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TRENDS TOWARDS FRAGMENTATION OF THE MOBILE PAYMENT MARKET IN SWEDEN

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Abstract

In Sweden many new mobile payment solutions and services have been proposed during the last years. Banks and payment providers have proposed different forms of person to person (P2P) and Point of Sales (PoS) services that are tested and taken into commercial use. The Swedish mobile operators have joined forces and formed a joint venture that offers a separate charging solution that can be used for mobile payments and e-commerce, i.e. not using the phone bill. Early 2013 the SMS ticket for public transportation was changed substantially with the entrance of many new actors.

In this paper we use the *ARA model* (Activities, Resources and Actors) in order to analyse the new mobile payment solutions and services looking into the activities, roles and responsibilities of different actors. We also apply the activity system approach describing the *Activity system* content, structure and governance and activity design themes indicating the main value creation drivers. The analysed cases include mobile payment services for P2P transactions, payments in shops, and ticketing for public transport and parking. The technology, services, and new constellations of actors seem to work fine but there are challenges for the adoption of new services both due to both the multitude of solutions as well as the need to register and manage new user accounts with the payment providers offering new solutions.

Keywords

Activity system, Actor cooperation, ARA analysis, Business models, Mobile payment services, New market actors, Parking services, Person to person payments, Public transport ticketing, Retailing, Value networks

INTRODUCTION

Sweden is an interesting country for research on mobile payment solutions, services and business models. New payment, ticket and security solutions using the mobile phone are proposed, developed and tested by a number of new Swedish companies like Accumulate, Infospread, iZettle, Klarna, Payair, PayEx, and Seamless. Many pilot projects and tests for mobile payments have been conducted in shops, coffee shops and restaurants during the last couple of years.

For SMS payment and ticket services the main actors (so far) have been mobile operators, SMS aggregators and ticket providers. The consumers have been charged for SMS payments using the mobile phone bill. In Sweden the mobile operators have joined forces and formed a joint venture that offers a separate charging solution, i.e. not using the phone bill. However, this new joint venture has in most cases not been involved in the public procurement of new ticket and payment solutions initiated 2012 by the Swedish local transport companies. Instead, a set of new actors (in new constellations) have got these contracts and, hence, entered the mobile payment market.

In addition, Swedbank and other Swedish banks have developed mobile phones solutions for payments in shops (Bart) and for transactions between bank accounts of private persons (Swish). The large retail chain has tested both Bart and the SEQR payment solution by Seamless in a number of shops. The SEQR solution has also been tested by a large fast food chain.

All in all, there are currently a very large number of payment solutions and services offered by several providers in different sectors. Consumers and merchants are faced with this multitude of “new” solutions that try to enter the market, and at the same time the card based payment systems is an established secure, cashless payment solution with very high service coverage.

In this paper we will look into drivers, benefits and barriers for different types of payment solutions. The overall research questions motivating the research for the Swedish market are:

1. Why do not mobile payments take off on a large scale although the technology is here?
2. What is the impact of the multitude of solutions on the adoption of mobile payments?
3. How are the value networks organized and what actors will take a leading position?

We will look into how different actors cooperate and how they distribute the responsibilities and activities when providing the payment services. The analysis will include different types of mobile payment situations that are considered in different application areas:

- Money transfers between individuals (Person to Person, P2P);
- Mobile payments in shops and restaurants (Point of Sales, PoS);
- Mobile payments and ticketing for public transport;
- Mobile payments for parking services.

The paper contributions are in the following areas: i) analysis of mobile payment starting with the user accounts (and not the mobile phone features), ii) business network analysis of mobile payment services in a business-to-business-to-consumer (B2B2C) context, and iii) an description and analysis of the fragmentation currently observed at Swedish mobile payment market.

The paper is organized as follows: first related work and contribution, data collection, and analysis approach are described. Next an overview of money transfer and billing solutions is presented. The following sections include actor-resource-activity analysis of the different types of payment services. Finally, we summarize the findings and discuss implications in terms of market fragmentation and user adoption.

RELATED WORK AND CONTRIBUTION

Mobile Payment Services

In the literature review by Dahlberg et al. (2008) it is stated that research papers on mobile payments often are dominated by topics related to either technology factors (m-payment system, mechanisms or protocols) or consumer factors (user attitudes, behavior, and adoption). Examples of the latter group are (Dahlberg and Öörni, 2006) and (Pousttchi and Widemann, 2007). There are some papers that focus on payments for parking services (Pedersen, 2003), (Anžek and Uzelac, 2004), (Strauß et al, 2005). These papers focus on user attitudes and behaviour. In (Mallat et al, 2009) the user values of mobile payments ticketing services are investigated including both (mental) costs of how to learn to use a new system and benefits of the usage. Customer experience aspects of mobile payment solutions are investigated by (Goetze and Pousttchi, 2010) where some indicators especially deal with solutions for mobile ticketing and the perceived impression of the payment provider.

A number of papers on m-payment market and provider factors listed in (Dahlberg et al, 2008) describe the analysis of mobile payment services, scenarios, business model and analysis frameworks. A framework for business model analysis of mobile payment services is presented in (Pousttchi et al, 2009). Another theoretical analysis framework is presented in (Carton et al., 2012) and considers technical aspects (payment integration) and the value proposition to end users (purchase control). Criteria to measure both customer and merchant satisfaction of mobile payment services are proposed in (Mohammadi and Jahanshahi, 2008) and used in order to analyze a number of early European mobile payment concepts.

Analysis of business models and value networks for mobile payments can be found in (Methlie and Gressgård, 2006) and (Markendahl, 2011). The grouping of actor networks and relations presented in (van Bossuyt and van Hove, 2007) include two main types of payment models: operator-centric and payment service provider (PSP)-centric. The role of third party actors and payment providers are described in (Anderson et al, 2011), where the connections between technical development and the formation of new business ventures are analyzed. Cooperation between banks, mobile operators and application providers in order to offer mobile solutions including SMS, Internet, and PoS payments are presented in (Delic and Vukašinovic, 2006). The market position and roles of banks in mobile payment services, and how different resources and assets can be used (or not) as a competitive advantage are described in (Gaur and Ondrus, 2012).

