An Institutional Perspective of Mobile Payment Adoption: The Case of Japan

Remy Magnier-Watanabe
University of Tsukuba, Tokyo, Japan
magnier-watanabe.gt@u.tsukuba.ac.jp

Abstract

Mobile payment systems have been predicted to grow at the same pace as mobile phones and internet shopping for several years now. However, their slow adoption in most countries calls into question the general justifications rooted in economic and technology-acceptance models. This paper proposes that the successful adoption of mobile payment systems depends as much on satisfying institutional constraints found in country-specific environments, as on complying with industry- and resource-based views.

Following a review of institutions, institutional carriers, and their constraining effects, mobile payments are examined from the perspective of regulative, normative, and cognitive institutional carriers. Then, the case of Japan's widely used mobile payment system Mobile Suica is introduced to illustrate how a tight institutional fit can ensure wide acceptance.

The findings of this research can be applied to other mobile payment systems currently offered to identify and minimize the gaps with their institutional environment, thus speeding up their adoption.

1. Introduction

Innovation and technology adoption have typically been examined from the perspective of economic theory. For instance, Au and Kauffman [1] have studied the underpinnings of mobile payment systems (MPS), a form of electronic payments, in terms of consumer choice and demand, network externalities, switching costs, complementary goods, information technology value, and adoption and diffusion [1]. In a recent book, M'Chirgui and Chanel [2] examined the limited success of the French mobile payment using innovation theory, network externalities, and social influence, and identified different adoption factors for merchants and consumers. For the former, economic factors such as initial investment and transactions costs were found to be essential, while for the latter, technological factors such as ease-of-use, compatibility and security were found to be more critical.

However, these economic variables provide only a short-sighted angle from which broader institutional factors are hard to account for [3, 4]. Indeed, Peng et al. [3, 4] have compellingly argued that, in addition to the industry-based view and resource-based view, the institution-based view represents "the third leg of a strategy tripod" which focuses on contexts and the unwritten rules of the game [4, p. 63]. While the industry-based view attempts to map the position of the firm relative to Porter's five forces [5], and the resource-based view focuses on specific capabilities geared towards differentiation [6], the institution-based view aims at completing these angles by including "the formal and informal aspects of the institutional environment" [4, p. 71]. Formal constraints consist of political, legal, and economic rules, while informal constraints include socially-accepted norms of behavior dominant in a particular culture [7]. When the industry-based view and resource-based view cannot explain differences in outcome for similar products or services, then, the institution-based view might. The relevance of the institution-based view for technological innovations and information technologies and systems in general has already been underscored [8]. Furthermore, Peng et al. [4] have highlighted the importance of knowing the rules of the game for firms who compete not only internationally but also at home.

In addition, the adoption and diffusion of technology has predominantly been observed from the standpoint of user acceptance and utilization, as demonstrated by the wide range of user acceptance models. For instance, Venkatesh et al. [9] have formulated a unified theory of acceptance and use of technology integrating the elements of the theory of reasoned action, the technology acceptance model, the motivational model, the theory of planned behavior, a model combining the technology acceptance model and the theory of planned

978-1-4799-2504-9/14 $31.00 © 2014 IEEE
DOI 10.1109/HICSS.2014.136

behavior, the model of PC utilization, the innovation diffusion theory, and the social cognitive theory [9]. Venkatesh et al. [9] acknowledge the limits of their unified theory of acceptance and use of technology in explaining individual acceptance and usage decisions in organizations.

Although these models purposefully focus on users, some of them also include constructs related to the institution-based view. The theory of reasoned action, the technology acceptance model, the theory of planned behavior, and the model combining the technology acceptance model and the theory of planned behavior put forth subjective norm, or "the person's perception that most people who are important to him think he should or should not perform the behavior in question" [10, p. 302]. The model of PC utilization uses social factors or "the individual's internalization of the reference group's subjective culture, and specific interpersonal agreements that the individual has made with others, in specific social situations" [11, p. 126], and facilitating conditions found in the environment. Last, the innovation diffusion theory uses compatibility or "the degree to which an innovation is perceived as being consistent with the existing values, needs, and past experiences of potential adopters" [12, p. 195]. These four constructs of subjective norm, social factors, facilitating conditions, and compatibility point towards normative rules "that introduce a prescriptive, evaluative, and obligatory dimension into social life" [7, p. 54].

To some extent, M'Chirgui and Chanel [2] have included some social factors in the study of the adoption of the French mobile payment. However, these social factors merely reflect the complexity of the institution-based view as they were limited to Bass's [13] "social interactions": information from a source external to the social system such as that stemming from retailers, and communication within a specific social system, for instance early adopters [2, p. 84]. Furthermore, previous research has investigated the role of culture, decomposed into several dimensions, on technology adoption [14, 15, 16, 17]. The focus of this paper on institutional contexts rather than culture alone intends to be more inclusive since culture itself has been identified as a carrier of institutions [18].

