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# An ecosystem view on third party mobile payment providers: a case study of Alipay wallet

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**Abstract**

**Purpose** – To understand why the penetration of handset-based mobile payment in most countries is still low has been an important research topic for the last 15 years, and it has been analyzed from different perspectives. However, the analysis of a single aspect cannot provide a sophisticated answer to the complicated underlying question. The purpose of this paper is to understand how a relatively successful m-payment ecosystem is created and sustained through the coopetition of various actors.

**Design/methodology/approach** – To that end, the authors analyze the case of Alipay wallet, the m-payment service provider with the largest market share in China, and focus on understanding the motivations and subsequent actions of the organizations cooperating in the Alipay wallet core ecosystem.

**Findings** – The results show that actors with heterogeneous and complementary resources can forge sustainable collaboration. Within an ecosystem, although always constrained by resources and capabilities, the actions that the core actors take and the resulting power imbalances are dynamically changing, reflecting actors' aim of reducing uncertainty.

**Research limitations/implications** – The main limitation of this case is that it was conducted in a Chinese context, which has specific features that may not apply to other cases. In addition, this study is based on a single case study in a single country, without comparing the results to any other cases or countries. Therefore, some modifications may have to be made when applying the framework and generalizing the results.

**Practical implications** – With regards to the practical perspective, the Alipay case may serve as an example that other providers follow, taking similar actions to increase the dependency of others and reduce their own dependency on others. It is helpful to take a keystone strategy to create value within the ecosystem and share this value with other participants. Moreover, Alipay acts as the platform provider, in addition to managing value creation within the ecosystem and sharing that value with the other participants. Alipay focuses on the business and strategic needs of the core actors, without threatening their main business, for example, Alipay focuses on micro-payments, which does not pose a direct competition to banks, who mainly rely on macro-payments to generate profit. Micro-payments are often related to high transaction costs for banks. In addition, although it is difficult to define the boundaries of actors in the ecosystem, the core business of every actor is the key competitive or even survival condition. This notion should be taken into consideration by actors whose actions affect the business of other ecosystem partners. For instance, Alipay will not aim to become a bank, as they know that if they do so, they cannot connect any other bank to their platform. In other words, the scope and boundary of the actors are clearly identified so that the core business will not be threatened. Sords, we can learn from Alipay that it pays off to focus on one area, and not to let your competitors challenge you.

**Originality/value** – The authors proposed the StReS framework for analyzing a business ecosystem by combining resource-based review, resource dependency theories and network analysis for investigating the motivations of the organizations cooperating in the core ecosystem and the actions they have taken to reduce dependency and uncertainty.

**Keywords** Mobile payment, Mobile payment ecosystem, Platform theory, Resource based review, Resource dependency theory, Third party payment provider

**Paper type** Research paper

## Introduction

Although Coca-Cola vending machines in Finland started the era of mobile commerce by accepting short message service (SMS)-based payments as early in 1997 (Mattos, 2010)

and keeping in mind the accelerating rate of innovation in mobile payment technologies, penetration of mobile payment (m-payment) in most Western countries is still low. M-payments can be defined as payments for goods, services and invoices using a mobile device via wireless and other communication technologies (Dahlberg et al., 2015a, 2015b). This definition excludes: any type of electronic or mobile money, access to electronic payment services with mobile devices and electronic banking. As pointed out by Dahlberg et al. (2015a, 2015b), the low level of penetration of mobile payment can be traced back to four main reasons:

1. consumer and merchant behavior;

2. large number of competing technologies;

3. complexity of mobile payment ecosystem; and

4. a lack of harmonized regulations.

Regulations are quite different across different countries and regions. Although technology and consumer adoption have been researched extensively, the studies in question provide limited explanations for the failure of mobile payments, without taking other factors into account. Generally speaking, analyzing one single aspect, no matter how systematically, is unlikely to provide a sophisticated explanation to the complex phenomenon of mobile payments.

To analyze this complex problem, we examine the case of the Alipay wallet from various perspectives to understand the inter-organizational issues involved in mobile payment ecosystems. An m-payment ecosystem is a set of interconnected and interdependent organizations that compete and cooperate with each other in a dynamic structure that evolves and develops over time (Peltoniemi, 2006; Moore, 1996; Iansiti and Levien, 2004). Because of the involvement of multiple interdependent organizations, the resulting complexity can create misalignments among the stakeholders who have different strategic incentives, resources, capabilities and prerequisites. In other words, the way all the relevant stakeholders can come on board and sustain collaboration is one of the main issues of concern.

The reasons for studying the Alipay wallet case have to do with its relative success and the fact that China has the world's largest mobile subscriber base: the number of mobile subscribers in China reached 1.3 billion as of August 2015 (Kemp, 2015). The situation in China is favorable for the development of m-payment solutions, with Alipay wallet being the most prominent example (Bakker, 2015) at the time of writing this paper. The main goal of this paper is to identify and analyze: the motivations of the organizations for cooperating in the wallet-payment ecosystem and the actions they take to reduce/increase dependency and uncertainty. Building on insights from business ecosystem concepts, we use the resource-based view (RBV) and resource dependency theory (RDT) adopting a qualitative research approach, for example, in-depth interviews with experts and managers from organizations, to understand the Alipay wallet platform/ecosystem in China.

The paper is structured as follows. Section 2 presents a review of papers on mobile payment research, with a special focus on articles adopting an ecosystem perspective. Section 3 describes the proposed research framework used to analyze mobile payment ecosystems; we motivate, discuss and explain the framework. In Section 4, we discuss the methodology and the background of data collection and analysis, and the results of the analysis are presented in Section 5. The discussions and conclusions are provided in Section 6.

## Literature review

As indicated in a number of studies (Dahlberg et al., 2008b; Dahlberg et al., 2015a, 2015b; Guo et al., 2015), literature on mobile payment between 1998 and 2014 has been dominated by two main topics: technology and consumer adoption. Only 31 of the 284

reviewed papers (from March 1998 to March 2016) focused on the mobile payment market or ecosystem and on three areas in particular: multi-perspective frameworks, m-payment business models and platform theories and strategies.

According to the first view, the articles aim to build a multi-perspective framework for mobile payment ecosystem studies, introducing (and recommending for other mobile payment studies to include) theories from other areas, such as economics, marketing or business ecosystems (Ondrus et al., 2005; Zmijewska and Lawrence, 2005; Dahlberg et al., 2008a; Au and Kauffman, 2008; Pousttchi et al., 2009). Several studies build theoretical frameworks and apply them in practical cases, providing empirical insights (Ondrus et al., 2009; Kazan and Damsgaard, 2013; Liu et al., 2015; Guo and Bouwman, 2015). All these papers emphasize that only a combination of the various perspectives can provide useful insights to analyze mobile payments. Since 2008, the number of ecosystem-related articles on mobile payment has gradually grown. Dahlberg et al. (2008a) proposed a theoretical framework to understand the failure of a dominant design in the Finnish market by building on theories adapted from standardization and emerging market research. Au and Kauffman (2008) proposed a framework for the analysis of economic issues of disruptive technologies to identify issues in relation to consumers, firms, business processes and markets, as well as industrial and social issues. Liu et al. (2015) retrospectively analyzed the evolution of mobile payment innovations in the past two decades in relation to technological changes and market competition and cooperation, and government regulation, to identify the main forces behind the evolution of technology-based innovations, such as mobile payments, in financial services, and to identify the roles played by market competition, cooperation and regulation in shaping the observed paths of evolution and the changing pace of technological transitions.

Second, the articles adopt an integrated view on m-payment business models (Faber and Bouwman, 2003; Ondrus and Lyytinen, 2011; Miao and Jayakar, 2016). The early study by Faber and Bouwman (2003) explored the connections between service offering and organizational arrangements by analyzing the business models and value network of three mobile payment initiatives. Ondrus and Lyytinen (2011) provides an early assessment of the emergence of new actors, such as Apple and Google, examining whether the newcomers will face the same challenges as the incumbents and anticipate how disruptive the new insurgents could be in the mobile payment markets. Miao and Jayakar (2016) examine the possible evolutionary paths of operational models for mobile payments in China, comparing them to the established and more advanced models in Japan and South Korea, from the perspectives of the industry, economics, society and regulation polices.