(Ondrus and Lyttinen, 2011) discuss new payment solutions and technologies in a social, institutional, and business model context. The business performance of Google, Apple and Square as “newcomers” in the mobile payment business is analyzed. Mobile wallet concepts proposed by banks, mobile operators and Internet companies are compared by Narayan (2013). The discussion of market fragmentation brought by different incompatible payment solutions is presented in (van Hove, 1999). Additionally, the opportunities of these payment solutions to reach a critical mass of consumers are analyzed.

Mobile payment services are often presented in terms of technical features for security and use of Near Field Communication (NFC) technology and QR codes. In contrast, we will start the analysis by looking into how the end-users are charged. Does the mobile payment solution make use of credit cards, bank accounts, the mobile phone bill or any separate charging solution?

The approach to look into the mobile payments by identifying different accounts for consumers and what actors that offer payment services using these accounts is one of the paper contributions. The type of user accounts imply what actors that are involved and how.

As the literature review shows the question of business model is central for analysis of mobile payment services. Due to that, a short literature review on business models and specifics of business network research is presented in the next sub-section.

Business Model and Business Network Research

A commonly used business model definition was proposed by Chesbrough and Rosenbloom (2002). The definition contains the following elements: i) The value proposition, ii) the market segment, iii) the cost structure and profit potential, iv) the firm organization and value chain, v) the competitive strategy, and vi) the position of the firm in the value network.

The elements describing the value chain and the position of companies with the value chain or network is closely related to that ARA model proposed by business network researchers, i.e. people belonging to the IMP group (Håkansson and Snehota, 1995), (Ford et al, 2007). The ARA model describes businesses, firms and cooperation between actors in terms of Actors, Resources and Activities. For analysis of mobile payment services the ARA model was the key analysis tool in (Markendahl, 2011) providing information on the following aspects:

- The distribution of activities and responsibilities between actors.
- What activities, roles and actors that provides a certain type of value.
- What actor(s) that seem to be dominant and possibly organizes the network.

A similar business network approach is described by Zott and Amit (2010). They discuss *Activity systems* from different perspectives; the *content* refers to what activities that are performed, the *structure* describes how activities are linked, and the *governance* describes who performs the activities. The approach by Zott and Amit also include analysis in terms of *Activity design theme* indicating the main driver for a change: novelty, lock-in, complementarities, and efficiency (NICE).

A number of research gaps can be identified related to business network research and the paper tries to contribute in the following areas: ARA analysis of mobile services in a B2B2C context in general and ARA analysis for mobile payment services in particular. This type of contribution can be better understood since a lot of business network research focus on supply chain management and distribution in a business-to-business (B2B) setting. Payment and ticket services are supporting activities to the core service; it is payment and tickets for “something” that represents the key service that the end-user wants. Hence, the provider-customer relation needs to be seen in a B2B2C context.

Another contribution is to present an analysis and explanation of the recent changes at the Swedish mobile payment market and the trends towards fragmentation that currently can be observed. We also discuss the consequences of this fragmentation for adoption of mobile payments services in general.

METHODOLOGY

Data Collection

Interviews with different types of actors dealing with mobile payment services and solutions have been conducted since 2009. The main groups of actors are: i) service providers making use of mobile payment solutions, ii) providers of mobile payment and ticketing services, and iii) providers of technology solutions (that may also provide services).

A first round of interviews was conducted during 2010–2011 in order to understand the market position and plans for different actors. This is reported in (Markendahl, 2011). During 2011 mobile payment solutions, drivers and obstacles were discussed in-depth with Swedbank, the mobile operators Telia and Tele2, and with the payment providers PayEx and PayAir. Within a project on cashless society a number of workshops with participants from the banking industry were organized in March 2012. Another workshop on the cashless society and mobile payment services was organized in June 2012 with representatives from different sectors: parking, retailing, and transportation (Arvidsson, 2013).

A second round of interviews was done in 2012 in order to understand: i) the objective and scope of different pilot projects and trails, and ii) strategies and plans for both solution providers as well as users of the upcoming “new” SMS payment services. The 20 interviews were made with:

- Parking operators in Stockholm, Västerås, Linköping, and Gothenburg;
- The mobile parking payment provider Easypark;
- The regional public transportation companies in Stockholm (SL), Uppsala (Upplands lokaltrafik UL), and Linköping/Norrköping (Östgötatrafiken);
- Providers of mobile payment, ticket and/or security solutions and services: Accumulate, Nets, Payair, PayEx, Samtrafiken, Seamless, Swedbank, Unwire, and WyWallet.

In February 2013, after the launch of the “new” SMS tickets for public transportation, around ten interviews were made with public transportation companies in the five major cities/regions of Sweden (SL, Västtrafik, Skånetrafiken, UL, and Östgötatrafiken) and with some of the providers of the ticket and payment solutions: IPX, Mobill, PayEx, Samtrafiken, Seamless, and WyWallet.

Analysis Approach

For the description of distribution of activities among actors for the different payment solutions we use of the *ARA model* (Actors, resources and activities) from the business network research mentioned in the related work section (Håkansson and Snehota, 1995), (Ford et al, 2007). This analysis also provides information about the interaction between different actors, the type of relation between end-users and providers and, what actor(s) that possibly organizes the network. The results are presented in the form of actor-activity maps illustrating activities/resources controlled by these actors.

In order to analyze changes of the business networks and the possible drivers, the use of the *ARA model* is complemented by the *Activity system* approach proposed by Zott and Amit (2010). With this approach we analyze both the design elements of the business model, i.e. the content, structure and governance of the activities as well as the activity design themes: novelty, lock-in aspects, complementarities, and efficiency.