This research therefore examines the ecosystem and institutional carriers that have affected the diffusion of mobile payment systems in Japan. This paper presents in section two the theoretical foundations of institutions and their carriers. Then, section three describes mobile payment systems as institutional carriers. And section Four examines the case of Japan's successful diffusion of the FeliCa-based mobile payment system.

2. Institutions

Institutions are products of the human socialization process. When frequently repeated actions become cast into a pattern leading to an economy of effort and greater efficiency – also called learning curve, this habitualized activity frees up valuable resources for reflection and innovation. In other words, institutionalization enables tension-relieving predictability allowing the specialization of actors through the division of labor [19]. Jepperson [18] asserts that metaphors about institutions usually connote "stable designs for chronically-repeated activity sequences" (p. 145). A more operational description recognizes that "institutions consist of cognitive, normative, and regulative structures and activities that provide stability and meaning to social behavior. Institutions are transported by various carriers – symbolic systems, relational systems, routines, and artifacts – and they operate at multiple levels of jurisdiction" [7, p. 48]. However, institutions are not set in stone and although they imply stability, "they themselves undergo change, both incremental and revolutionary [7, p. 50]. Peng et al. [3] stress the dual formal and informal characteristic of institutions which make up the political, legal and social environment in which firms and products or services necessarily exist and have to deal with.

2.1. Institutional Pillars and Carriers

Scott [7] contends that most institutional theorists recognize the existence of three pillars of institutions, namely regulative, normative, and cognitive systems, which he further decomposes in terms of basis of compliance, basis of order, mechanisms, logic, indicators, and basis of legitimacy. Regulative systems refer to institutions' setting of rules, monitoring, and sanctioning. Normative systems relate to values and norms which define preferred or desirable conceptions. And cognitive systems denote shared meanings and symbols.

Beyond those characteristics, institutions are conveyed or embedded in carriers. Although scholars differ in the number of institutional carriers and their importance, they usually overlap. For instance, Jepperson [18] identifies the three primary carriers of formal organization, regimes, and culture, while Scott [7] singles out symbolic systems, relational systems,

routines, and artifacts. These carriers greatly determine "the extent to which organizational components or features are institutionalized" [7, p. 82].

2.2. Institutional Isomorphisms

As classic research showed [20, 21], institutions are especially prone to inertia, reducing their capacity to change, while undergoing institutional and competitive isomorphic pressures forcing them to adopt the same structure fitting the environment's constraints. DiMaggio and Powell [20] argue that structural change may be driven more by processes, rather than by competition, thus making organizations more similar without necessarily making them more efficient. Organizations can in general be categorized as part of an organizational field, such as suppliers or consumers for instance, and that once structured into a field, these organizations undergo isomorphic pressures, making them more similar. "Isomorphism is a constraining process that forces one unit in a population to resemble other units that face the same set of environmental conditions" [20, p. 66]. There are two types of isomorphism, competitive and institutional, and we focus here on the latter kind which counts three mechanisms of institutional isomorphic change: coercive isomorphism that stems from political influence and the problem of legitimacy; mimetic isomorphism resulting from standard responses to uncertainty; and normative isomorphism, associated with professionalization. Indeed, DiMaggio and Powell [20] argue that institutional isomorphic pressures are more relevant than competitive ones for those organizations which seek institutional legitimacy, as may be the case for a complex new service – such as a mobile payment system – that requires the cooperation of several stakeholders with previously divergent interests.

Coercive isomorphism is the result of both formal and informal pressures, such as legal requirements, regulations, standards, and procedures, which apply to any given category of organization in the same field. Mimetic isomorphism occurs in ambiguous and uncertain environments, pressuring some organizations to model themselves after those perceived as more legitimate or successful. Normative isomorphism is a consequence of professionalization, especially formal education and professional networks, as exhibited by competing firms hiring personnel from particular universities or with specific credentials [20]. It is important to note that coercive isomorphic pressures – drawn from political influence, legitimacy and culture – are strongest since they exert prescriptive power over the very existence of the organization.

2.3. Institutions in Japan

In an analysis of dominant enterprise groups in the private sector in Japan, Orrù et al. [22] have highlighted shared ownership, mutually-beneficial transactions, and several interdependencies, leading them to assert the existence of strong institutional isomorphisms. These culturally-validated forces combining both competition and cooperation are the source of their success in Japan [22]. Likewise, Inagami and Whittaker [23] report that "the overwhelming majority of listed companies continue to have stable shareholders" and that although "many have reduced their levels of reciprocally-held shares (…), few think the practice is necessary" (p. 107). Referring to Zaheer [24]'s liability of foreignness, Japanese firms operating outside of their particular environment find different coercive institutional isomorphic pressures and may be unable to adapt to succeed. Indeed, Orrù et al. [22] argue that "to be technically efficient, firms must consider and comply with the institutional setting in which they are embedded" (p. 362).

Peng [25] observes that national culture can explain institutional differences, citing the embeddedness of Japanese firms in informal networks enabling for instance major manufacturers to benefit from close cooperation with suppliers without having to rely on vertical integration as is the norm for their US competitors [26]. This is consistent with Inagami and Whittaker [23]'s view of the Japanese 'community firm' defined by its unique combination of employment practices, corporate governance and priorities, and value orientations or ideology of community members.

3. Mobile Payment Systems

3.1. Definition

The Committee on Payment and Settlement Systems of the Bank for International Settlements defines an electronic purse or wallet as "a reloadable multipurpose prepaid card which may be used for small retail or other payments instead of coins" [27, p. 22]. These have come to include phone-based solutions as well. Van Hove [28] notes that electronic wallets, although frequently compared to debit cards, should instead be compared to cash. He explains that "the rationale behind their introduction – from the

mid-1990s onwards – was indeed to provide consumers and merchants with an electronic payment instrument that could handle small transactions cost effectively [28, p. 11]. Unlike debit or credit cards, transactions using an electronic wallet are carried out off-line without the direct involvement of financial intermediaries and their high fixed costs [2].

Electronic wallet systems can also be integrated in mobile phones, thus making them into mobile payment systems. The European Central Bank (ECB) defines mobile payments as "payments for which the payment data and the payment instruction are transmitted and/or confirmed via mobile communication and data transmission technology through a mobile device; mobile payments can be classified as proximity payments (contactless payments using, for example, near field communication technology) and as remote payments" [29]. Menke and de Lussanet [30] contend that the most common mobile payment systems in Europe are SMS-based, with charges paid through the customer's mobile phone monthly bill and Mallat [31] notes that smart phones' internet connection plays the same role as SMS in regular mobile phones.

Hassinen et al. [32] divide mobile payments based on the transaction settlement method (pre-paid, post-paid, or pay-now), purchase type (digital or real goods) and value, and they point to the many technologies competing, notably SMS and NFC, to become established standards.

3.2. Mobile Payment Systems as Institutional Artifacts

Scott [7] explicitly mentions that "complex technologies, embodied in both hardware and software" are recent examples of artifacts, or instances of material culture (p. 81). Therefore, mobile payment systems can be examined as artifacts embodying a new institutional arrangement arising from the recognition of a problem for which existing institutions have not yet found an answer [33]. Indeed, mobile payment systems provide several advantages. For users, the key benefit is convenience as they no longer need to worry about carrying change or having exact change for small purchases, or finding ATMs when they need cash. However, they may still need to periodically recharge their mobile payment system if it is of the pre-paid type. For merchants, Van Hove [28] lists benefits such as improved security, greater earned float, fewer transaction errors, speedier transactions, and lower cash handling costs. However, some merchants are reluctant to providing e-wallet solutions to consumers as they need to invest in a system which carries fixed and variable costs higher than those of cash transactions.

More specifically, regulative carriers, or objects complying with mandated specifications, include for instance security requirements, mode of operations, and technical standards. Normative carriers, or objects meeting conventions and standards, consist of technical standards ensuring compatibility and subsequently network effects supporting diffusion. And cognitive carriers, or objects possessing symbolic value, comprise the modern, speedy and convenient characteristics of such mobile payment systems [7, p. 77].

3.3. Mobile Payment Stakeholders

Ondrus and Pigneur [34] have proposed a classification framework of mobile payments based on payment service providers and technology, with financial institutions and mobile network operators versus newcomers and intermediaries in the former, and card-based versus phone-based solution in the latter. In their analysis, they identified three groups of mobile payment stakeholders – providers, merchants, and consumers – conspicuously leaving out broader institutions which are center stage in the institution-based view. Therefore, this type of typology may be useful to map out the market but does not provide insights into the diffusion of mobile payment systems from an institutional perspective.

Au and Kauffman [1], on the other hand, explicitly include a wider range of stakeholders in their framework describing the effects of a mobile payment-related disruptive technology. Stakeholders encompass: technology producers, including technology companies, consulting firms, university and government research labs; end-users, consumers and buyers; sellers or business intermediaries; and government agencies and regulators.