Third, the studies focus on platform theories and strategies (Staykova and Damsgaard, 2015; De Reuver et al., 2015; Kazan and Damsgaard, 2014). Staykova and Damsgaard (2015) propose a framework to analyze the entry and expansion strategies of digital payment solutions. De Reuver et al. (2015) combine the collective action theory and the platform theory to study the issues of collaboration and competition between banks and operators, concluding that different strategic objectives and interests, conflicts, lack of dependencies and governance-related issues led to the dissolution of the mobile payment platform. Kazan and Damsgaard (2014) propose a framework for studying digital payment and conduct a comparative case study of digital payment platforms by considering banks, mobile network operators, merchants and start-ups to look into their platform design and strategy issues.

To summarize, some papers focus on building conceptual frameworks and extending theory, and others focus on empirically examining existing frameworks mainly by looking at cases from Western markets. A number of recent studies have identified several possible reasons for the failures of mobile payment platforms: a lack of collaboration between multiple stakeholders, difficulties in finding win–win business models and a lack of standardization (Apanasevic, 2013; De Reuver et al., 2015; Gannamaneni et al., 2015; Liu et al., 2015; Ozcan and Santos, 2014). Moreover, because of the rapidly changing

technological environment and the lack of successful m-payment ecosystems, there is still no study that focuses on a case that can be called as successful. M-payment ecosystem studies are still in an early stage and the concept of business ecosystem in relation to platforms is still immature. Based on the three important characteristics of the business ecosystem, multi-actors that are loosely connected but reinforce each other, platforms that parties other than the platform provider(s) can also use and a coevolution process in which the organizations evolve together, we could focus on one of these aspects or integrate them into a comprehensive m-payment ecosystem logic.

## Theoretical foundation and research framework

Following the definition of business ecosystems (Moore, 1993), the main goal of this paper is to analyze the complex relationships amongst several actors to understand how value is generated through their interactions and how these interactions are triggered by different strategies. Subsequently, we propose the StReS model to analyze the business ecosystem on three levels: structure, resources and strategy.

### Structure

We begin by constructing the structure of the m-payment ecosystem by analyzing the articles in existing literature classified as m-payment ecosystem category in Dahlberg *et al.* (2015a, 2015b) by utilizing network visualization.

The ecosystem view provides a starting point for examining the network of organizations. To fully understand how organizations' behavior concerning coopetition (cooperating and competition) in the m-payment ecosystem evolves, we need to discuss the resources and capabilities of the core actors.

### Resource

Second, we use the information obtained in the network analysis involving the centrality of the actors to determine on which actors to focus. As the second step in our approach, we apply the RBV (Wernerfelt, 1984; Barney, 1991) and RDT (Pfeffer and Salancik, 1978, 2003) to identify the resources controlled by the core actors of the ecosystem and the dependency on resources among core actors. Hillman *et al.* (2009) recommend integrating RDT with the RBV of the firm (Barney, 1986, 1991), as this combination can be more productive than applying the two frameworks individually. According to the business ecosystem theory and RDT, the relationships among actors within an ecosystem depend on managing resource dependencies, which change dynamically all the time.

The RBV of organizations assumes that resources are heterogeneous in nature and that idiosyncratic resource bundles lead to value creation, irrespective of market conditions (Wernerfelt, 1984; Barney, 1991). Identifying and classifying a firm's resources and capabilities serves as a source of sustained competitive advantage, as these activities can help organizations to understand what they can do more effectively than their rivals. In other words, to gain a sustainable competitive advantage is the main reason why the core actors cooperate and work together to build a business ecosystem. However, in addition, the ecosystem perspective furthermore suggests that exchanges within a network allow actors to acquire knowledge about their partners, including their resources, needs, capabilities, strategies and other relationships. Therefore, the RDT (Pfeffer and Salancik, 1978, 2003) can be used to identify the external resources acquired from other actors in the network. The RDT (Pfeffer and Salancik, 1978, 2003) is applied to determine a set of associated resources that affect the relationship of every pair of actors. In other words, RDT is used to explain how the actors work together.

Pfeffer and Salancik (1978, pp. 26-27) pointed out the basic argument of the resource dependence perspective and inter-organizational relations as:

1) the fundamental units for understanding intercorporate relations and society are organizations; 2) these organizations are not autonomous, but rather are constrained by a network of interdependencies with other organizations; 3) interdependence, when coupled with uncertainty about what the actions will be of those with which the organizations interdependent, leads to a situation in which survival and continued success are uncertain; therefore 4) organizations take actions to manage external interdependencies, although such actions are inevitably never completely successful and produce new patterns of dependence and interdependence; and 5) these patterns of dependence produce inter-organizational as well as intra-organizational power, where such power has some effect on organizational behavior.

The RDT has two tenets. First, firms are constrained by, and depend on, other organizations that control critical resources. Second, firms attempt to manage uncertainty to acquire more power and to improve their performance (Greening and Gray, 1994). The lack of self-sufficiency with regards to the resources leads to a potential dependence on the parties who control the resources, which in turn will introduce uncertainty in a firm's decision-making (Pfeffer and Salancik, 2003). Moreover, the dynamic changes in the environment and the dependency resources dynamically changed according to the strategies adopted by the actors increase that uncertainty.

The actors in the ecosystem that acquire control over important resources can use the advantage that gives them to increase their power over the other actors and, consequently, their share of the total revenue of the ecosystem. However, exercising too much control over other actors in a longer timeframe can have serious negative consequences for the ecosystem as a whole (Iansiti and Levien, 2004). Therefore, we investigate what actions the actors have taken to manage their dependency resources.

### Strategies

Last, by focusing on the most important links in the network, we look into the "strategies", which here refer to the actions that the organizations have undertaken to redefine their dependency relationships and reduce uncertainty. Uncertainty is perceived to be a problem only when it relates to the dependency on critical resources, forcing the organization to take measures to reduce uncertainty (Pfeffer and Salancik, 2003). Organizations that are faced with an unpredictable task environment will try to establish inter-organizational arrangements in response to uncertainty and inter-firm dependence (Stern and Reve, 1980). Iansiti and Levien (2004) recommend acting as a keystone or a niche player in a dynamic ecosystem, and a keystone could turn into a dominator when the industry becomes mature and stable. However, the roles in an ecosystem can be varied and dynamic. According to RDT, power and dependence are terms that reflect an asymmetric relationship between companies: B is dependent on A to the extent that A has power over B. Furthermore, power does not add up to zero, as A and B can each have power over each other, making them interdependent. In addition, RDT also predicts that organizations continuously try to reduce their dependency on others; however, what an organization should do and what it actually can do to absorb its constraints often differ dramatically (Casciaro and Piskorski, 2005). In other words, the tendency to want to reduce uncertainty may cause opposite results. To differentiate various levels of this power imbalance, we classify a dependency relationship using the (essential/complementary) resources involved. We classified different resources as being essential and complementary. The term "essential" refers to the resources actors must have because the service cannot work without them, and "complementary" refers to the resources that are important to a specific service, but that does not stop the service from being operational. More specifically, if B is dependent on A through some essential resources, and A is also dependent on B through essential resources, we say that A and B are in a power balance. If B is dependent on A through essential resources, and A is dependent on B through complementary resource, A has more power over B than B has over A, which will be followed in our case study.

In this section, we proposed a five-step approach to identify and analyze the complex set of relationship among actors in a business ecosystem. In the three steps, we:

- visualize the network by utilizing network theory based on the literature;

- draw the core network based on interview results and compare it with the network visualized in Step 1;

- explain why the core actors work together to build the network by applying resource-based reviews (general resources of each actors);

- explain how the actors work together by applying the RDT (dependency resources dividing into essential and complementary resources); and

- examine the "strategies" the actors have adopted to reduce uncertainty.

## Methodology

### Research design

Following the literature review and taking the network analysis as the starting point, we selected core organizations, which is the first step of our approach. Our research uses in-depth interviews as the basis of analysis. Interviews provide the most direct research focused on interaction between researcher and participant (Rubin and Rubin, 2011). The following main steps were carried out: designing the interview protocol, conducting interviews, analyzing data and interpreting findings.

In designing the interview protocol, the questions for the semi-structured interviews were formulated in accordance with the research objectives and discussed theories. In accordance with the objectives, the questions are divided among several subjects: interviewee and company details, description of the dependent resources, details regarding cooperating and competing organizations, the description of the Chinese market and the details regarding the companies' cooperation.