OVERVIEW OF MONEY TRANSFER AND BILLING SOLUTIONS

As it was already mentioned, a wide range of launched mobile payment solutions is currently available for usage. However, before going into description and analysis of selected cases, several key aspects need to be highlighted. They are essential differences existing between analyzed mobile payment solutions in terms of a money transfer, a billing method, and a need to set a dedicated service account. These differences are illustrated in the table below (see *Table 1*).

One key issue illustrated in Table 1 is how the end-user is charged and by whom, i.e. what actor that sends the bill. Another important aspect is the emergence of a large number of separate charging solutions provided by new actors.

Table 1. Money transfer and billing specifics of analyzed mobile payment solutions.

Mobile payment solution	Direct charging of bank account	Direct charging of credit card	Use of phone bill or pre-paid card	Separate charging and account solution and the options for end-user billing		
				Phone bill	Credit card	Bill
P2P payments						
Swish	X					
Mobile banking	X					
WyWallet				X	X	X
ME	X	X				
SEQR					X	X
PoS payments						
SEQR	X				X	X
Bart	X					
Payair		X				
ME				X	X	X
Credit/debit card		X				
Parking and transport						
Parking subscriptions					X	X
SMS until 2013			X			
SMS Mobill					X	X
SMS Seamless					X	X
SMS WyWallet				X	X	X
SMS Klarna					X	X
MobiTime					X	X

The overview of the variety of available mobile payment situations launched in different application areas will be presented in the following sections of this paper.

P2P MOBILE PAYMENT SOLUTIONS

A number of mobile payment solutions provide an opportunity to make P2P money transfers. The overview of some of these solutions is presented in the table below (see *Table 2*).

SEB bank announced about the launch of the Swish mobile payment service in December 2012 (SEB, 2012). The service is provided in cooperation with other major banks: Danske Bank, Handelsbanken, Länsförsäkringar Bank, Nordea, Swedbank, and Sparbankerna (SEB, 2012). The service is targeting private individuals, and its main purpose is provisioning of a quick, secure, and simple way of P2P money transfers (SEB, 2012). Real-time transfers are done using mobile phone numbers, which are linked to corresponding bank accounts (SEB, 2012), (Getswish, n.d.). In order to perform a P2P money transfer, the consumers need to download the Swish app to their smartphones and to have the mobile Bank ID (SEB, 2012).

Table 2. P2P Mobile payment solutions.

Mobile payment solution	Payment service provider	Payment type	Other parties involved
Swish	Danske bank, Handelsbanken, Länsförsäkringar Bank, Nordea, SEB, and Swedbank	Bank account	
Mobile banking	Provided by all banks	Bank account	
ME	Accumulate	Bank account Bank card	Point (VeryFone company)
WyWallet	4T Sweden (Tele2, Telia, Telenor and 3)	Transfer between WyWallet accounts	PayEx and Accumulate
SEQR	Seamless	Transfer between SEQR accounts	Collector (billing)

Mobile banking is another mobile payment solution provided by all banks. In this case, money is transferred directly between personal bank accounts.

One more mobile payment solution directly linked to bank accounts is the universal Mobile Everywhere (ME) mobile financial service platform developed by Accumulate. The solution is independent of mobile network operators (Accumulate, 2013).

In both the Swish and the mobile banking cases, the banks are the payment service providers having direct relation with the end consumers, providing the mobile payment interface, performing money transfers, and managing consumers' bank accounts. The main function of mobile operators is just to provide connectivity for the performance of the transaction. The consumers make payments either directly managing their banks accounts or using a separate payment solution, which is directly connected to their bank accounts.

The major difference between previously discussed mobile payment solutions and ME is the role of the central actor managing consumer relations. In the case of ME, this is Accumulate. Another difference is splitting activities between two actors. This means that Accumulate company manages direct relation with the end consumers and provides the mobile payment interface; the banks perform money transfers, and manage the bank accounts of the consumers. Hence, there is a relation between these actors (see in *Figure 1*).

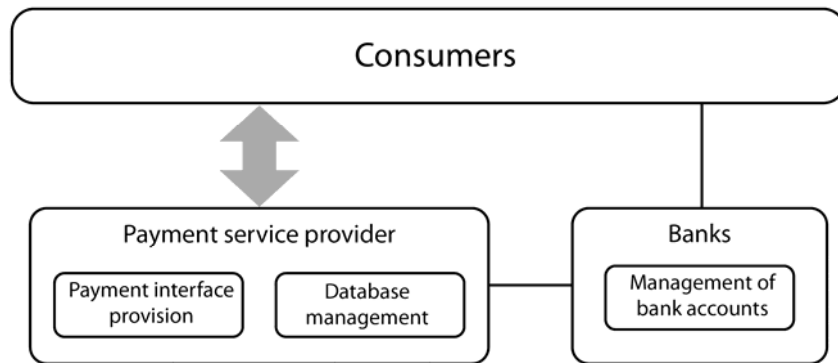


Figure 1. Actors and relations for ME mobile payment solution. In the case of the Swish and the mobile banking, banks are the payment service providers performing management of bank accounts. The grey arrow indicates the “billing relationship”.

A different approach is introduced in WyWallet and SEQR solutions. WyWallet was launched by 4T Sweden, a joint venture of the main Swedish mobile operators Telia, Tele2, Telenor, and Three (Clark, 2012). The payment solution is based on Accumulate’s ME mobile financial service platform (Clark, 2012). Another partner – PayEx – performs payment transfers (Narayan, 2013). WyWallet app is linked to user’s bank credit cards, additionally, NFC tags can be used (Sellebråten, 2013). In order to perform a P2P payment, a money recipient’s mobile phone number should be entered in WyWallet app (WyWallet, n.d).