4. Japanese Mobile Payment Systems

4.1. Two Major Systems

Japan counts two major mobile payment systems, Rakuten EDY (previously of Bitwallet, Inc.), a joint venture whose main shareholders were Sony and NTT Docomo and which was acquired by Japan's largest online shopping mall Rakuten in 2010, and Suica/Pasmo founded by a consortium of transportation companies. The two solutions use Sony's FeliCa NFC contactless chip technology, which boasts high security, speed, and multiple applications. Besides the mobile payment application,

FeliCa can also be used for transportation or access-key purposes. Both systems allow to charge up to JPY50,000 on either an IC card or a FeliCa chip-equipped mobile phone. EDY, launched in 2001 as the first mobile payment in Japan, had about 69 million prepaid rechargeable contactless smart card customers as of January 2012 [35] and 12.5 million mobile customers as of April 2011 [36]. It is currently accepted at 350,000 stores and 48,000 websites (as of May 2013) including popular chains such as major convenience store chains, hotel chains, drugstores, fast food restaurants, and family restaurants [37] (Table 1).

Table 1: Latest Suica/Pasmo and EDY diffusion

	Card	Mobile	Sub-total	Retail outlets
Suica	*38,190,000	3,000,000	41,190,000	185,000
Pasmo	20,380,000	-	20,380,000	20,448
Sub-total	58,570,000	2,300,000	61,570,000	205,448
EDY	69,000,000	12,500,000	81,500,000	350,000
Total	127,570,000	17,800,000	143,070,000	

(Data compiled from multiple sources cited in text)
*with e-money capability out of a total of 40,480,000 cards

Suica, started by Japan Railways (JR) East in 2001, is a prepaid IC card that could originally be used on the JR East network in the Tokyo metropolitan area and later included other adjacent areas. JR East expanded the IC card's functions from passenger stored-fare tickets to shopping by beginning Suica electronic money services in March 2004, in order to "capitalize on the potential of Suica as a means of settling transactions for small sums" [38, p. 36]. Pasmo, ever since its introduction in March 2007 by Tokyo-area private railways, subways, and bus companies, has been interchangeable with Suica. As of August 2012, there were more than 40 million active Suica/Pasmo cards in circulation, of which 95% are equipped with the electronic money function, accepted at about 185,000 points of sales [39]. Suica/Pasmo cards can be used in the greater Tokyo area on the entire transportation network of JR East and those of about 12 private railway and bus operators, as well as on other JR transportation networks in densely-populated areas throughout Japan (Kyushu, Okayama, Hiroshima, Osaka, Nagoya, Shizuoka, Sendai, Niigata, and Sapporo) [40]. As of March 2012, Suica/Pasmo accounted for roughly 3 million daily transactions [41]. Already as of August 2009, 82.8% of residents in the Tokyo metropolitan area used electronic money, with an average monthly transaction amount of ¥6,000 ($61 to $65) and an average of seven transactions per month [42]. JR East reported that Suica/Pasmo's mobile payment function (Mobile Suica) had been used more than 75 million times in July 2012 [43].

In 2004, the main Japanese mobile operator, NTT Docomo, started integrating Sony's FeliCa RFID contactless chip technology in its mobile phones. It then licensed the technology to rival mobile carriers Softbank and KDDI to spread its penetration and establish it as the de factor standard [42]. As of June 2012, more than 200 million units of the mobile FeliCa IC chip had been shipped and there were more than 18 million FeliCa-equipped mobile handsets sold cumulatively since [44] and as of April 2011 there were more than 2.4 million registered active Mobile Suica users [45], and as of February 2011 about 12.5 million registered active "osaifu keitai EDY" users (mobile EDY) [46]. The EDY application is also available on any FeliCa -enabled handset. The mobile applications provided by EDY and Suica offer the same functionalities as the prepaid IC cards they replace.

Suica/Pasmo cards can be recharged at any ticket vending machines found in every station of participating transportation networks. Suica/Pasmo-enabled mobile phones, such as Mobile Suica, are linked to a credit card or bank account, and can further be recharged with cash at select convenience stores. EDY cards and EDY-enabled mobile phones can typically be recharged at the register of participating convenience stores and at dedicated charging machines found on premises of participating retailers. The two systems can only be recharged in JPY1,000 increments, with a ceiling of JPY20,000 for Suica/Pasmo, and JPY25,000 for EDY.

5. Japanese Mobile Payment Systems as Institutional Carriers

While past research has already examined the diffusion and adoption of Japan's mobile payment systems [47], this paper focuses on the identification of specific institutional carriers that have supported the acceptance of Mobile Suica. Indeed, as it is the only mobile payment system also used as a passenger stored-fare transportation ticket, it is embedded deeper into Japan's institutions.

In doing so, we use Scott [7]'s typology of institutional carriers – regulative, normative, and cognitive with data gathered from public records and an interview with a manager in the Corporate Strategy Section of FeliCaNetworks, Inc. conducted in June 2012. FeliCaNetworks, Inc., a joint-venture between Sony Corporation (57%), NTT docomo (38%), and East Japan Railway (5%), provides two services, technology licensing and platform

management. It licenses the development, manufacture and sale of the Mobile FeliCa IC Chip, the core technology of NFC FeliCa handsets, and other FeliCa-related technology to build FeliCa-enabled systems, in order to provide as many products and services as possible using the NFC FeliCa technology.

This study is consistent with Halpin and Moore's findings [48], who attribute the success of FeliCa to three main factors: collaboration between mobile network operators, handset and POS manufacturers, and retailers, achieved through the licensing of the FeliCa technology; continuous investments leading to the development of integrated turnkey solutions to provide FeliCa to retailers; and the relaxation of financial rules in Japan that enabled non-banks to provide financial services. The authors also point out that cultural attitudes and social factors may have played a role in the rapid diffusion of mobile payment systems, citing the pre-FeliCa usage of a wide range of mobile services and dense urban living.

5.1. Regulative Carriers

Regulative carriers include complying with mandated specifications and technical standards.

In Japan, the de facto standard for e-money is FeliCa, but in Europe and the US, other standards, such as Type A and Type B, prevail. And although FeliCa was the world's first contactless chip certified by ISO/IEC 15408, the most reliable criteria to measure security level of a system, it does not comply with ISO 14443, an international standard for proximity or contactless smart card communication prevalent in Europe and adopted by Type A and Type B chips. This certification issue prevents FeliCa from expanding to Europe and has forced FeliCaNetworks to focus on the Asian market instead, where its strategy is to first gain a foothold though FeliCa chip-enabled card-based services and then to expand to mobile handsets. So far, the cost of implementing the technology generally surpasses the benefits that services providers or mobile network operators (MNOs) can derive from it, and therefore adoption remains slow outside Japan.

However, since FeliCa has gained wide acceptance, supported by large corporations which command a sizeable market share both on the supply side (NTT docomo, JR East) and the demand side (7&I formerly known as 7Eleven, Aeon), it has emerged as the only credible option for mobile payment systems, unchallenged by rival standards or technologies in Japan.

Security standards play the role of coercive isomorphic pressures as any competing system with Mobile Suica would have to comply with the same rules, thus calling for large technology investments. Deep-pocketed organizations which would have thought of investing in such system have therefore an incentive to buy into the existing FeliCa platform rather than to develop their own. In addition, the success and widespread utilization of FeliCa-based payment systems have made it into the de facto standard in Japan, thus further pressuring the demand side to adopt it.

5.2. Normative Carriers

Normative carriers consist of technical standards ensuring compatibility and diffusion.

FeliCaNetworks' platform management business, called Trusted Service Manager, controls and manages the memory area in the Mobile FeliCa IC chip, enabling service providers to deliver reliable and secure services to their customers using a NFC FeliCa handset. For instance, FeliCaNetworks allocates the memory area for services providers on the chip, then executes secure online transactions using its secure servers for services, such as McDonald's coupons and All Nippon Airways loyalty programs.

The e-money ecosystem consists primarily of MNOs, handset manufacturers, and service providers which include content providers, credit card companies, and merchants. In Japan, NTT docomo is the largest MNO and an early investor and adopter of e-money technology, as demonstrated by its stake in FeliCaNetworks, and in 'the JV', a joint-venture with McDonald's Corporation Holdings, Japan which operates the FeliCa-chip based coupon system of McDonald's with about 15 million subscribers since it started in August 2009 as of February 2013 [49]. Historically, Japanese MNOs dictate specifications and purchase network-specific handsets from phone manufacturers that they later resell to consumers. This structure means that MNOs, not handset manufacturers, bear all the risks, while their position gives them the most leverage in terms of technology adoption. This balance of power is similar in the US, but different in Europe, where consumers are not bound to a specific MNO and handset manufacturers decide the technical features of their phones, selling directly to consumers.

Therefore, in Japan, whether the FeliCa chip is integrated in the handset is driven by MNOs, which, being primarily concerned with subscriber retention and average revenue per user, constantly introduce handsets with an increasing number of features. At the same time, NTT docomo, the MNO with a stake in FeliCa, promotes the technology with service

providers to speed up its adoption, since the technical platform itself is only a platform in need of services. It is a classic case of indirect network effect, whereby complementary goods (e.g. FeliCa-based services) are more readily available, lower in price, or more attractive to develop, as the number of users of a good (FeliCa chip-equipped handset) increases [50]. The key for MNOs and service providers is to come up with services that monetize the technology. Other Japanese MNOs, which had adopted a "wait-and-see" attitude instead of investing in an uncertain, if novel, technology, have rallied behind the technology and are now offering FeliCa chip-equipped handset, thus giving in to a normative isomorphic pressure (Figure 1).

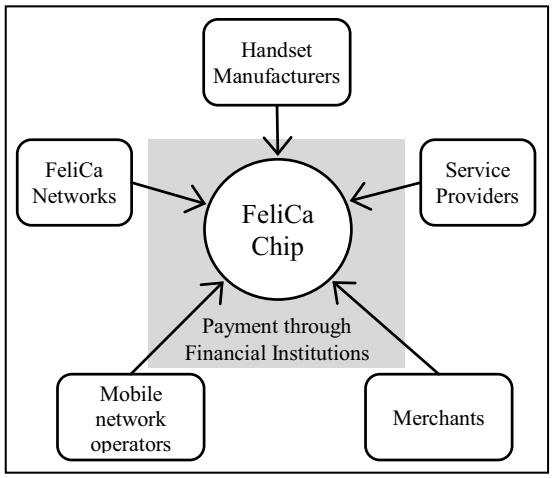

Figure 1. Stakeholders of mobile payment systems in Japan

5.3. Cognitive Carriers

Cognitive carriers comprise the modern, speedy and convenient characteristics of such mobile payment systems

One reason for the success of Suica has to do with the pricing of commuter travel in Japan. Before Suica, when traveling from station A to B, commuters had to refer to a detailed route map to work out the fares to their destinations; fares are calculated based on the number of stations travelled on any given line and commuters had to purchase yet another ticket if traveling on another network during their journey through the Tokyo area. In case commuters had purchased a ticket whose fare insufficiently covered their journey, they had to pay the difference at fare-adjustment machines before exiting through the gates. This option still exists today, favored mostly by elderly or occasional users.

The Suica rechargeable fare card solved the major hassle of having to calculate the fare of each journey. And since it is now completely interchangeable with the Pasmo card in the greater Tokyo area, it is supported on virtually any train, tramway, and bus system. And because of its stored-fare function, fare settlement is done automatically at the gate when passengers ride a train beyond the area covered by their commuter pass.

Beyond the transportation application, the success of Suica and Mobile Suica, as well as related payment services is largely due to the adoption by large companies. M'Chirgui and Chanel [2] contend that the slow diffusion of the mobile payment in one of France's regions is mainly due to its lack of critical mass and social interactions. In his diffusion of innovation model, Rogers [51] outlined several strategies to boost adoption, such as getting an innovation adopted by a respected individual within a social network, creating an instinctive desire for a specific innovation, and providing benefits for early adopters. M'Chirgui and Chanel [2] suggested that a mass market retailer or a catalyst such as a transport application could speed up the adoption of mobile payment systems in France. According to the FeliCaNetworks manager interviewed for this research, the fastest growing applications using NFC FeliCa technology are those supported by large retailers, specifically Nanaco, owned by 7&I and which operates Ito-Yokado, and Waon, which belongs to Aeon; Ito-Yokado and Aeon are some of the largest supermarket chains in Japan. Nanaco and Waon have 20 million and 31.8 million registered users, are accepted at 100,000 and 160,000 locations, and 49 million and 45.4 million monthly transactions using card- or phone-based FeliCa payment services respectively as of March 2013 [52, 53]. Because of their scale, these retailers provide enough incentives to consumers for using their "local e-money" service inside their wide network of stores, tapping into a large pocket of captive customers and making use of built-in loyalty programs. And so as not to be left behind by the competition, cognitive carriers act as mimetic isomorphism with large retailers following after their competitors in introducing local FeliCa-based e-money services. In contrast to local e-money services, common e-money services, such as that of EDY, are available to any merchant accepting to purchase a dedicated terminal and pay transaction fees.

5. Conclusion

The diffusion and adoption of mobile payment systems in Japan has admittedly been much faster and more durable than in any other nation to date. Beyond typical economic or technological motives, its success can be attributed to the payment solution satisfying regulative, normative, and cognitive constraints specific to the Japanese environment. It is important to note that the stakeholders of the technology – handset manufacturers, mobile network operators, service providers, merchants, and users – have rallied under a single standard – FeliCa – operated by FeliCaNetworks.

After being adopted by national and private railway companies and therefore being used by millions of users, the payment platform itself has become institutionalized, thus leading stakeholders to compete over applications rather than standards, relying on FeliCaNetworks to manage the chip's memory and execute online transactions. Last, the adoption by large retailers for their local electronic money services has further institutionalized the technology platform. The case of Japan demonstrates that the adoption by end users depend very much on the adoption by the mobile payment's stakeholders, especially MNOs, handset manufacturers, service providers, and merchants. Until stakeholders in other countries can respond to their specific institutional environment and agree on a cooperative business model using a common platform, the adoption of mobile payment systems by companies and then by end users will remain slow.

6. References

[1] Au, Y.A., Kauffman, R. (2008). The economics of mobile payments: Understanding stakeholder issues for an emerging financial technology application. Electronic Commerce Research and Applications, 7 (2), pp. 141-164.

[2] M'Chirgui, Z., Chanel, O. (2008). The adoption and use of smart card technology in banking: An empirical evidence from the Moneo electronic purse in France. In V. Ravi (Ed.), Advances in Banking Technology and Management: Impacts of ICT and CRM. Information Science Reference, Hershey, PA.

[3] Peng, M.W, Wang, D.Y.L., Jiang, Y. (2008). An institution-based view of international business strategy: A focus on emerging economies. Journal of International Business Studies, 39 (5), pp. 920-936.

[4] Peng, M.W., Sun, S.L., Pinkham, B., Chen, H. (2009). The institution-based view as a third leg for a strategy tripod. Academy of Management Perspectives, 23 (3), pp. 63-81.

[5] Porter, M.E. (1980). Competitive Strategy. Free Press, New York, NY.

[6] Barney, J.B. (1991). Firm resources and sustainable competitive advantage. Journal of Management, 17 (1), pp. 99-120.

[7] Scott, W.R. (2001). Institutions and Organizations (2nd ed.). Sage, Thousand Oaks, CA.

[8] Björck, F. (2004). Institutional theory: A new perspective for research into IS/IT security in organizations. Proceedings of the 37th Annual Hawaii International Conference on System Sciences (HICSS'04), 7, pp. 70186b.

[9] Venkatesh, V., Morris, M.G., Davis, G.B., Davis, F.D. (2003). User acceptance of information technology: Toward a unified view. MIS Quarterly, 27 (3), pp. 425–478.

[10] Fishbein, M., Ajzen, I. (1975). Belief, Attitude, Intention and Behavior: An Introduction to Theory and Research. Addison-Wesley, Reading, MA.

[11] Thompson, R.L., Higgins, C.A., Howell, J.M. (1991). Personal computing: Toward a conceptual model of utilization. MIS Quarterly, 15 (1), pp. 124-143.

[12] Moore, G.C., Benbasat, I. (1991). Development of an instrument to measure the perceptions of adopting an information technology innovation. Information Systems Research, 2 (3), pp. 192-222.

[13] Bass, F. (1969). A new product growth model for consumer durables. Management Science, 15 (5), pp. 215-227.

[14] Hofstede, G. (2001). Culture's consequences: Comparing values, behaviors, institutions, and organizations across nations. Sage Publications, Thousand Oaks, CA.

[15] House, R.J., Hanges, P.J., Javidan, M., Dorfman, P.W., Gupta, V. (2004). Culture, leadership and organizations: The GLOBE study of 62 societies. Sage Publications, Thousand Oaks, CA.

[16] Steers, R.M., Meyer A.D. Sanchez-Runde, C.J. (2008). National culture and the adoption of new technologies. Journal of World Business, 43 (3), pp. 255-260.

[17] Bhagat, R.S., McDevitt, A.S., McDevitt, I. (2009). Cultural variations in creation, diffusion, and absorption of organizational knowledge. In R.S. Bhagat and R.M. Steers (eds.), Handbook of Culture, Organization, and Work. Cambridge University Press, Cambridge, U.K.

[18] Jepperson, R.L. (1991). Institutions, institutional effects, and institutionalism. In W.W. Powell and P.J. DiMaggio (eds.), The new institutionalism in organizational analysis (pp. 143-163). University of Chicago Press, Chicago, IL.

[19] Berger, P.L., Luckmann, T. (1966). The social construction of reality: A treatise in the sociology of knowledge. Anchor Books, New York, NY.

[20] DiMaggio, P.J. and Powell, W.W. (1983). The iron cage revisited: institutional isomorphism and collective

rationality in organizational fields. American Sociological Review, 48, pp.147–160.

[21] Zucker, L.G. (1977). The role of institutionalization in cultural persistence. American Sociological Review, 42, pp.726–743.

[22] Orrù, M., Biggart, N.W., Hamilton, G.G. (1991). Organizational isomorphism in East Asia: Broadening the new institutionalism. In W.W. Powell and P.J. DiMaggio (eds.), The new institutionalism in organizational analysis (pp. 361-389). University of Chicago Press, Chicago, IL.

[23] Inagami, T. Whittaker, D.H. (2005). The New Community Firm. Cambridge University Press, Cambridge, UK.

[24] Zaheer, S. (1995). Overcoming the liability of foreignness. Academy of Management Journal, 38 (2), pp. 341-363.

[25] Peng, M.W. (2002). Towards an institution-based view of business strategy. Asia Pacific Journal of Management, 19 (2/3), pp. 251-267.

[26] Dyer, J., Nobeoka, K. (2000). Creating and managing a high-performance knowledge-sharing network: The Toyota case. Strategic Management Journal, 21, pp. 345-367.

[27] CPSS (Committee on Payment and Settlement Systems) (2003). A glossary of terms used in payments and settlement systems [Online]. Available at http://www.bis.org/publ/cpss00b.htm.

[28] Van Hove, L. (2004). Electronic purses in Euroland: Why do penetration and usage rates differ? The Société Universitaire Européenne de Recherches Financières (SUERF) [Online]. Available at http://www.suerf.org/download/studies/study20044.pdf.

[29] ECB (2013). Why is the Eurosystem interested in retail payment innovations? European Central Bank [Online]. Available at: http://www.ecb.europa.eu/paym/sepa/innovation/html/index.en.html.

[30] Menke, L., de Lussanet, M. (2006). SMS-based mobile payment: popular with the young. Forrester Research.

[31] Mallat, N. (2007). Exploring consumer adoption of mobile payments – A qualitative study. The Journal of Strategic Information Systems, 16 (4), 413-432.

[32] Hassinen, M., Hyppönen, K. and Trichina, E. (2008). Utilizing national public-key infrastructure in mobile payment systems. Electronic Commerce Research and Applications, 7 (2), 214-231.

[33] Suchman, M.C. (1995). Localism and globalism in institutional analysis: The emergence of contractual norms in venture finance. In W.R. Scott and S. Christensen (eds.), The institutional construction of organizations. Sage Publications, Thousand Oaks, CA.

[34] Ondrus J., Pigneur Y. (2006). Towards a holistic analysis of mobile payments: A multiple perspectives approach. Electronic Commerce Research and Applications, 5 (3), pp. 246-257.

[35] Rakuten (2012). Convenience stores starting e-money payment services [Online]. Available at: http://www.rakuten-edy.co.jp/press/2012/pdf/20120308.pdf.

[36] Rakuten (2011). Android phones to begin offering "Edy Auto Charge" feature [Online]. Available at: http://corp.rakuten.co.jp/news/press/2011/0412_01.html.

[37] Rakuten (2013). Rakuten-Edy homepage [Online]. Available at: http://www.rakuten-edy.co.jp/.

[38] JR East (2009). JR East Annual Report 2009 [Online]. Available at: http://www.jreast.co.jp/e/investor/ar/2009/pdf/ar_2009_all.pdf.

[39] JR East (2012). The taxi company Dai-ichi Kotsu now accept Suica for payment [Online] Available at: http://www.jreast.co.jp/press/2012/20120911.pdf.

[40] JR East (2012). IC Card Suica / Toward Overseas Projection of Railway Business [Online]. Available at: http://www.jreast.co.jp/investor/factsheet/pdf/factsheet_06.pdf.

[41] JR East. (2012). JR East Annual Report 2012. [Online]. Available at: http://www.jreast.co.jp/e/investor/ar/2012/pdf/ar_2012_all.pdf.

[42] Ezell, S. (2009). Contactless Mobile Payments. Washington, DC: The Information Technology & Innovation Foundation.

[43] JR East (2013). More than 3 million Mobile Suica customers [Online]. Available at: http://www.jreast.co.jp/press/2012/20130105.pdf.

[44] FeliCa Networks (2012). President's message [Online]. Available at: http://www.felicanetworks.co.jp/en/company/message.html

[45] JR East (2011). Start of the Mobile Suica service for Android smartphones supporting osaifu-Keitai [Online]. Available at: http://www.jreast.co.jp/e/press/20110603/index.html

[46] Rakuten (2011). Android phones to begin offering "Edy Auto Charge" feature [Online]. Available at: http://corp.rakuten.co.jp/news/press/2011/0412_01.html.

[47] Amoroso, D.L., Magnier-Watanabe, R. (2012). Building a research model for mobile wallet consumer adoption: The case of mobile Suica in Japan. Journal of Theoretical and Applied Electronic Commerce Research, 7 (1), pp. 94-110.

[48] Halpin, R., Moore, R. (2009). Developments in electronic money regulation – the Electronic Money Directive: A better deal for e-money issuers? Computer Law & Security Review, 25 (6), pp. 563-568.

[49] FeliCaNetworks (2013). Mobile World Congress 2013, the world's largest exhibition in the mobile industry [Online]. Available at:

http://www.felicanetworks.co.jp/news/topics/20130225.html.

[50] Liebowitz, S.J., Margolis, S.E. (1995). Are network externalities a new source of market failure? Research in Law And Economics, 17, pp. 1-22.

[51] Rogers, E.M. (1962). Diffusion of Innovations. Free Press, New York, NY.

[52] Nanaco (2013). Corporate customers information page [Online]. Available at: http://www.nanaco-net.jp/corporate/index.html.

[53] Aeon (2013). Waon service to start al all Peacock supermarkets in Japan [Online]. Available at: http://www.aeon.info/news/2013_1/130425R_1.html