We conducted five interviews with people who have been involved in Alipay wallet m-payment development since the beginning. In Alipay, they have three core sectors for m-payment services: information technology (IT) platform infrastructure, m-payment service center and different business lines on the m-payment platform. Because there are five managers in charge, we conducted five interviews. Since 2013, when we started the m-payment research, we conducted interviews in 2013 with banks for the initial research on m-payment from a banking perspective. In the following year, the author travelled to China again for to interview merchants. We selected the interviews with merchants who cooperate with Alipay, which provided an additional perspective on our case. Interviews were conducted with merchants' m-commerce centers, as shown in Table I. The interviews were

| Table I | Interview information | |
|---|---|---|
| *Organizations* | *Position* | *Time* |
| Alipay wallet | IT platform manager | May 2015 |
| Alipay wallet | Mobile product manager | May 2015 |
| Alipay wallet | Alipay wallet project manager 1 | May 2015 |
| Alipay wallet | Alipay wallet project manager 2 | May 2015 |
| Alipay wallet | Mobile payment IT platform manager | May 2015 |
| Merchant A | Owner | February 2014 |
| Merchant B | General manager | February 2014 |
| Merchant C | General manager | February 2014 |
| Merchant D | Owner | February 2014 |
| Bank A | IT product manager | February 2013 |
| Bank B | IT product manager | February 2013 |
| Bank C | IT product manager | February 2013 |
| Bank D | IT product manager | February 2013 |

conducted in person and lasted 1.5 h on average. Following the interviews, summaries were composed and validated by the interviewees.

*Data collection*

We used a purposive sampling method, as proposed by Seale *et al.* (2004). The interviewees were selected because they have characteristics that enable detailed exploration and understanding of the research objectives. The banks and merchants were selected to represent both small- and big-sized companies. The names of the partners are not disclosed in this paper, as promised to the participant companies, to secure the complete cooperation of the interviewees. In addition to the interviews, we collected publicly available information from official websites of the interviewees' companies and of the People's Bank of China, the General Office of the State Council, the Ministry of Commerce, the National Development and Reform Commission, and China's Banking Regulatory Commission.

*Data analysis*

With regard to the data analysis and interpretation of the interview findings, all the interviews were summarized, interpreted and tabulated from the transcripts, in accordance with the research topics. If any information remained unclear and/or more information was required, respondents were contacted again for additional questions. Data analysis was performed in an iterative way. Memos were written throughout the interview and analysis process. After all the interviews had been transcribed, a software package for qualitative data analysis, QSR NVivo, was used. By creating an initial hierarchy of categories and sub-categories based on our objectives (i.e. resources and capabilities, dependency resources and actions/strategies), the interviews were analyzed and open coded on a sentence level according to the categories, after which the data were analyzed again to build the relationships between the categories with axial coding. Finally, in the theoretical coding phase, linkages between the codes were created.

We note here that the analysis in this paper focuses more on an ecosystem level rather than a company level. More specifically, as actors in the mobile payment ecosystem are interdependent, we analyze the position of all the core actors *vis-à-vis* other actors in the Alipay wallet ecosystem by looking at inter-industry competition rather than intra-industry competition. In the following section, according to our chosen research methodology, we first identify the resources of actors in Alipay wallet core ecosystem and analyze their dependency, that is, how the actors are dependent on each other's resources. Second, we look into the "strategies" that they adopt to reduce their dependency and uncertainty.

## Analysis and results

Based on the analysis of literature, the network of mobile payment actors is shown in Figure 1.

The nodes in the network correspond to the actors in the ecosystem, with the size (value) of the nodes representing the number of articles including the specific actor in their analysis of the m-payment ecosystem. The lines of the network represent connections between two actors included in (at least one of) the selected articles; the width of the lines represents the number of articles that considered that specific relationship in their analysis. The network was created using the open-source network visualization and exploration software Gephi[1]. As can be seen, the core actors are merchants, end-users and various platform providers, suppliers for platform providers, policymakers (government organizations) and regulatory agencies and newcomers, such as over-the-top companies entering the m-payment market. Although the subscriber identification module (SIM) card supplier and technology vendors are included in the ecosystem, their relationships with other parties have not been examined extensively yet. The secure elements, which are an important asset in mobile payment ecosystems, are not included in the network, because the different ecosystem actors compete to locate the secure elements in their own domain for control reasons (Figure 2).

**Figure 1** The process of applying the StReS framework
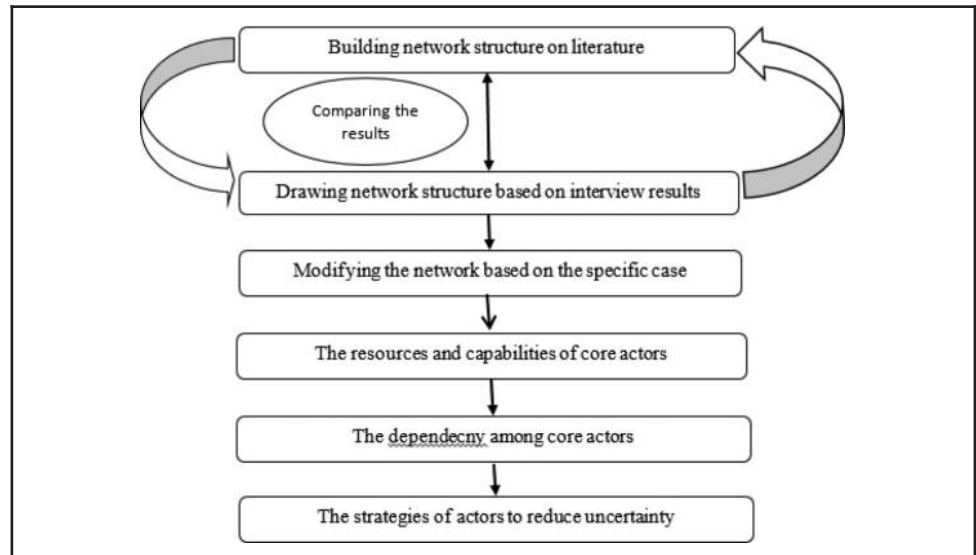


**Figure 2** The structure of m-payment ecosystem based on the literature
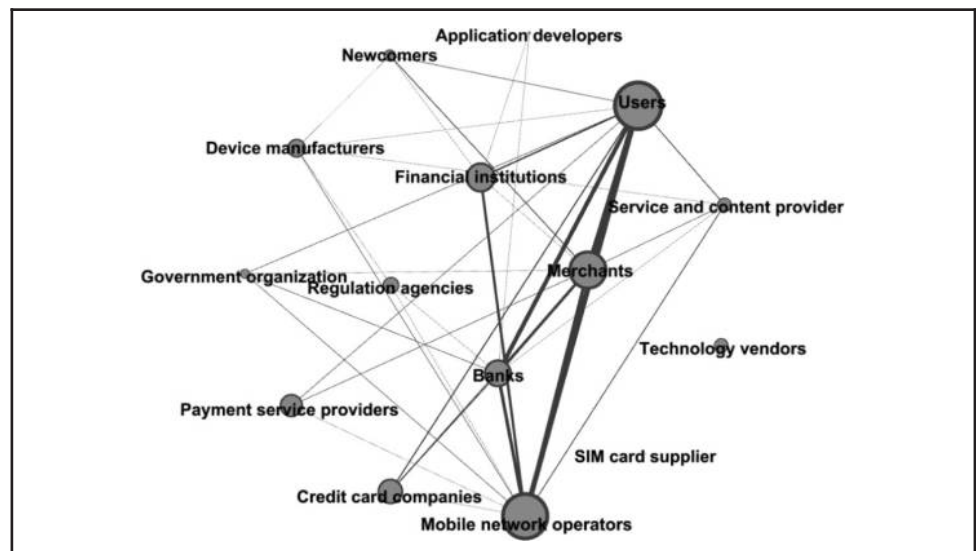


During each interview, we asked the interviewees to draw their own m-payment network (see examples in Appendix), after which we compared their network with the network based on the results of Step 1. All the interviewees of Alipay stated that Alipay, merchants, banks and end-users are the core actors. Therefore, we note that the Alipay wallet core ecosystem described by the interviewees is consistent with the mobile payment ecosystem network based on the literature review. In this specific case, the core business ecosystem includes Alipay, banks, merchants and end-users, whereas MNOs and financial institutions, other than banks, act as merchants. Alipay makes use of the mobile network provided by MNOs, which is specified by the end-users' contract with MNOs, so we do not consider the role of MNOs as providers of payment solution. MNOs as merchants here refer to the role that MNOs provide "phone recharging service" (i.e. charging for your prepaid SIM cards) on the Alipay wallet platform. Fund corporations, as a kind of financial institutions, provide fund services that consumers can use to buy products through the

Alipay wallet platform. For instance, Tianhong Fund Corporation provides money-market savings accounts known as Yu'E Bao or leftover Treasure. Alipay wallet includes the following services:

■ payment services (all the services directly related to payment, such as public service payment, credit card repayment, payment transaction, phone recharge, lottery payment, AA payment (split-the-bill payments) and payment at physical stores);

■ joint venture services (all the services that include payment and added value services: Kuaidi taxi-hailing, express delivery for checking, sending and payment and travel services including tickets, hotels, visa application and group shopping);

■ financial services (Yu'E Bao, Zhaocai Bao); and

■ credit life services (all the services that are based on the credits of the consumers using Alipay: hotel payments, flat renting without deposit and car rentals).