Functionality of SEQR, a mobile payment solution developed by Seamless, was extended with opportunity of P2P money transfers in August 2012 (Seamless, 2012). In order to perform a transaction, SEQR consumers have to register a credit account at a financial service company Collector. Within SEQR application, the specified amount of money is directly transferred to the money recipient’s bank account by specifying the corresponding mobile phone number (Seamless, 2012). Collector withdraws money from the sender’s billing account.

These two P2P mobile payment solutions are similar because money transfers are initiated between users’ accounts. 4T Sweden and Seamless companies act as the mobile payment service providers managing relation with end consumers, providing the mobile payment solution, and managing accounts of consumers. The financial companies (i.e. PayEx and Collector) handle all questions related to payment transfers. Mobile operators and banks are not directly involved in the payment. The main role of the mobile operators is to provide connectivity, and the banks perform actual bank account management associated with money transfer transactions. Relationship between the main actors is presented in *Figure 2*.

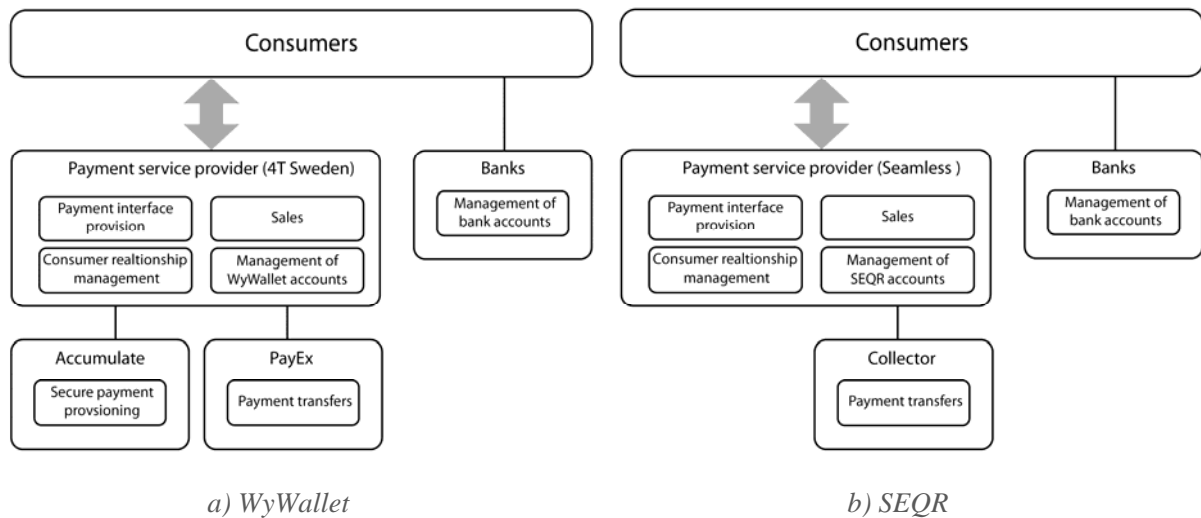


Figure 2. Actors and relations for WyWallet and SEQR mobile payment solutions. The grey arrow indicates “billing relationship”.

In summary, there is a range of new P2P mobile payment solutions recently introduced in the market by new actors entering the mobile payment market. Overall, mobile payment solutions tend to be bank and mobile network operator independent, resulting in the elimination of the latter actors out of the market. In addition, the mobile operators are being excluded from the mobile payment network, and, currently, their main function is just to provide mobile network connectivity. Moreover, there is a trend to separate the provisioning of mobile payment service and consumer billing, and these functions are performed by different types of actors.

POS MOBILE PAYMENT SOLUTIONS

A number of mobile payment solutions are currently available in the retail in Sweden. A brief summary of the most popular mobile payment solutions is presented in the table below (see *Table 3*).

Since spring 2012, SEQR, a mobile payment solution developed by Seamless, can be used for payments in a number of different shops, e-shops, and restaurants (Seamless, 2012), (Sellebråten, 2013). Moreover, the solution can be used free of charge and is not linked to any bank account or card. So, there is no dependence on consumers' affiliated banks. In order to perform the payment, a QR-code should be scanned and payment approved with a personal PIN code. The SEQR users have to register a credit account at a financial service company Collector and receive monthly service bills (Seamless, 2012), (Sellebråten, 2013).

In October 2012, after a prior trial, the third largest Swedish retail chain Axfood announced about introduction of SEQR in its retail chains Hemköp, Willys, and PrisXtra (Axfood, 2012a). By December 2012, about 2400 PoS were installed at 380 Axfood's stores throughout Sweden. In order to pay using SEQR, a corresponding app should be downloaded to a user's smartphone. When performing a payment at the PoS terminal, Axfood customers have to scan a QR-code and approve a payment using a personal PIN code. A sum of expenses is provided in a monthly bill by Collector (Sellebråten, 2013). Other market actors are also interested in the SEQR solution. So, for example, there was a trial of this payment solution in five McDonalds' restaurants in Stockholm during summer 2012 (Thoresson, 2012).

Table 3. Mobile payment solutions provided by different actors in retail.

Mobile payment solution	Retailer	Payment service provider	Payment type	Other parties involved
SEQR	Axfood, McDonalds	Seamless	Monthly bill	Collector (billing)
Bart	Axfood	Swedbank, Sparbankerna	Bank account	Shops equipped with PoS terminals
Payair	Webhallen, shops and restaurants as a part of a trail in Uppsala	Payair	Bank accounts Credit card	Webhallen
ME	Beijing8	Accumulate	Bank account Bank card	Point (VeryFone company)

In this case, Seamless is the PoS mobile payment service provider managing relation with the end consumers, providing the mobile payment solution, and handling the accounts of the consumers. The financial company (i.e. Collector) handles all questions related to payment transfers. The retailers issue bills via the mobile payment app. Finally, the mobile operators and the banks are not directly involved in the payment. The relationship between the main actors is illustrated in *Figure 3a*.

Another mobile payment solution dedicated to retail purchases is Bart. This service was launched by Swedbank and Sparbankerna (Swedbank, n.d.). Bart is directly related to consumer's bank account, acts as a bank card, and performs payment transactions via QR-codes (Swedbank, n.d.), (Sellebråten, 2013). In November 2012, Axfood started a pilot project trying the Bart payment service in three shops in Stockholm (Axfood, 2012b), (Swedbank, 2012).

It is announced that by April 2013 the service will be rolled out in 400 Axfood's stores (including Hemköp, Willys, Willys Hemma, and PrisXtra) all over Sweden (Swedbank, n.d.).

In this case, the mobile payment solution providers are banks. They have a direct relation with the consumers, manage their bank accounts and perform money transfers. Additionally, bills issued by merchants are saved in the electronic form within the payment application. The mobile operators just provide connectivity for the performance of the transaction. The consumers make payments using the separate payment solution directly connected to their bank accounts (see in *Figure 3b*).

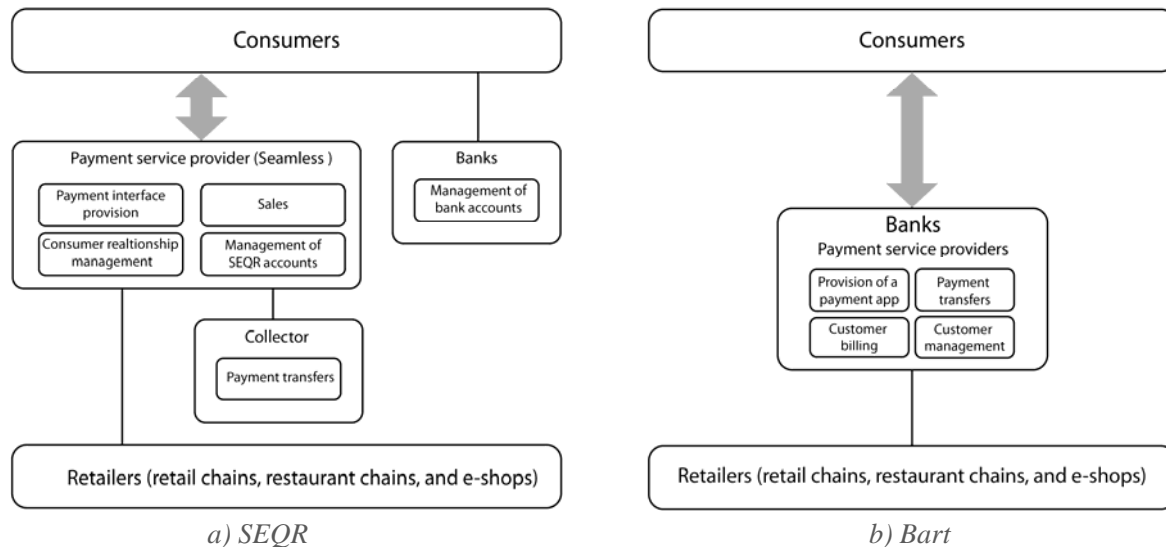


Figure 3. Actors and relations for SEQR and Bart mobile payment solutions. The grey arrow indicates “billing relationship”.

One more mobile payment solution developed by Payair uses QR-codes for payment transfers. At the moment it can only be used for payments at e-shops. The Payair application is linked to the user's bank account or credit card.

In previous section mentioned ME solution, developed by Accumulate, can be used for payments at PoS terminals. The solution covers all payment situations, payment solutions and pairing technologies (NFS, SMS, One Time Ticket (OTT), QR- and barcodes), and, as mentioned, does not depend on mobile network operators (Accumulate, 2013). This solution was chosen for a mobile payment test in the network of Chinese restaurants Beijing8 (Accumulate, 2012). Point (a VeriFone company) is a provider of PoS terminals accepting cards and mobile payments performed with or without NFC (Accumulate, 2012). The installed ME application is linked to users' bank accounts or cards.

These two mobile payment solutions have some similarities. The payment service providers (i.e. Payair and Accumulate) handle the relation with the consumers. The mobile payment applications are directly linked to the bank accounts of the users, so, a relation exists between the service providers and the banks. The retailers (i.e. e-shops and restaurant chains) issue bills via the mobile payment app. The mobile operators provide connectivity and are not involved in the payment process. The relations between the main actors are presented in *Figure 4*.

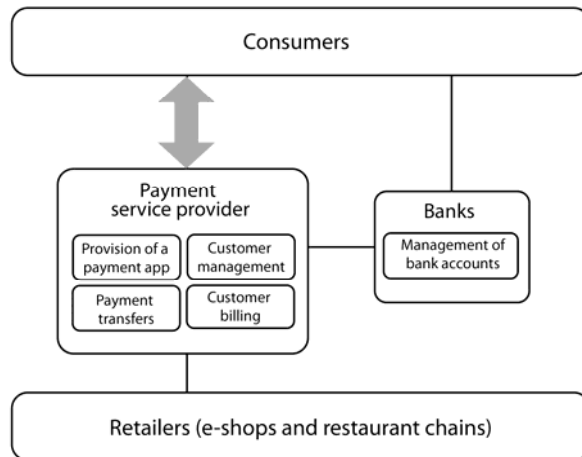


Figure 4. Actors and relations for Payair and ME mobile payment solution. The grey arrow indicates “billing relationship”.

It needs to be said that one more actor operating in the mobile payment market – WyWallet – has future plans to provide mobile payments dedicated to the retail.

Finally, traditional debit and credit cards issued by banks need to be mentioned. They are common type of payments actively used in the retail.

Generalizing the market offerings and the mobile payment solutions related to the retail, it is possible to say that there is an increase in the number of alternative available mobile payment solutions in the market. They are provided by actors mainly coming from financial and IT industries: banks and financial payment solution developers. Due to the fact that provided solutions are bank and mobile network operator independent, the latter actors are being excluded from the mobile payment market. Similarly as in the P2P mobile payment cases, there is a noticeable trend to separate the provisioning of mobile payment service and consumer billing between different types of actors. Another important trend is that the retailers and merchants have relation with consumers via a mediator, which is the mobile payment application.

