An Institutional Analysis on the Vicissitudes of a Micro-Payment Platform

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Abstract

The EASYCARD provided by the Taipei Smart Card Corporation (TSCC) is a milestone in application of intelligent transport system in Taiwan. Besides, its applications vary from public transportation, related services, access control, to school campus. When facing the institutional problems, however, these applications can not do well as they did. In this paper, through an institutional analysis, we detailed the vicissitudes of a micro-payment platform implementation based on the EASYCARD system. Through a deep understanding of such case, the paper mainly contributes to inter-organizational system, or innovation adoption and diffusion in the information systems (IS) research field.

Key words: Near Field Communication (NFC), Micro-payment platform (MPP), innovation, new institutional theory, relational networks

1. Introduction

This paper provides an institutional study of how the Micro Payment Platform (MPP) attempts to conquer the various institutional environments. We consider the implications of structural attributes and control system characteristics in light of the institutional and technical environment for organizational performance during innovation.

The EASYCARD provided by the Taipei Smart Card Corporation (TSCC) is a milestone in application of intelligent transport system in Taiwan. Besides, its applications vary from public transportation, related services, access control, to school campus. It is undoubtedly a successful MPP. However, how are these applications doing when meet the institutional problems? In this paper, through an institutional analysis, we detailed the vicissitudes of a micro-payment platform implementation based on the EASYCARD system.

1.1. An Interesting Case

One of the main actors in this case, a metropolitan university (U1) won initial success on the micro-payment platform (MPP) through an integration of 12 applications in EASYCARD in its own campus. However, unlike the success of the EASYCARD, the innovation seems hard to cross the campus to the whole society. What’s wrong with the innovation case on MPP? Through a two-year study, we tried to detail the vicissitudes of this still-going case.

1.2. Research Questions

Drawing from an institutional perspective [15], this paper analyses why an innovation of MPP case meets so many obstacles. The study questions the dichotomy between technology and institutional pressures normally made in information management research based on new institutional theory.

Our questions are: 1) Even though the great success the EASYCARD had, how is the vicissitudes in the case of MPP. 2) Why there is the vicissitudes in the case of MPP. Following the new institutional theory, we employ the concept of relational networks to study the case.

The rest of the paper is organized as follows. Section 2 states the new institutional theory and the emergence of Micro-Payments Platform (MPP) using Near Field Communication (NFC) technology. The research method and the data collection are explained in Section 3. Results are analyzed in Section 4. In
Section 5, we provide the conclusions and discuss the theoretical and practical implications.

2. Literature Review

2.1. New Institutional Theory

To sociological institutionalisms, institutions constitute actors and adopt features that seem legitimate to the cultural context. Sociological institutionalism defines institutions broadly to include, “not just procedural rules, procedures or norms, but also the symbol systems, cognitive scripts, and moral templates that provide the ‘frames of meaning’ guiding human action” [7, 14].

In information systems research, Lamb and Kling [10] re-conceptualized the users as social actors by a multidimensional view which contains: affiliations, environment, interactions, and identities. They addressed that a social actor is an organizational entity whose interactions are simultaneously enabled and constrained by the socio-technical affiliations and environments of the firm, its members, and its industry. To address them, some IS researchers have called for a better integration of institutional theory into information and communication technology (ICT) related studies [12, 13]. In Scott’s [16] synthesis of institutional theory concepts provides a good basis for understanding organization members who use ICTs as social actors. This study confirms that the development and use of intranets, like that of online services, is influenced in predictable ways by the technical and institutional pressures of industry environments.

Institutional theory provides an overarching framework as to how organizations respond to institutional pressures within its contexts [2, 5, 9, 11, 16, 23]. Organizational theory suggested that a combination of both internal and external organizational pressures has a tendency to advance the convergence of business practices across different organizations and the importance of creating and maintaining legitimacy is stressed [6, 17, 18].

Institutional theory identifies four main mechanisms that lead to isomorphism and legitimacy: law, rule, normative, and mimetic [5, 8, 22]. Coercive mechanism develops through informal and formal pressures exerted from outside of the organization, for example, through regulatory pressures by the national law or the specific requirements of some organizations rules. [5, 22]. Coercive mechanism is strongly related to the desire to seek organizational legitimacy. Normative mechanism describes the collective efforts of groups to professionalize organizational practices to define both the conditions and the methods of their work; this might be through trade unions or through professional bodies such as accountants, teachers, or supply chain professionals. Mimetic mechanism is generally caused by uncertainty; firms may choose to copy others if they are unsure about certain practices or take it for granted [22].