Basically, most of the services provided on the Alipay wallet platform originate from various network partners.

### Resources of actors in core business ecosystem

Alipay has 350 million users and processes 80 million transactions per day (Rao, 2015). As a subsidiary of Alibaba Group Holding Ltd, Alipay wallet is the only payment solution on Taobao (consumer-to-consumer) and Tmall (business-to-consumer). These are China's largest retail platforms for businesses and consumers, dominating China's online retail marketplace, and the relationship between Taobao and Tmall with Alipay can be compared to that between eBay and PayPal. Alibaba ecosystem is composed of dozens of other business entities, including consumer-to-consumer trading platform, business-to-consumer platform, shopping search engine (that covers product results from most Chinese online shopping platforms), group shopping platform, third-party online/mobile payment platform and cloud computing service platform. All the components in the Alibaba ecosystem work together smoothly, as each component benefits and contributes to the survival of the whole system. There are more than one network effect operating simultaneously, and the network effects are generated from one platform to another and through the whole Alibaba ecosystem. For instance, the interactions between buyers and sellers generate network effects, which create both cross-side and same-side network effects, resulting in more merchants and more consumers. In addition, as Alibaba owns different interconnected marketplaces, many buyers and sellers in one marketplace also participate in the activities in other marketplaces, that is, from Taobao to Tmall, from online payment to m-payment, thereby generating continuously network effect which further strengthens their ecosystem. In other words, the crucial barrier to entry for the others is Alibaba's network economies of scale:

As one IT platform manager mentioned: "we have a large customer base of online payments. We are aiming to expand to offline payment, as we want to keep our leading position in the payment field. For instance, China mobile begin to grow to offline payment. Unionpay dominates the offline payment with point-of-sale (POS) machine".

The IT platform manager answered a question on how Alipay has generated the large customer base, as follows:

The Alibaba ecosystem includes buyers, sellers, producers, marketing affiliates, logistics providers, retail operating partners, developers and other service providers. The interactions among these participants create value for one another as our ecosystem expands and generates strong network effects.

Our customer segments mainly consist of young customers and business people. Nowadays, more and more young people and business customers use it, so we will continue use m-payment and improve user experience (Merchant A).

As for security issues, the location of secure elements, the reputation of the providers and trust built in long-term relationship can ensure that the m-payment is secure. As the largest third-party payment provider, their reputation and customers' trust also transfer from online payment to m-payment:

> The secure element is located in Alipay cloud, which is controlled by us. In this way, the payment transaction is safe and can be done at any time anywhere (IT platform manager of Alipay).

> According to our collaboration experience with this provider on online payment, we never had any serious security issues. We trust them and willing to continue the collaboration on m-payment (Merchant C).

The compatibility (both technology and business) of platform and support from the providers with necessary resources are essential. The Alipay platform provides integrating services and was built to handle millions of e-commerce transactions, communications and internet search functions which can be considered critical advantages in relation to traditional banks:

> This platform is compatible with our existing system and business, which is easy to fit into our financial management system (Merchant B).

> We do not have a professional team or any talents to support an m-payment platform, and we do not know the whole process, how it works together with our normal financial system (Service Industry 5).

> Ant Financial (which was built in 2014, affiliated to Alibaba to provide financial services, including m-payment wallet) using Aliyun (Alibaba cloud) for our own banking platform, and we plan on offering it as a cloud service to small and medium sized banks in the future (Alipay IT Platfrom Manager).

In summary, large customer base, compatible and secure technology platform and technical support are important resources of Alipay wallet.

Merchants are essential for providing payment scenarios on the Alipay wallet platform to attract consumers. In the following section, we look at the typical services offered by merchants on the Alipay wallet platform as a basis for understanding their resources:

> In the offline payment domain, the daily usage is critical to lock the consumers, for instance, financial services, public transportations, bill payments, etc. Therefore, we are seeking for the scenarios that can keep consumers using our application quite often. Then, the demands change to various requires which lead to more payment scenarios (Alipay Wallet Project Manager 1).

As pointed out by interviewees from Alipay wallet, of all the services, the most frequently used at the moment include financial services (Yu'E Bao), payment services (public services payment, AA payment, micro-payment transaction and micro-payment offline store) and joint services (Kuandi taxi-hailing). Yu'E Bao is a financial service: consumers can save money as investments and the returns are higher than China's bank interest rates, with money withdrawals possible at any time. While Chinese depositors have been stuck with banks because of the lack of alternative investment options, Yu'E Bao and other similar products offered by Chinese Internet companies now offer long-suffering depositors alternatives and returns that are always much higher than those of the banks. As another example, public services payments, mainly referring to water, electricity and gas, used to be paid at banks or in certain locations, whereas it is nowadays possible to perform the transactions on smartphones. AA payments (split-the-bill payments) allow people to share costs with friends using the Alipay wallet, for example, in restaurants. Kuaidi taxi-hailing service, which is similar to Uber, offers the convenience of a taxi to passengers at a lower price than the traditional alternative:

Yu'E Bao as a financial service, payment services (public services payment, AA payment, micro-payment transaction and micro-payment offline store), and joint services (Kuandi taxi-hailing) are most frequently used services, according to Alipay wallet project manager 2.

The main target of Alipay with the services discussed above and numerous similar others is to enrich the list of potential payment scenarios and to increase the lock-in effect for end-users. To do so, Alipay selects merchants who provide must-use services (i.e. public service payment), convenient and fast services (i.e. Kuaidi taxi-hailing) and value-added services (i.e. Yu'E Bao). At the moment, Alipay wallet still seeks to provide more payment scenarios by inviting more merchants, focusing on attracting not only a large number of merchants but also a diverse group of merchants, which in turn can attract more users and increase their loyalty:

> Alipay came and negotiated with us, and we agreed this would be good, as it can save our manpower and a lot of tedious work (Merchant A).

> We have different approaches towards our customers (merchants). For the large companies or monopolies, we negotiate the details of cooperation. For the SEMs, they can apply online or offline with the same rules (Alipay wallet).

Alipay applies different approaches to attract different merchants. On the one hand, Alipay negotiates one by one with the merchants (i.e. public service merchants) who have monopoly in their industry by providing customized services; on the other hand, Alipay provides unified standard services to small- and medium-sized merchants.

Banks are essential in the ecosystem, as they provide the payment channel. Interviewees claimed that banking systems and banking licenses are the key resources and capabilities of the banks, allowing them to act as important actors in the Alipay wallet ecosystem:

> The IT platform manager of Alipay wallet stated that "if one day, banks cut their connection with Alipay wallet, then we are dead immediately. Their payment channels are essential for us. If we have a banking license, we are not Alipay wallet, we are an Alipay bank, which is the same as any other bank, and we cannot connect to different banks, because we can only connect to Alipay bank".

Interviewees from Alipay wallet identified three important abilities from a payment perspective: payment scenario, payment ability and payment channel. Payment scenarios include online payments and offline payments in different shops and locations. As Alipay already dominates the online payment market, it aims to expand its share in the offline payment market, which is dominated by China Unionpay:

> Online payment is a kind of scenario, with internet development, there are more and more offline payment scenarios. All the payments where there is a need for cash could be replaced by mobile payment. This is our aim to do offline mobile payment, stated by the Alipay Wallet IT platform manager.

Payment channel refers to the connection to banks, as all the payments at some point in the process need to connect to the banking system. Banking licenses describe the range of financial activities a bank can undertake, as well as the boundaries for the other companies in what they cannot undertake. Therefore, banking licenses are critical in the payment industry; if Alipay does not want to become a bank, then having banks on board is essential:

> We now have a connection to 200 major banks out of the 4,000 banks in China; these 200 banks cover 99.99 per cent of total capital and 99.99 per cent of cardholders in the entire banking system (Alipay wallet project manager).

At the same time, it is important to realize that the establishment of a payment channel is also limited:

> [. . .] from the cost perspective, as the cost to connect any bank is the same, to connect the big banks is more beneficial as the customer base, i.e. the users who own cards issued by the banks, is larger. So, if we can connect to the big banks, the income may be higher, as explained by Alipay wallet project manager.

Payment ability is the information processing capability, which is the main foundation of payment scenarios:

> Banks invest millions every year on improve the payment ability, as well as upgrading our machines (Bank A).

We summarize the resources of core business actors regarding Alipay wallet ecosystem in Table II.

## Dependency resources among the core actors

In the following section, in line with the RDT, the aim is to identify the interdependences among the core actors in the Alipay wallet ecosystem. Building on this analysis, we then take a look at what the actors have done to manage the external interdependencies and the outcome of their actions.

### Alipay wallet and merchants

Mobile payments in the Chinese market are very concentrated, with 93.4 per cent of the total market share being held by Alipay (82.8 per cent) and Tenpay (10.6 per cent), according to the most recent statistics (iResearch, 2015). Keen (1991) proposed the concepts of reach and range of the IT platform in which range refers to the level of information that is accessible across the IT platform, whereas reach refers to the level of connectivity of the platform. In other words, in the case of an m-payment platform, Alipay wallet platform providers aim to offer various features and more payment scenarios (range) to attract more participants (reach).

> Even though Alipay dominates third-party mobile payment market in China, several large players from financial institutions (i.e. China Mobile provided by China Unionpay) and from other industries (i.e. Tenpay provided by Tencent) are emerging. In addition, most banks have developed their own mobile payment platforms. Facing this great competition, we have to increase the number of payment scenarios in order to maintain their leading position (an Alipay wallet project manager).

| **Table II** | Resources and capabilities of core actors in Alipay wallet ecosystem | |
|---|---|---|
| *Actors* | *Resources* | *Role* |
| Alipay wallet | Secure authentication and authorization | Platform providers |
| | Secure element | |
| | Risk management | |
| | Cost-efficient independent payment infrastructure | |
| | Transaction management | |
| | System integration | |
| | IT infrastructure | |
| | Customer base | |
| Merchants | System integration | Critical payment scenarios |
| | Cost-efficient independent payment infrastructure | |
| | Customer base | |
| Banks | Secure authentication and authorization | Payment channel |
| | Risk management | |
| | Transaction management | |
| | Banking system | |
| | Customer base | |
| | Banking license | |

Alipay has to improve the functionality of the platform by increasing the range of applications. There are various payment scenarios, as explained earlier: the online scenario, the offline scenario and the offline–to-online (O2O) scenario [combining offline products and services with online operations by generating orders online and delivering products or services offline (CNNIC, 2015)].

The interviewees from the merchants' side agreed that it does not matter whether payment takes place online or offline, merchants are eager to grasp the opportunity in this internet age because of the large number of mobile subscribers and mobile internet users:

> There are so many mobile users, and the younger generations are becoming the main consumption group. We need to catch up with the age and grasp the new services that can help realize it (Merchant D).

In China, as of the end of 2014, the number of mobile internet users had reached 557 million, which accounts for 85.8 per cent of the total netizen population (CNNIC, 2015).

> Innovation is an important tradition in our company. We have to keep our reputation in the industry, and we are eager to capture the market share in advance. Alipay wallet has a large customer base already and they are leading the market, which fits in with our company image (Merchant A).

> Young and fashionable people like to try new things, and they learn quickly. Their consumer habits change very fast. The feedback from these customers is very positive (Merchant C).

By joining the Alipay wallet platform, merchants can gain access to valuable resources and obtain a competitive advantage, as identified by the interviewees. First, compared to other payment methods, except for cash (i.e. POS machine by bank cards), the commission fee is lower, and the money reaches the merchants' Alipay wallet account immediately:

> We chose Alipay wallet platform because it has the largest market share and can cover all kinds of credit/debit cards from different banks. In addition, the commission fee is lower than the Unionpay with POS machine (Merchant D).

Second, it has the potential to increase the number of potential customers. For instance, as pointed out by one mobile product manager:

> When customers are close to the merchants' store, the Wi-Fi connection will automatically offer a brief introduction about the merchant and reminds customers to follow the merchant on Alipay wallet platform, and then later they can receive promotions and updates of this merchant.

Moreover, Alipay wallet will provide guidance on the offered promotion of a merchant's specific products, based on the results of an analysis of big data collected on customers:

> As the mobile product manager from Alipay Wallet explained: We provide information on the customers' habit and consume preferences that are relevant to the merchants. We only provide the results of the analysis as guidance to merchants but not the customers' data.

Finally, an important feature is that the payment ability support includes mobile payments and coupon, e-card management and e-credit payments:

> As was pointed out by the interviewee from Merchant A: our products are very diverse, so it is more difficult to know the customers' preferences. The guidance from Alipay wallet can provide more relevant angles for our promotions and targeting.

To summarize, Alipay wallet depends on merchants in various payment scenarios, whereas merchants depend on Alipay wallet to increase sales with different promotions, low commission fees, marketing guidance and technological support.

*Alipay wallet and banks*

Payment channel is one of the crucial functionalities in the Alipay wallet ecosystem. Banking systems play a role when customers withdraw money from (or transfer money to) Alipay accounts.

Alipay wallet depends on banks of payment channels. At the same time, interviewees from banks pointed out that banks are experts at macro-payments, and they are more willing to make macro-payments:

> We do not take micro-payment as our major business. The costs of micro-payments or macro-payments are more or less the same, but macro-payments generate more profit than micro-payments (Bank D).

Therefore, by cooperating with Alipay wallet, micro-payments are mainly performed by Alipay wallet. Moreover, through Alipay wallet, banks attract more new users and increase the loyalty of existing customers:

> We received a lot new registration customers since cooperating with Alipay wallet, especially the young generations (Bank C).

> We lost quite a few customers, because we didn't join in Alipay wallet. The customers said it was not convenient for them as so many places accepted Alipay wallet, which is more places than our own m-payment (Bank B).

As listed in Table III, there are two essential resources in the case of Alipay wallet:

1. Alipay depends on the banks' license and the banking system, as, if they do not connect to Alipay wallet, the Alipay wallet m-payment platform cannot work.

2. Merchants depend on Alipay, as very few of them can choose to develop mobile payment services by themselves, so if they choose to cooperate with someone else, the resources necessary for payment ability support are essential for them.

| **Table III** Dependency resources of core actors in Alipay wallet ecosystem | | |
|---|---|---|
| *Actors* | *Dependency resources* | *Type* |
| Alipay wallet on merchants | More functionality services<br>Customer base | Complementary |
| Merchants on Alipay | Low commission fee and fast money arrival<br>Customer base<br>Marketing guidance<br>Payment technical support<br>Secure authentication and authorization<br>Secure element<br>Risk management<br>Cost-efficient independent payment infrastructure<br>Transaction management<br>System integration<br>IT infrastructure | Essential |
| Alipay wallet on banks | Secure authentication and authorization<br>Risk management<br>Transaction management<br>Banking system<br>Banking license | Essential |
| Banks on Alipay wallet | Handling micro-payment<br>Customer base<br>Enhancing the loyalty of existing customers | Complementary |

### Strategies (actions) to reduce uncertainty

In this section, we look at the actions that the actors have taken to reduce the uncertainty and the outcome of those actions. To reduce uncertainty, there are two prominent ways: reducing dependency on the others and/or increasing the dependency of others.

#### Dependency between Alipay wallet and banks

Alipay takes the actions leading to reducing dependency on banks and increasing the dependency of banks on Alipay. The main strategy for Alipay is to connect to as many banks as possible and to avoid being dependent on one single bank. Currently, Alipay cooperates with more than 200 banks in China. If one or two banks were to decide not to cooperate, it would pose no problem for Alipay.

Moreover, Alipay provides micro-payment services that the banks do not consider as major business. As a consequence, from the banks' perspective, they can focus on their major financial services and save manpower, costs and time, which can be used to focus on their main business. However, they have to accept a loss of brand image with regard to mobile payments, because customers who can choose between banks' mobile payment and Alipay wallet will almost always choose Alipay wallet.

Even though banks have their own mobile payment solutions, there are two main reasons for joining the Alipay wallet platform, the first of which is the capability to process large numbers of transactions:

> In the past, information processing mainly referred to the POS machine and cashier in the banks, with the amount of transactions much lower than now, as the consequence of exponential growth of e-commerce and m-commerce. This is one of the reasons why banks do not want to do micro-payments. If the number of information processing is fixed, the larger the amount of each payment transition is, the better it is, as the cost for macro- and micro-payments are more or less the same (IT product manager from Bank A).

The second reason reflects the idea of "if you can't beat them, join them". Bank B introduced its own mobile payment application early on, and initially, it was quite popular. However, the success of Alipay wallet forced them to join, as they started to lose customers:

> Alipay came to us to negotiate before, but we did not make a deal. We were good in the beginning, with more mobile payment customers than any other bank. But we did not continue performing so well. For example, we are actually not that interested in micro-payments. We still think we are the only one who can deal with the payments. We did not even see that the threat is coming. Later, the number of customers of other banks who joined Alipay began to increase, while ours begin to decrease. We then decided to join (IT product manager form Bank B).

In summary, Alipay takes the actions to increase the banks' dependency and reduce dependency on banks. However, Alipay wallet did not choose the strategy of acquiring a bank to obtain a banking license; the interviewees explained that if Alipay wallet had acquired a bank, it would have become Alipay bank, meaning there would be no difference with any other banks providing a mobile payment platform. The banks are willing to join them also because they simply offer a platform that facilitates the exchange of good.

Banks keep their own m-payment services in order to reduce the dependency on Alipy:

> We still keep our own mobile payment service. We cannot put all our eggs in one basket. Anyway, mobile payment services still provide valuable information for us to know our customers (Bank B).

> Although we have joined Alipay, we still have our own mobile payment service. In this information era, who owns the information wins (Bank C).

*Dependency between Alipay and merchants*

Alipay depends on merchants' various scenarios, whereas merchants depend on Alipay wallet's platform to generate more revenue and customers.

Merchants take actions to reduce dependency by finding as many payment alternatives as possible, that is, POS machine payment, Alipay, Wechat and other alternatives:

> We have as many as main payment methods in order to make the convenient to our customers. In addition, we have choices if one or some of them increased the costs (Merchant C).

> We can survive even without any mobile payment, as we survived before. But we know that the (Internet) time is coming, and we should prepare and grasp this opportunity to attract more young and fashionable customers. In addition, we have our own customer data and we can combine that information with the suggestions from Alipay. We can provide a helpful and useful promotion to target customers, instead of a lot of tedious information that customers are not interested in (Merchant B).

## Discussion and conclusions

In this article, we proposed the StReS framework for analyzing a business ecosystem and for investigating the structure of a business ecosystem, the motivations of the organizations cooperating in the core ecosystem and the actions they have taken to reduce dependency and uncertainty. By providing a framework for organizing, structuring and synthetizing the Alipay case data and interview data, StReS helps by providing solid explanations for the proposed research questions. By applying StReS, we were able to paint the picture of Alipay wallet ecosystem and focus on the core business actors. The analysis showed that actors with heterogeneous and potentially complementary resources can create a sustainable but dynamic collaboration. The cooperation of core actors in an ecosystem is motivated by their need for each other's resources to gain competitive advantages. Our framework relies on the observation that the role of actors involved in an ecosystem is shaped by their resources and capabilities. Moreover, the dependency relationships among the actors, determined by their resource configurations, are changing dynamically within the ecosystem, resulting in unstable power balances that are determined by the actions taken by the actors.

Alipay has taken to increase its power balance in Alipay wallet ecosystem, and the company had its own advantages in the first place to provide m-payment services as a platform provider. Alipay is the leading online payment provider in the Chinese market: the company has experience in e-payment, a large market share, a large customer base (merchants and end-users) and a solid reputation. All those pre-conditions helped Alipay move smoothly from online payment to m-payment. With regard to the power balance between Alipay and banks, Alipay depends on banks' essential resources, and banks depend on Alipay' complementary resources. Even though Alipay could not survive without a bank, more and more banks are joining Alipay's platform, with a majority of Chinese banks already on board. This development is the consequence of Alipay's keystone strategy, and its actions are designed to create value within the ecosystem and share this value with other participants. Alipay managed to realize its strategy by creating the Alipay wallet platform, with various services, tools and technologies that offer solutions to other participants, and sharing data (some of it with keeping customers' privacy), such as guidance on consumers' habits based on the results of big data analysis, communicated to merchants and the basic information to banks according to the contracts. As a consequence of those actions, the power of Alipay within the ecosystem has increased compared to the initial stages, when some of the banks were reluctant to join. Presently, a majority of banks has joined the platform. In other words, although actors with essential resources have advantages in the ecosystem, the position and power balances are dynamically

changing according to the strategies (actions) the actors have followed, as resources and configurations of dependency resources are changing dynamically as well.

As for the Alipay wallet platform, its main goal is to increase range and reach to enable interactions among the participants (merchants and end-users) affiliated with the platform and, thus, to create and capture value which can lead their long-term success. To achieve this, Alipay wallet cooperates with various merchants and attracts them mainly with its large consumer base. The dependency relationships in the ecosystem are created by the essential/complementary resources involved. Accordingly, the power of all actors is dynamically changing through their actions designed to reduce their dependency on others. Although the actors with essential resources and capabilities are in the more powerful position at first, that situation is dynamically affected by the strategies they adopt at a later stage. The actors with complementary resources could acquire more power if their actions helped them become irreplaceable. In this case, Alipay wallet triggered the platform network effects, including both same-side effect and cross-side effect, for Alipay wallet platform to reach critical mass. The network effects of Alipay m-payment platforms, with more connected end-users, merchants and banks, drive value creation and scale to any party so that they are more dependent on Alipay.

With regard to practical perspective, the Alipay case may serve as an example that other providers follow, taking similar actions to increase the dependency of others and reduce their own dependency on others. It is helpful to take a keystone strategy to create value within the ecosystem and share this value with other participants. Moreover, Alipay acts as the platform provider, in addition to managing value creation within the ecosystem and sharing that value with the other participants. Alipay focuses on the business and strategic needs of the core actors, without threatening their main business, for example, Alipay focuses on micro-payments, which do not pose a direct competition to banks, who mainly rely on macro-payments to generate profit. Micro-payments are often related to high transaction costs for banks. In addition, although it is difficult to define the boundaries of actors in the ecosystem, the core business of every actor is the key competitive or even survival condition. This notion should be taken into consideration by actors whose actions affect the business of other ecosystem partners. For instance, Alipay will not aim to become a bank, as they know that if they do so, they cannot connect any other bank to their platform. In other words, the scope and boundary of the actors are clearly identified so that the core business will not be threatened. Sords, we can learn from Alipay that it pays off to focus on one area and not to let your competitors challenge you. However, the main limitation of this case is that it was conducted in a Chinese context, which has specific features that may not apply to other cases. In addition, this study is based on a single case study in a single country, without comparing the results to any other cases or countries. Therefore, some modifications may have to be made when applying the framework and generalizing our results. In future studies, the process that led Alipay to be so successful could be examined more thoroughly. In addition, the framework should be validated based on other cases from other industries. Moreover, attention should be paid to the dynamics within a given ecosystem, first, of all, by using more specific quantitative network analysis (e.g. various centrality measures) over time, we can represent and understand the structure of the core business ecosystem (or other sub-systems) over time. Next, based on the results of the network analysis, we can analyze the multi-level and multi-actor perspective of ecosystems, using methods suitable to the research objective in question, either qualitative, quantitative or mixed. When discussing the interaction of ecosystems with strategies and platform theory, transaction cost theory, control mechanisms and organizational (strategic) behavior may play a role in the analysis.

## Note

1. Available at: http://gephi.github.io/

## References

Apanasevic, T. (2013), "Factors influencing the slow rate of penetration of NFC mobile payment in Western Europe", *Proceedings of the 12th International Conference on Mobile Business (ICMB)*, *Berlin*.

Au, Y.A. and Kauffman, R.J. (2008), "The economics of mobile payments: understanding stakeholder issues for an emerging financial technology application", *Electronic Commerce Research and Applications*, Vol. 7 No. 2, pp. 141-164.

Bakker, E. (2015), "Dominant Alipay adds P2P payments and further broadens its mobile commerce platform", *Business Insider*, 10 July.

Barney, J.B. (1986), "Strategic factor markets: expectations, luck, and business strategy", *Management Science*, Vol. 32 No. 10, pp. 1231-1241.

Barney, J.B. (1991), "Firm resources and sustained competitive advantage", *Journal of Management*, Vol. 17 No. 1, pp. 99-120.

Casciaro, T. and Piskorski, M.J. (2005), "Power imbalance, mutual dependence, and constraint absorption: a closer look at resource dependence theory", *Administrative Science Quarterly*, Vol. 50 No. 2, pp. 167-199.

CNNIC. (2015), *The 35th Statistical Report on Internet Development in China*, China Internet Network Information Center.

Dahlberg, T., Bouwman, H., Cerpa, N. and Guo, J. (2015a), *M-Payment-How Disruptive Technologies Could Change The Payment Ecosystem*.

Dahlberg, T., Guo, J. and Ondrus, J. (2015b), "A critical review of mobile payment research", *Electronic Commerce Research and Applications*, doi:10.1016/j.elerap.2015.07.006.

Dahlberg, T., Huurros, M. and Ainamo, A. (2008a), "Lost opportunity: why has dominant design failed to emerge for the mobile payment services market in Finland?", *Proceedings of the 41th Annual Hawaii International Conference on System Sciences*, *IEEE Computer Society Press*, *Washington, DC*.

Dahlberg, T., Mallat, N., Ondrus, J. and Zmijewska, A. (2008b), "Past, present and future of mobile payments research: a literature review", *Electronic Commerce Research and Applications*, Vol. 7 No. 2, pp. 165-181.

De Reuver, M., Verschuur, E., Nikayin, F., Cerpa, N. and Bouwman, H. (2015), "Collective action for mobile payment platforms: a case study on collaboration issues between banks and telecom operators", *Electronic Commerce Research and Applications*, Vol. 14 No. 5, pp. 331-334.

Faber, E. and Bouwman, H. (2003), "Designing business models for mobile payment services", *Proceedings of International Conference on Electronic Business*, *Singapore*.

Gannamaneni, A., Ondrus, J. and Lyytinen, K. (2015), "A post-failure analysis of mobile payment platforms", *Proceedings of the 48th Hawaii International Conference on System Sciences (HICSS)*, *IEEE Computer Society Press*, *Washington, DC*.

Greening, D.W. and Gray, B. (1994), "Testing a model of organizational response to social and political issues", *Academy of Management Journal*, Vol. 37 No. 3, pp. 467-498.

Guo, J. and Bouwman, H. (2015), "An analytical framework for an m-payment ecosystem: a merchants' perspective", *Telecommunications Policy*, Vol. 40 No. 2, pp. 147-167.

Guo, J., Nikou, S. and Bouwman, H. (2015), "Business model for mobile payment in China", *International Journal of Systems and Service-Oriented Engineering (IJSSOE)*, Vol. 5 No. 2, pp. 20-43.

Hillman, A.J., Withers, M.C. and Collins, B.J. (2009), "Resource dependence theory: a review", *Journal of Management*, Vol. 35 No. 6.

Iansiti, M. and Levien, R. (2004), *The Keystone Advantage: What the New Dynamics of Business Ecosystems Mean for Strategy, Innovation, and Sustainability*, Harvard Business Press, Boston, MA.

Iansiti, M. and Levien, R. (2004), "Strategy as ecology", *Harvard Business Review*, Vol. 82 No. 3, pp. 68-81.

iResearch (2015), "*2015 China E-payment Report*", available at: www.iresearchchina.com

Kazan, E. and Damsgaard, J. (2013), "A framework for analyzing digital payment as a multi-sided platform: a study of three European NFC solutions", *ECIS, p.* 133.

Kazan, E. and Damsgaard, J. (2014), "An investigation of digital payment platform designs: a comparative study of four European solutions", *Proceedings of the European Conference on Information Systems*.

Keen, P.G.W. (1991), *Shaping the Future: Business Design Through Information Technology*, Harvard Business School Press, Boston, MA.

Kemp, S. (2015), *Digital, Social & Mobile in China in 2015. We are Social*, available at: http://wearesocial.net/tag/china/ (accessed 18 December 2015).

Liu, J., Kauffman, R.J. and Ma, D. (2015), "Competition, cooperation, and regulation: understanding the evolution of the mobile payments technology ecosystem", *Electronic Commerce Research and Applications*, Vol. 14 No. 5, pp. 372-391.

Mattos (2010), "The history of mobile payments – how and where it started?", available at: http://electronicbankingoptions.com/2010/04/23/the-history-of-mobile-payments-how-and-where-it-started/#sthash.6V1jGAUh.dpuf

Miao, M. and Jayakar, K. (2016), "Mobile payments in Japan, South Korea and China: cross-border convergence or divergence of business models?", *Telecommunications Policy*, Vol. 40 No. 2, pp. 182-196.

Moore, J.F. (1993), "Predators and prey: a new ecology of competition", *Harvard Business Review*, Vol. 71 No. 3, pp. 75-83.

Moore, J.F. (1996), *The Death of Competition: Leadership and Strategy in the Age of Business Ecosystems*, HarperCollins Publishers.

Ondrus, J., Camponovo, G. and Pigneur, Y. (2005), "A proposal for a multi-perspective analysis of the mobile payment environment", *Proceedings of the 4th International Conference on Mobile Business (ICMB)*, Sydney.

Ondrus, J. and Lyytinen, K. (2011), "Mobile payments market: towards another clash of the titans?", *Tenth International Conference on Mobile Business (ICMB)*, IEEE, pp. 166-172.

Ondrus, J., Lyytinen, K. and Pigneur, Y. (2009), "Why mobile payments fail? Towards a dynamic and multi-perspective explanation", *42nd Hawaii International Conference on System Sciences, HICSS'09*, IEEE, pp. 1-10.

Ozcan, P. and Santos, F.M. (2014), "The market that never was: Turf wars and failed alliances in mobile payments", *Strategic Management Journal*, doi: 10.1002/smj.2292.

Peltoniemi, M. (2006), "Preliminary theoretical framework for the study of business ecosystems", *Emergence: Complexity & Organization*, Vol. 8 No. 1, pp. 10-19.

Pfeffer, J. and Salancik, G.R. (1978), *The External Control of Organizations: A Resource Dependence Perspective*, Harper & Row, New York, NY.

Pfeffer, J. and Salancik, G.R. (2003), *The External Control of Organizations: A Resource Dependence Perspective*, Stanford University Press, Stanford, CA.

Pousttchi, K., Schiessler, M. and Wiedemann, D.G. (2009), "Proposing a comprehensive framework for analysis and engineering of mobile payment business models", *Information Systems and E-Business Management*, Vol. 7 No. 3, pp. 363-393.

Rao, L. (2015), "Alipay's US chief talks expansion, Uber China partnership and more", available at: http://fortune.com/2015/06/19/alipay-china-uber-alibaba/ (accessed 10 May).

Rubin, H.J. and Rubin, I.S. (2011), *Qualitative Interviewing: The Art of Hearing Data*, Sage.

Seale, C., Gobo, G., Gubrium, J.F. and Silverman, D. (Eds) (2004), *Qualitative Research Practice*, Sage.

Staykova, K.S. and Damsgaard, J. (2015), "The race to dominate the mobile payments platform: entry and expansion strategies", *Electronic Commerce Research and Applications*, Vol. 14 No. 5, pp. 319-330.

Stern, L.W. and Reve, T. (1980), "Distribution channels as political economies: a framework for comparative analysis", *The Journal of Marketing*, Vol. 17 No. 1, pp. 52-64.

Wernerfelt, B. (1984), "A resource-based view of the firm", *Strategic Management Journal*, Vol. 5 No. 2, pp. 171-180.

Zmijewska, A. and Lawrence, E. (2005), "Reshaping the framework for analysing success of mobile payment solutions", *Proceedings of the IADIS International Conference on E-Commerce*, Porto.

## Further reading

Damsgaard, J. and Gao, P. (2005), "A framework for analyzing mobile telecommunications market development", *Proceedings of IFIP TC8 Working Conference on Mobile Information Systems (MOBIS)*, *Oslo*, pp. 169-182.

Gaur, A. and Ondrus, J. (2012), "The role of banks in the mobile payment ecosystem: a strategic asset perspective", *Proceedings of the 14th Annual International Conference on Electronic Commerce*, *ACM*, pp. 171-177.

Guo, J., Nikou, S. and Bouwman, H. (2013), "Analyzing the business model for mobile payment from banks' perspective: an empirical study", *24th European Regional Conference of the International Telecommunication Society*, Florence, pp. 20-23.

Hedman, J. and Henningsson, S. (2012), "Competition and collaboration shaping the digital payment infrastructure", *Proceedings of the 14th Annual International Conference on Electronic Commerce*, *ACM*, pp. 178-185.

Lim, A.S. (2008), "Inter-consortia battles in mobile payments standardisation", *Electronic Commerce Research and Applications*, Vol. 7 No. 2, pp. 202-213.

Ondrus, J. and Pigneur, Y. (2006a), "A multi-stakeholder multi-criteria assessment framework of mobile payments: an illustration with the Swiss public transportation industry", *Proceedings of the 39th Hawaii International Conference on Systems Science (HICSS)*, *IEEE Computer Society Press, Washington, DC*.

Ondrus, J. and Pigneur, Y. (2006b), "Towards a holistic analysis of mobile payments: a multiple perspectives approach", *Electronic Commerce Research and Applications*, Vol. 5 No. 3, pp. 246-257.

Pousttchi, K. (2008), "A modeling approach and reference models for the analysis of mobile payment use cases", *Electronic Commerce Research and Applications*, Vol. 7 No. 2, pp. 182-201.

Appendix

| Table AI | The list of papers used for network analysis | | | |
|---|---|---|---|---|
| No. | Papers | Authors | Year | Journal/conference |
| 1 | A disruption analysis in the mobile payment market | Ondrus, J. and Pigneur, Y. | 2005 | Proceedings of Hawaii International Conference on System Sciences |
| 2 | A proposal for a multi-perspective analysis of the mobile payment environment | Ondrus, J., Camponovo, G. and Pigneur, Y. | 2005 | Proceedings of International Conference on Mobile Business |
| 3 | A multi-stakeholder multi-criteria assessment framework of mobile payments: an illustration with the Swiss public transportation industry | Ondrus, J. and Pigneur, Y. | 2006 | Proceedings of Hawaii International Conference on System Sciences |
| 4 | A systematic approach to explain the delayed deployment of mobile payments in Switzerland | Ondrus, J. and Pigneur, Y. | 2006 | Proceedings of International Conference on Mobile Business |
| 5 | Towards a holistic analysis of mobile payments: A multiple perspectives approach | Ondrus, J. and Pigneur, Y. | 2006 | Electronic Commerce Research and Applications |
| 6 | Mobile payment models and their implications for NextGen MSPs | Van Bossuyt, M. and Van Hove, L. | 2007 | Info |
| 7 | The economics of mobile payments: Understanding stakeholder issues for an emerging financial technology application | Au, Y.A. and Kauffman, R.J. | 2008 | Electronic Commerce Research and Applications |
| 8 | Lost opportunity why has dominant design failed to emerge for the mobile payment services market in Finland? | Dahlberg, T., Huurros, M. and Ainamo, A. | 2008 | Proceedings of Hawaii International Conference on System Sciences |
| 9 | A modeling approach and reference models for the analysis of mobile payment use cases | Pousttchi, K. | 2008 | Electronic Commerce Research and Applications |
| 10 | Why mobile payments fail? towards a dynamic and multi-perspective explanation | Ondrus, J., Lyytinen, K. and Pigneur, Y. | 2009 | Proceedings of Hawaii International Conference on System Sciences |
| 11 | Proposing a comprehensive framework for analysis and engineering of mobile payment business models | Pousttchi, K., Schiessler, M. and Wiedemann, D.G. | 2009 | Information Systems and E-Business Management |
| 12 | Mobile payments market: towards another clash of the titans? | Ondrus, J. and Lyytinen, K. | 2011 | Proceedings of International Conference on Mobile Business |
| 13 | Framework for mobile payments integration. | Carton, F., Hedman, J., Damsgaard, J., Tan, K.T. and McCarthy, J.B. | 2012 | Electronic Journal of Information Systems Evaluation |
| 14 | The role of banks in the mobile payment ecosystem: a strategic asset perspective | Gaur, A. and Ondrus, J. | 2012 | Proceedings of International Conference on Electronic Commerce |
| 15 | Competition and collaboration shaping the digital payment infrastructure | Hedman, J. and Henningsson, S. | 2012 | Proceedings of International Conference on Electronic Commerce |
| 16 | Investment timing for mobile payment systems. | Kauffman, R.J., Liu, J. and Ma, D. | 2012 | Proceedings of International Conference on Electronic Commerce |
| 17 | Factors influencing the slow rate of penetration of NFC mobile payment in Western Europe | Apanasevic, T. | 2013 | Proceedings of International Conference on Mobile Business |
| 18 | Technology investment decision-making under uncertainty: the case of mobile payment systems | Kauffman, R.J., Liu, J. and Ma, D. | 2013 | Proceedings of Hawaii International Conference on System Sciences |

(continued)

| Table AI | | | | |
|---|---|---|---|---|
| No. | Papers | Authors | Year | Journal/conference |
| 19 | A framework for analyzing digital payment as a multi-sided platform: a study of three European NFC Solutions | Kazan, E. and Damsgaard, J. | 2013 | Proceedings of European Conference on Information Systems |
| 20 | Collective action for mobile payment platforms: A case study on collaboration issues between banks and telecom operators | de Reuver, M., Verschuur, E., Nikayin, F., Cerpa, N. and Bouwman, H. | 2014 | Electronic Commerce Research and Applications. |
| 21 | An investigation of digital payment platform designs: a comparative study of four European Solutions | Kazan, E. and Damsgaard, J. | 2014 | Proceedings of European Conference on Information Systems |
| 22 | The market that never was: Turf wars and failed alliances in mobile payments | Ozcan, P. and Santos, F.M. | 2014 | Strategic Management Journal. |
| 23 | A post-failure analysis of mobile payment platforms | Gannamaneni, A., Ondrus, J. and Lyytinen, K. | 2016 | Proceedings of the Annual Hawaii International Conference on System Sciences |
| 24 | The market that never was: Turf wars and failed alliances in mobile payments | Ozcan, P. and Santos, F.M. | 2016 | Proceedings of the Annual Hawaii International Conference on System Sciences |
| 25 | The impact of openness on the market potential of multi-sided platforms: A case study of mobile payment platforms | Ondrus, J., Gannamaneni, A. and Lyytinen, K. | 2016 | Proceedings of the Annual Hawaii International Conference on System Sciences |
| 26 | Mobile payments in Japan, South Korea and China: Cross-border convergence or divergence of business models? | Miao, M. and Jayakar, K. | 2016 | Proceedings of the Annual Hawaii International Conference on System Sciences |
| 27 | The new normal: Market cooperation in the mobile payments ecosystem | Hedman, J. and Henningsson, S. | 2016 | Proceedings of the Annual Hawaii International Conference on System Sciences |
| 28 | Collective action for mobile payment platforms: A case study on collaboration issues between banks and telecom operators | De Reuver, M., Verschuur, E., Nikayin, F., Cerpa, N. and Bouwman, H. | 2016 | Proceedings of the Annual Hawaii International Conference on System Sciences |
| 29 | Competition, cooperation, and regulation: Understanding the evolution of the mobile payments technology ecosystem | Liu, J., Kauffman, R.J. and Ma, D. | 2016 | Proceedings of the Annual Hawaii International Conference on System Sciences |
| 30 | The race to dominate the mobile payments platform: Entry and expansion strategies | Staykova, K.S. and Damsgaard, J. | 2016 | Proceedings of the Annual Hawaii International Conference on System Sciences |
| 31 | An analytical framework for an m-payment ecosystem: A merchants' perspective | | 2016 | Telecommunications Policy. |

**Figure A1** Drawing examples and descriptions of interviews of Alipay wallet ecosystem
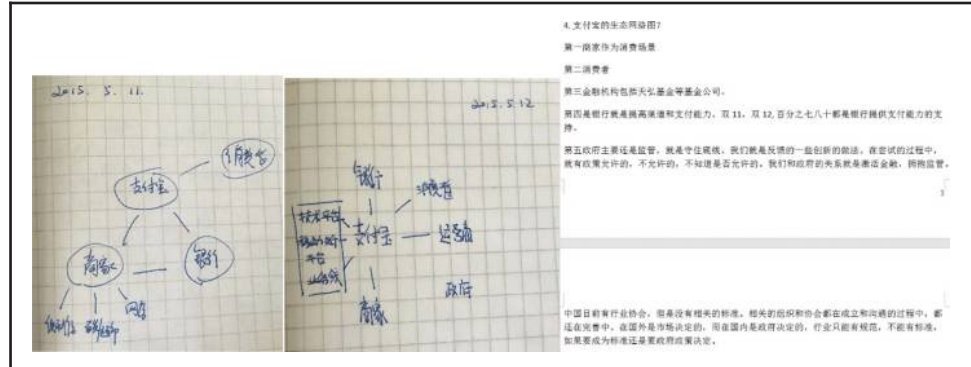


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