MOBILE PAYMENT SOLUTIONS IN PARKING SERVICES

In this section we discuss the multitude of payments solutions available for parking services, the focus is on solutions that somehow make use of the mobile phone.

A Multitude of Payment Solutions

Consumers and parking operators are faced with a multitude of options for parking tickets and payments including parking permits, parking tickets purchased in machines using cash/debit cards and different forms of mobile phone services. The mobile phone solutions include SMS tickets, parking subscriptions and the use of special parking apps, see left part of *Figure 5*. Although this multitude of solutions and providers, the parking companies manage the daily ticket and permit control. The ticket control staff has handheld devices connected to data bases with parking session and car registration data. By entering the registration number of a car, information is provided on valid parking permits or sessions or if the car is stolen, see the right hand part of *Figure 5*.

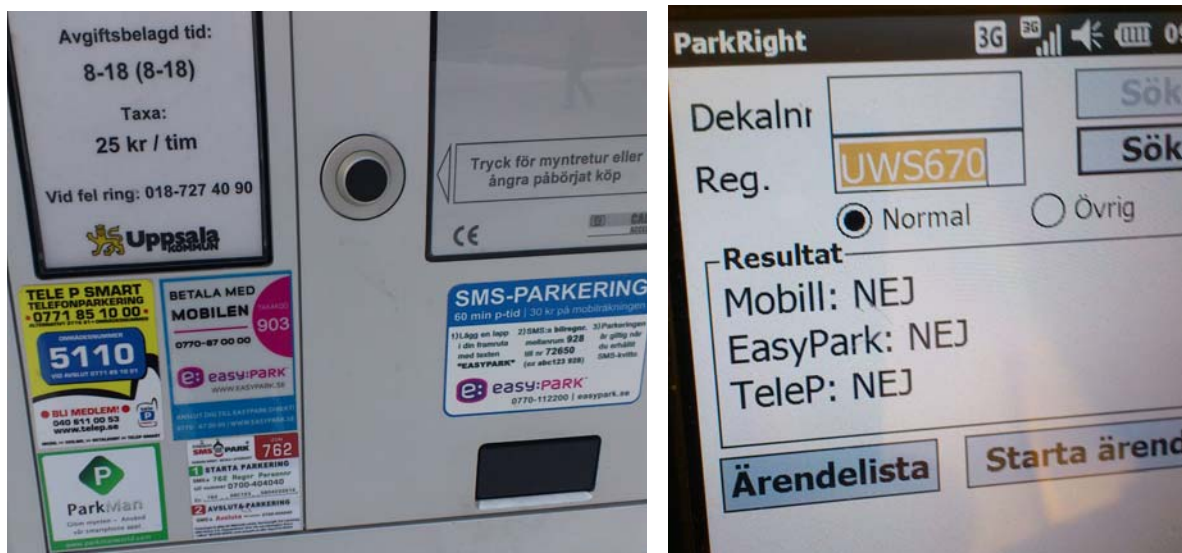


Figure 5. Ticket machine illustrating multiple payment solutions for parking (left) and a snap shot showing the user interface of the handheld device for the ticket control staff (right).

The parking subscriptions are provided by Mobile Parking Payment Providers (MPPP) like EasyPark and Tele-P that have agreements with parking operators. In order to use the parking subscription, the user needs to register to the MPPP and open an account. On registration the user provides registration number of one or several cars, a mobile phone number, a credit card account or a billing address. In order to use the service, customers call or send a SMS to the MPPP when a parking session starts and ends. The parking session is registered and put into a database. Hence, the “ticket” exists as a data record in the MPPP database, this is similar to SMS tickets for public transport. The parking company can check parked cars through their registration number and see if there is an active ongoing parking session.

Actors, Resources and Roles for Mobile Parking Solutions

This mobile parking subscription is interesting since it is mobile payment solution that neither involves banks nor mobile operators. The MPPP has relations with both end-users and with the parking operators. Mobile operators and credit card companies have no relations with the service providers and are connected through the end-users. The service is provided by an intermediary actor that has knowledge about parking services and establishes business relations with the service providers, e.g., the parking operators, garages and municipalities. The payments by end-users are done using a separate payment solution.

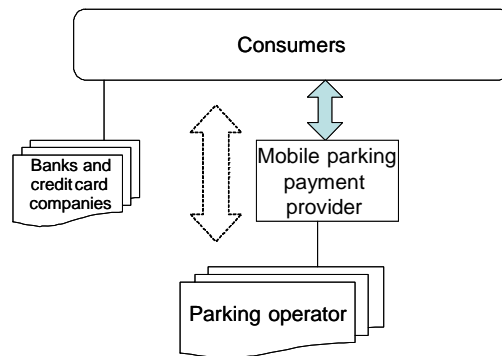


Figure 6. Actors and relations for mobile parking subscriptions, the blue arrow indicates “billing relation” and the lines indicate other types of business relations

For SMS parking tickets we can find other ways to distribute the roles and activities among actors. Until early 2013, the local parking operator in the town Västerås used the company Unwire as ticket provider and SMS aggregator, Figure 7. The parking operator makes use of the agreement that Unwire has with the operators. For Västerås another payment provider, Klarna, also could be used. The user needs register an account with Klarna and then parking fees are aggregated at a monthly bill sent to the user. Another example of distribution of roles can be found in Uppsala where SMS parking tickets can be used involving the company EasyPark. They are responsible for the ticket handling but they do not have any agreement with operators. Hence, Easypark have used a separate SMS aggregator (initially MBLOX) as a partner. Note that in this case the SMS ticket provider is visible to the end user, the ticket machines have a sign saying “send SMS to EasyPark if you want to use SMS parking”.

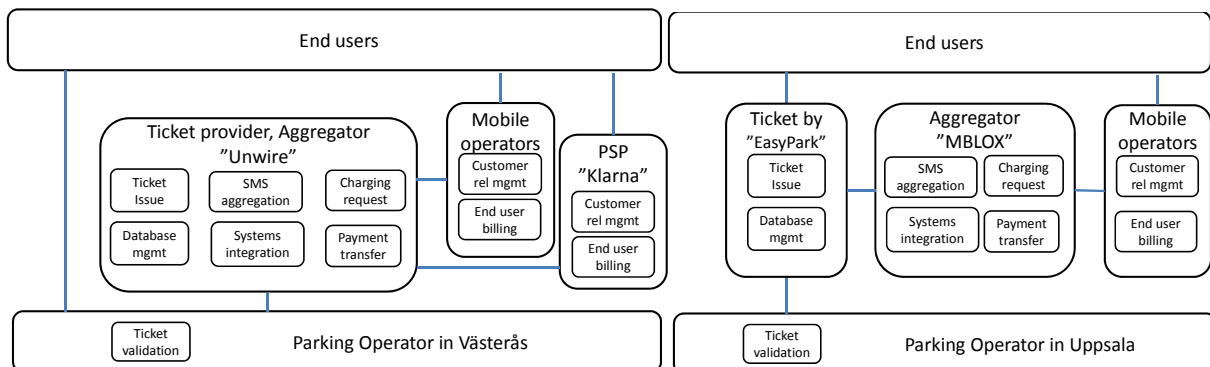


Figure 7. Distribution of activities and resources among actors for provisioning of SMS tickets for parking services until early 2013 – the case Västerås to the left and Uppsala to the right.

MOBILE PAYMENT SOLUTIONS IN PUBLIC TRANSPORT TICKETING

This section is about mobile payments for public transport with focus on one way single tickets using SMS. There are other mobile phone solutions, to be included in the discussion section, but the transformation of the SMS ticket services in Sweden 2012–2013 illustrates some very interesting aspect of mobile payments.

Activities, Resources and Roles Related to SMS Tickets

SMS payments have been used for some years for applications like TV voting, fundraising, vending machines, parking and for public transportation. Single tickets for local bus and subway travels are the largest application areas. Until now the end-user billing for SMS tickets have been based on the mobile phone subscription or prepaid card. The SMS ticket solutions have been provided by mobile operators and mobile service providers like SMS aggregators and ticket providers. Examples of these companies are Plusdial, Unwire, Mobill, and IPX.

SMS payment and ticketing services (in Sweden) can be described by resources and activities belonging to the following main groups, no matter what actor who is doing what.

- Ticket handling. This includes to issue the SMS ticket, to send it to the end-user, to create a “virtual” ticket in a data base and to validate the ticket. If no ticket is involved in the service, e.g. for vending machines, TV voting, etc., then the group ticket handling is removed.
- SMS aggregation and integration into the business system of the service provider. Aggregation require agreements with all operators and means that SMS ticket requests from users are collected at a single point no matter what operator the user has.
- Management of customer data, end-user billing and payment streams. When a SMS ticket request is received a charging request is issued in order to check if it is OK to charge the user or account. If it is OK to charge the user account the ticket issue etc. can proceed.

Change in Distribution of Roles and Responsibilities

Traditionally the responsibilities and activities for SMS payment and ticket services were usually split between the mobile service provider and the operator. Since the end user billing was done using the phone bill or prepaid SIM card as a payment solution, the mobile operators were naturally involved. The end-users were subscribers of the mobile operators and this customer and billing relation was exploited.

The ticket handling and SMS aggregation was usually managed by one mobile service provider, examples are Mobill, Unwire and Plusdial. Note that the ticket validation is managed by transport company, “ticket control” staff with handsets connected to the ticket database. Also note that the ticket provider and aggregator in this case not are visible to the end-user.

For public transportation companies the distribution of roles typically looked like the one illustrated in the left part of *Figure 8*. Note that the public transportation companies, as large actors, had direct revenue sharing agreements with the operators.

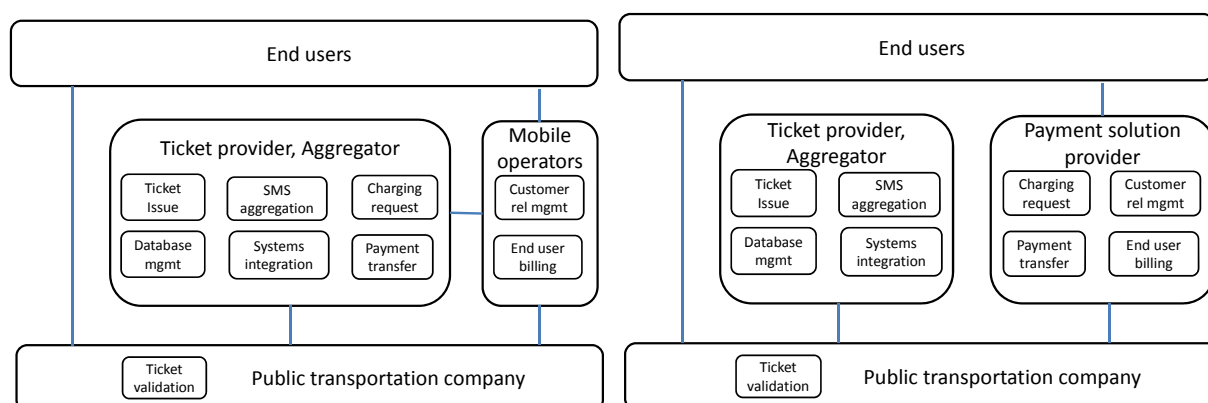


Figure 8. Typical distribution of activities and resources among actors for provisioning of SMS tickets for public transportation in Sweden; until (left) and after (right) February 2013.

Due to financial regulation, the mobile operators are no longer allowed to handle payments and transactions for non-telecom services without being a payment provider. The Payment Services Directive (PSD) states that payment providers need to know the identity of the person doing the transaction. This means that mobile operators need to register subscribers with pre-paid subscriptions. In order to avoid being payment providers themselves and in order to avoid too many non-telecom items at the phone bill, the Swedish Mobile operator formed the joint venture 4T Sweden to offer the WyWallet payment services.

However, after February 1 2013, the “traditional” SMS payment solution involving end-user charging through the mobile operators is no longer used. The public transportation companies have made a procurement of “new” SMS payment solutions. In most cases the contract consists of two parts, one for the technology solutions (i.e. handling the SMS tickets), and another for the payment solution. For applications other than local transportation (vending machines, fundraising, etc.) the operator owned joint venture WyWallet has taken over the SMS payment contracts.

The analysis of all new cases results in a generic map shown in the right part of *Figure 8*. There is a clear separation between the actors managing the technology solution and the payment solution. The mobile operators are no longer directly involved in the payment service, and the mobile phone bill cannot be used. Many new actors have entered the market for SMS payments, see *Table 4*. In the case of SL, a temporary solution is used since the contract awarded to Samtrafiken and their partners has been appealed by one of the other bidders.

Table 4. Actors and teams that got the contracts late 2012 for technology and payment solutions for SMS ticket services for regional transportation companies in Sweden.

Regional transportation company	Provider of technology solution	Provider of payment solution
UL, Östgötatrafiken, etc	Mobill	PayEx and OKB
Skånetrafiken	Plusdial	WyWallet
Västtrafik	IPX and Plusdial	Seamless
SL/Stockholm (got the contract)	Unwire	Samtrafiken, DIBS
SL (temporary solution)	Mobill	PayEx and OKB

Changed Market Structure

The procurement of SMS ticket services has resulted in a totally changed structure of the market. Previously, the mobile operators, SMS aggregators and ticket providers were the main actors in the provisioning of SMS ticket services. There were several SMS ticket providers and aggregators but together with the mobile operators they formed a “provider team” for SMS payment services. An agreed way to do the business was established, and merchants and service providers that wanted to offer SMS payments contacted some mobile service providers. Of course, many business agreements were established for the “provider team” but it was easy to use for consumers. The consumers were charged for SMS payments by use of the mobile phone bill. From the consumers perspective the complexity was low, if you wanted to use SMS payments you used a specific short SMS number for the corresponding service. The mobile operators had the main customer relation with the end-users through the subscription, see *Figure 9*.

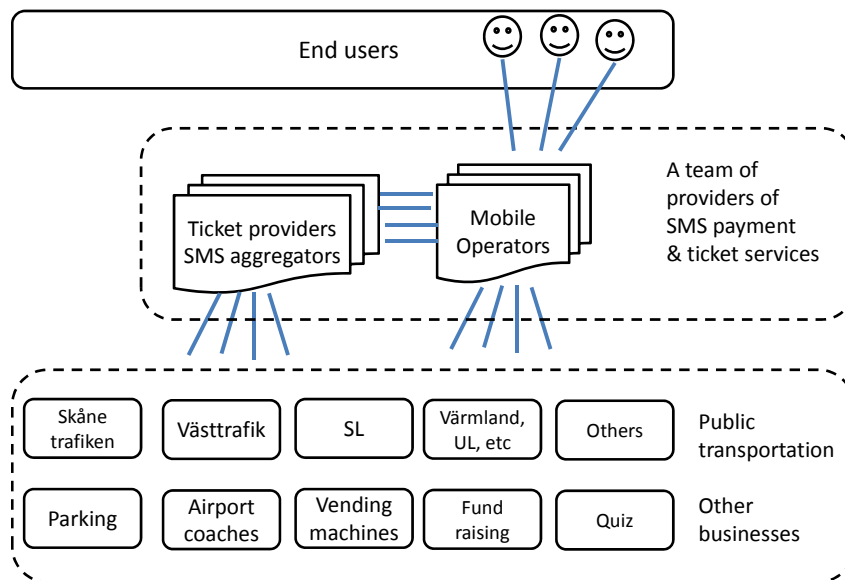


Figure 9. A map of business relations for the former way to provide SMS payment services, one “set of providers” provided services and solutions to all businesses; consumers were connected through the subscriptions with the mobile network operators.

The local transportation companies are public organizations that need to make official procurements including tender evaluation of competing offers. Many new actors did bid for these contracts but the operator joint venture WyWallet in most cases did not participate. The outcome of this process is interesting:

- The Mobile operators themselves have left the mobile payment market.
- All local transportation companies except one has chosen another solution than WyWallet.
- A number of new actors and constellations have entered the SMS payment business.
- No solution by banks is among these new payment solutions.
- There is no common national solution. Users that register an account in order to be able to use SMS ticket in Stockholm cannot use this in Gothenburg or Malmö.

In many areas like airport coaches, fundraising, parking the traditional SMS payment services have been migrated to WyWallet. The operator strategy to migrate SMS payments to the new joint venture did seem to work fine for some applications but not for public transportation. Many representatives for the local transportation claim that the procurement process for public services may not have been fully identified or understood by the mobile operators and WyWallet. WyWallet also decided not to bid for several of the procurements of SMS ticket and payment solutions, hence, other actors like Mobill, IPX, PayEx, Samtrafiken, and Seamless made offers and got all contracts except one.

If the operators had stayed with the previous business model but acquired payment provider licenses and registered all customers then the market position may had been the same. The “bill chock” problem would still remain but the entry barrier for new actors would have been much higher.

When it comes to the multitude of payment solutions and providers, we can see a fragmentation of the mobile payment service market (see *Figure 10*). There are many local solutions and constellations of actors. The complexity has increased for the consumers. For example, in order to be able to use SMS-tickets in the three major cities, you need to have different accounts and “wallets”. In some regions (Uppland, Östergötland, Västmanland, