amoroso and Ogawa, 2011)

**Collaborative** The key of building a business ecosystem is the collaboration. The collaborative approach NTT DoCoMo is shown in all activities during its fostering the MCP ecosystem. NTT DoCoMo is in the center of the whole mobile contactless payments ecosystem. In other words, it need to establish a effective relationship with all players involved in its business model, like Sony, up to 67 banks, merchants, various contactless applications providers including JR East, Edy and more. In order to make sure an effective and powerful execution, NTT DoCoMo also needs to choose establish different levels of relationship with those stakeholders. For example, the support from financial institutions is very critical in the early days, so NTT DoCoMo chose to make a big investment to purchase 34% shares of SMCC to form a close and deep relationship. Others like the joint venture-FeliCa Networks with Sony and JR east; and BitWallet, the joint venture of Edy, NTT DoCoMo and other companies and so forth. NTT DoCoMo opens the Mobile FeliCa to its competitors and turn the Osaifu-Keitai platform into de facto standard for mobile payemtns in Japan, thus forging the whole Japanese payment system. So the NTT DoCoMo-centric ecosystem is a huge one and NTT DoCoMo as a leader, has to coordinates all relationships of all parties. These collaborative approaches allow participants to share the significant risks.

### **5.3.2 NTT DoCoMo's Pushing Strategy**

Pushing NTT DoCoMo's deployment of MCPs is built around push strategy, which is most obviously exhibited in the enhancement of the dynamics of consumer adoption, NTT DoCoMo exerts two powerful pushing forces to enhance the user's adoption of its mobile payments service. One is to increase the potential users; the other one is to improve the service performance like enlarging the merchant acceptance of terminals. This pushing strategy is important to make NTT DoCoMo's MCPs accepted by end-users quickly and widely; therefore, the pushing strategy is a very important success factor of NTT DoCoMo's success in building MCPs ecosystem.

### **5.3.3 Enabling Environment**

An enabling environment is also important to NTT DoCoMo's deployment and development of MCPs, from two aspects. First, it can reduce barriers for the launch of NTT DoCoMo's services. Second is that a good market environment will make NTT DoCoMo's service easier to accept. Taken together, Japan's government, as policy-makers, is more behind the scenes to give the strategic guidance to the mobile payments development and help the strategic alliance creation between industry players. However, just as the combination of Makoto Koizumi and Wang's comments, it is impossible for NTT DoCoMo to make it, without government's support. In terms of practical move, the role of government is invisible and not so significant.

## **6 Conclusion**

### **6.1 Implications**

MCPs can be a new market with a large potential which should not be ignored which has great and positive influences on consumer habit, consumption culture and even the economy of one country. After our study, there is indeed a huge success in the MCPs field in Japan, due to the unique characteristics in both culture and market, majority of the researchers hold the opinions that Japanese experience cannot be exported. However, there are still some common implications for the global development of MCPs. Considering the complex landscape of MCPs, the business ecosystem theory, keystone strategy, pushing strategy provide a good perspective for strategy planning. If a player has the ambition to be a leader to develop MCPs, the successful experiences from NTT DoCoMo can be a guideline from the strategic perspective, especially in those countries similar to Japanese market in some aspects. By taking lessons from NTT DoCoMo, some possible problems can be avoided and the effectiveness and efficiency of their ecosystem strategies can be improved. Additionally, because of MCPs is a new market where rules or regulations lag behind, the role of keystone company is particularly important and even necessary during the development of MCPs ecosystem. Lastly, there are many lessons for the other countries need to learn like how to build an enabling environment including security, flexible policy. For example, Japanese mobile phone real name system offers a safer environment for the development of MCPs in Japan. The government in Japan also plays behind-the-scenes role in promote the the development of MCPs, by a flexible policy and strategic guide.

### **6.2 Limitation and Future Research**

This research is based on studying literatures and analyzing one classic case, use the inductive approach and qualitative method by secondary and primary data. We choose to study and analyze the classic case, it turns out that we fulfill our purposes.

First, we analyze from the perspective of service providers. In other words, we just conduct our study from the supply side. In the future study, both the supply side and demand side can be investigated. Also a comparison between two countries can provide more helpful suggestions.

Second, we have not been to Japan before. So we have to devote and contribute more time trying to understand Japanese society and market deeply. To do this, we also get some information from the Chinese students who study abroad in Japan, besides from some Japanese friends.

During our study, we also found some interesting questions which can be studied in the future. The uniqueness of the Japanese market like the completely exclusive sales model is indeed

helpful to develop the MCPs ecosystem in Japan. However, this unique model make Japanese's handset manufactures lose its global competitive advantage. In the future research, some suggestions could be found to solve this problem. Additionally, not every services launched by NTT DoCoMo are successful to date. We noticed that persons from 12 years old can subscribe the "DCMX mini". However, according to our interviews, the adoption of this service turned out not so good. So in the future study, we could study on the attitudes of the children's parents, how do they value "DCMX mini", do they allow their children to use the credit so early? What dose kids using credit bring to the Japanese society? We do hope these can spark the inspirations for the future studies.

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# Appendix 1

## Interview Questions

### How long have you been working in the company?

The questions are categorized into three aspects:

What is your position?

What are your responsibilities?

### 1. About DOCOMO

- What compelled DOCOMO to take the leadership role in driving Felica-based mobile phone payment (OsaiFu Keitai) in Japan?
- What advantages do you think DCM has to take the leadership role of Japan's mobile payments ecosystem?

### 2. How to collaboration with other players:

#### With handset manufacturers:

- As far as we concerned, Japan's mobile operators exercise very strong leverage over handset manufacturers who implement completely customized production according to mobile operators' specifications including the design of the mobile phone from software to hardware.
  - So can we just say it is straightforward to convince the handset manufacturers to produce FeliCa-enabled phones?
  - What value can DOCOMO's mobile payments services bring to handset manufacturers?

#### With Banks:

- In the beginning, do banks or other credit card issuers have great willingness to join the development of mobile payment services in Japan?
- Why to establish the cooperative relationship with Mitsui card and UCard by share acquisition? Did DOCOMO take a heavy risk to do these big investments at that time? What DOCOMO benefits from these bold moves?
- Could you please comment on the role of Mitsui card in the development and promotion of DOCOMO's mobile payments services?
- As the development of DOCOMO's mobile payment services, are there more and more banks or credit cards issuers show increased willingness to join the "iD" platform?

- To those credit card issuers who want to deploy the services via “iD” platform, is there any fee DOCOMO charge?

#### **With Merchants:**

- Is it a large challenge to convince Japanese merchants/retailers to deploy FeliCa-capable “iD” terminals presented?
- What strategy DoCoMo took to encourage Japanese merchants to install the “iD” terminals?

#### **With Sony (to start Felica Network)**

- Before the introduction of FeliCa-capable Osaifu Keitai, there are already many FeliCa-enabled contactless applications like transportation ticketing, digital money, ID cards and more. Is this one important reason for DOCOMO to use FeliCa as the technology enabling Osaifu Keitai because of its good compatibility?

#### **With other Felica-enabled contactless application and content providers**

- Besides mobile credit payments, Osaifu Keitai can be used as loyalty cards, ID credentials, commuter passes (suica byJR East), boarding passes, tickets, digital money (Edy).
  - How to realize the cooperation with these application and content providers?
  - What value can DoCoMo give them?
- What roles are they playing in the promotion of Osaifu Keitai services to the market?

#### **With competitors:**

- We noticed that AU, KDDI, and Softbank came into mobile payments with the use the same technology “Mobile FeliCa”. Why DoCoMo not to seek exclusive rights for Mobile FeliCa?

#### **Other aspects**

- Recently, we have learned from “NTT DOCOMO's CEO Discusses F4Q11 and Full Year 2012 Results” that Ryuji Yamada - President & CEO of your honored company said for the first time in eight years we achieved an increase in both revenues and income in fiscal 2011. Is it mainly because of the huge investments in the development of mobile payments service?
- Do you agree the following viewpoints (Score1)? (1 to 5, strongly disagree to strongly agree)

- To which degree do you think it is important to the development of DOCOMO’s mobile payments service (Score2)? (1 to 5, not at all to very important)

Viewpoints	Score1	Score2
DoCoMo’s willingness to <b>take a heavy risk</b> is the main impetus for the huge success of the Japan’s mobile payment ecosystem.		
DoCoMo conducts a “ <b>push</b> ” promotional strategy to actively create consumer demand for a product.		
DoCoMo is very <b>collaborative</b> corporate.		
The top management of DoCoMo have great visions.		
DoCoMo is innovative.		
<i>You can write more...</i>		

### 3. How to increase customer adoption

Only if an innovation reaches a mass-market, it can be viewed as a success. In this section, we wanna know how DOCOMO increase its customer adoption of mobile payments services.

(Osaifu Keitai phones refer to FeliCa-embedded mobile phones)

- About what percentage of Osaifu Keitai phones in all mobile phone which are sold by DOCOMO now?
- How to encourage customers to purchase Osaifu Keitai phone ?
- Are there many customers buying Osaifu Keitai phones, not for its mobile wallet functions, rather other features like good-looking appearances, advertising campaign ?
- Is a user with Osaifu Keitai phones more likely to become a active subscriber of DOCOMO’s mobile credit services?
- We noticed that persons from 12 years old can subscribe the “DCMX mini”, what do you think of the potential of the group (12-18 years old) to use “DCMX mini”?
- Customer perceived risk of a new technology is usually high in the early stage. DOCOMO’s Osaifu Keitai is a new service involving in payments which customers are more careful about. What level of perceived risk do you think Japanese customer have in the early stage?
- Do you think the following aspects will reduce the customer perceived risk? You can provide us more or correct our viewpoints. (1-5, not at all to reduce a lot)

Points	Score
Good status of DOCOMO from its power, high customer satisfactions, government-backed background	

Osaifu Keitai' security protection like setting passwords	
Mature personal credit system	
Mobile phone real name system	
Focus on small-value purchase at first (not sure)	
Effective and efficient measures when the mobile phones are displaced or stolen.	
You can write more here...	

#### 4. Enabling Environments

**Competition:** DOCOMO is the first one to launch the mobile phone wallet services. At that time, were there other players like banks or mobile operators considering similar services?

##### **Consumer Habit:**

- Can you tell me some Japanese typical habit? For example, Mobile culture, Mass Transit Ridership , are there more?
- Do they promote actively an enabling environment for the development of DOCOMO's mobile payments services?

**Government's support:** For the development of DoCoMo deploying MCPs, does the government plays a critical role to provide an enabling environment?

- Flexible policies?
- Some strategic guidance?
- Or more?