This case study based on institutional theory is argued with qualitative methods. Our methodology follows the spirit of social capital, i.e. the habitus noted by Pierre Bourdieu and the trust. On the structure side, we employed Ronald S. Burt’s structural hole [4] to survey the reachability and goal oriented behavior. On the content side, we focus the organizational conformance, i.e. the decoupling between administrative level and technical Core. Besides these two sides, we also noticed the relation between informal and formal institutional elements.

2.2. The Emergence of MPP using NFC Technology and other Relevant Studies

The technology of Near Field Communication (NFC) made possible the integration of traffic, authentication, various services as well as micro-payment. In other words, the implementation of micro-payment platform (MPP) obviously plays an important role, not mention the great niche behind. We discussed the application of institutional theory in the area of IS research from the following perspective: strategy, mimetic isomorphism, and intentions to get legitimacy in adopting interorganizational linkages.

Ang and Cummings [1] showed that the propensity of banks (both hypercompetitive and highly institutionalized) to conform to or resist institutional pressures depends on the nature of institutional pressures, perceived gain in production economies, financial capacity to resist institutional influences, and transaction cost considerations. Teo et al. [19] used institutional theory as a lens to understand the factors that enable the adoption of interorganizational systems. It posits that mimetic, coercive, and normative pressures existing in an institutionalized environment could influence organizational predisposition toward an information technology-based interorganizational linkage. They remarked that normative pressures had the strongest effect on organizational adoption intention toward financial electronic data interchange (EDI), followed by coercive and mimetic pressures.
Tingling and Parent [20] suggested that many technologies benefit from network effects and increasing returns and in exchange for the high risk and ambiguity of technological selection the decision process of early adopters can create path dependence and stifle innovation by creating positive feedback loops and animate cycles where the number of adopters create stronger pressures to adopt. Because of their key position as gatekeepers of technology selection, further research should focus on these firms. Through institutional theory, we may have a better understanding of what the obstacle, pressure, and complexity are in the innovation processes.

3. Methods

3.1. Sampling
The rationale behind the study was to explain how the barriers an integrated business unit respond to institutional pressure to implement NFC on an MPP. The data collection took place since June, 2006. The researchers keep a close connection with the case. One author has been involved in this case as an action researcher throughout the 2-year time period. A second researcher acted as an ‘outside observer’ and as a reviewer of research data and document. In the current four phases of the case, we take a depth interview with the project leader. For triangulation purposes, the questions were asked to multiple informants. Further, documents were collected and observations were made to validate the verbal responses.

3.2. Unit of Analysis and Informants
There are 17 independent business units formed into eleven groups during the period. The unit of analysis in this study is the concrete relation or network. The study investigates 74 meetings or negotiations and some key participants in each group and the project leader in U1, who is most visible across groups.

3.3. Data Sources
The data for the study came primarily from three data sources: in-depth semi-structured interviews, documents, and observations. These will be discussed next.

3.3.1. Semi-Structured Interviews
To gain a deep understanding of the phenomenon, an in-depth semi-structured interview technique was used to probe the actors regarding the individual business unit background; current performance; the perceived external pressure to innovate MPP; how internal actors reacted to the pressure and to MPP; and how the business unit responded to the mandate in terms of how they innovated MPP.

3.3.2. Documents
Process for MPP activities were requested from the relevant business units, especially the U1. Copies of the meeting minutes in U1 were also supplied, together with copies of each business unit’s interpretation of the MPP from the public news.

3.3.3. Observation Data
Several site visits took place at all four phases in this case. During the visit, any MPP activities were observed, together with a meeting in the groups. The primary purpose of the observations was to verify the information collected from interviews and documentation. We hope to gain further insights into the culture and history of each network.

4. Results Analysis

4.1. Phases Analysis
Following approaches from the qualitative research, the analysis sought discriminative meaning during the case, such as the limit of law and policies. We present four phases that are unique to the case. We tabulated Table 1 to analysis the current four phases of the case.

In the initial phase, G1 has initial success in services integration. G2, learned from G1, formed its own group to promote. Finally, U1 sought another possible collaboration of BA to form a MMP (Micro & Mobile Payment) (SmartPay), i.e. G3; however, it’s still pending due to an official promotion. This phase shows that the easiness of imitation in innovation of service and the limitation of law.

In the sprouting phase, through T2’s enrollment, G1 won two cooperation plans as well as collaboration with G4. G5 failed to cross over the school boundary due to its credit payment base. (Q-Pay). G6 failed to form a new small payment platform (SPP) due to B1’s company policy. This phase accounts for the network extension and the limitations of law and regulation.
Table 1. The Result Analysis

<table>
<thead>
<tr>
<th>Phases / Date</th>
<th>Events</th>
<th>Network</th>
<th>Institutional Change and Forces</th>
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<tr>
<td>1 2006/05</td>
<td>Initial G1 has initial success in integration on authentication, service and cash flow. There are totally 12 services. G2 learned from G1, formed its own group to promote. G1’s promotion limited to the traffic use and campus. U1 seek another possible collaboration of BA to form a MMP (Micro &amp; Mobile Payment) (SmartPay), however, it’s still pending due to an official promotion.</td>
<td>G1 {S1, C1, T1, T2, B1, U1} G2 {U2, B2, T3} G3 {U1, BA}</td>
<td>The innovation of service is easy to imitate as long as the necessary group can be formed (Mimetic Isomorphism, Trust) G1’s limitation (R, L, Legitimacy)</td>
</tr>
<tr>
<td>2 2006-2007</td>
<td>Sprouting Through T2’s enrollment, G1 wins two cooperation plans as well as collaboration with G4. U1 tried to break the boundary of campus and the limitation of traffic use to small amount payment. However, G5 failed to cross over due to its credit payment base. (Q-Pay) On account of the B1’s company policy, G6 failed to form a new small payment platform (SPP), too.</td>
<td>G1 {S1, C1, T1, T2, B1, U1} G4 {I1, N1, N2} G5 {B1} G6 {T1, U1, B1}</td>
<td>The network extends through the relationship of members. (N, Structure holes) G5’s fail to cross the boundary of campus. (L, Legitimacy) G6’s failure (R, L, Habitus, Legitimacy)</td>
</tr>
<tr>
<td>3 2007</td>
<td>Breakthrough B2 had a success on SPP (e-Coin), so U1 seek the possible collaboration (G7). However, due to the possibility of G8, G6 is hard to form a solid collaboration. However, G8 failed finally. Interestingly, G9 formed a new SPP (i-Cash). G7 failed, too.</td>
<td>G7 {U1, T1, B2} G8 {B2, C2} G9 {B1, C2}</td>
<td>G7 and F8’s failures (R, Structure holes, Habitus) G9’s success (R, Structure holes, Habitus, Trust, Legitimacy)</td>
</tr>
<tr>
<td>4 2007-2008</td>
<td>Re-Channel B1 try to promote an update campus version of Q-Pay. By way of the support of National Science and Technology (S&amp;T) Project, U1 reunited G11 to promote a Mobile Payment Project. It’s still on going.</td>
<td>G10 {B1} G11 {U1, I1, T4, T5, B3}</td>
<td>G10’s pending. (R, Habitus, Legitimacy) U1 broke the limit of institution through an S&amp;T Project. (N, C, Habitus, Trust, Structure holes, Legitimacy)</td>
</tr>
</tbody>
</table>

* Notation 1: {} means network structure, elements in the brackets means the actors.
* Notation 2: Actor U means University; B, Banking System; I, Individual; T, Company of Information Technology; C, Trading Company or Channel; S, Company of Smart Card; N, NFC Forum and Solution; BA, Banking Association.
* Notation 3: Institution change and forces L means Law; R, Rules; N, Norms; C, Culture.

In the breakthrough phase, U1 seek the possible collaboration (G7) because of the success on SPP (e-Coin) of B2. Due to the possibility of G8, G6 is hard to form a solid collaboration. However, G7 and G8 failed finally. Interestingly, G9 formed a new SPP (i-Cash). This phase notes the limitation of regulation.

In the re-channel phase, B1 try to promote an update campus version of Q-Pay (G10), U1 reunited G11 to promote a Mobile Payment Project through the
support of National Grants. This phase again remarks the limitation of regulation and the support of norms and culture. The story is still on going.

4.2. Overall Analysis

Drawing on the insights of new institutional sociology, the paper depicts the emergence of cases of organizational breakthrough in a context that, like law enforcement, are characterized by strict hierarchy and discipline.

We analyses the influence on the responses of actors. On the one hand, compulsory mechanisms related to the regulative pillar of institutions such as financial law posed on the actors and the technology. On the other hand, cognitive and social factors linked to the cognitive pillar. In particular, the technology may affect or change the current institutions. In other words, actors (individuals and organizations) are not passive actors when confronting institutional pressures; they can develop different responses ranging from acquiescence to manipulation of these environmental pressures.

The rule or regulation of each actor constitutes its policy which is hard to change. There are three explanations from a social network viewpoint. One is the inertia of each actor, the other is trust between actors, and another is the legitimacy of actor’s responses.

Inertia explains the actor’s unwilling to change its current status. Trust explains the limit of perceived uncertainty and risk. In this sense, the policy implications of these findings would not to increase in the number of independent actors but to require very well-informed and socially-embedded actors in the group. Refer to the legitimacy; the policy is the strategy to win legitimacy; while the legitimacy may constrain the policy, too.

5. Discussion

Drawing on the insights of institutional theory, the paper explores and describes the emerging dynamics (or changes) in an MPP innovation case. Identification of coercive and normative isomorphism in the decision as well as changes in the responses of the stakeholders is found in this case. We believe our research contributed not only to the applicability of innovation and institutional theories in IS research, but also to the understanding of the complexities (e.g. political, institutional, economic, and cultural conditions), emerged from an innovation case in a specific Asia Pacific context. The paper concludes with some suggestions for further research in the innovation of MPP based on NFC.

From the case study, we found the actors’ various responses to institutional pressure on adopting NFC technology to an MPP. The findings highlight the external institutional pressure and the complexities of the social network are key issues that impact the innovation development process. We found that rules (R) and laws (L) played stronger forces, than the mimetic (C) and normal (N) forces. This is different from other research [20]. We may see that centralized control plays stronger forces, however, once it changed, the forces emerged from the firms or communities may be even greater. That is, from the continuous breakthroughs, the isomorphism forces do existed in each network. We can also obviously observed that the uncertainty of managing behaviors among organization during service innovation. Moreover, we can see the service innovation emphasizes not on technological innovation but on organization innovation and legitimacies.

The study offers both theoretical and practical implications. From a theoretical aspect, we offer insights concerning organizational responses under conditions of uncertainty together with the identification of different types of mechanisms in relation to the nature of the technical and administrative cores. At the beginning phase of innovation, the early adopters may decrease the uncertainty, this happens to increase the mimicking behavior for the late adopters. This is contrary to the institutional literature which stipulates that when uncertainty is high organizational units show a high level of mimicking behavior [4]. Further, based on the resource-based view [21, 3], one might argue that the early adopters, having gone through the high level of uncertainty, might have developed more socially complex and largely un-imitable practices of RFID.

In our experience, we argued that the innovation can be two-fold, technology innovation owns both high level of uncertainty and mimicking behavior; while service innovation doesn’t. However, this issue worth further studies.

The practical implications of the study is to provide insight as to how managers operating in various collaborative organizations. How can they consider the value of complying with the institutional pressure and
collaboration to adopt NFC on MPP. Organizational units respond to exogenous institutional pressures to ensure sustained competitive advantage (SCA) (e.g., MPP implementation). Our study emphasized that early adopters have to develop more socially or institutionally complex and largely unimitable practices to gain SCA. Moreover, during technology innovation, institution may play a high wall hard to climb or a great niche to make. This depends on the interaction of behavior (e.g. collaboration, habitus, trust, etc.) and institution (e.g. relational network, structural hole, legitimacy, etc)

The study offers valuable insights for directing future research into how organizations respond to institutional pressure, as NFC matures over time, the synergy of this technology could be a major factor in determining whether organizations implement any innovation.

6. References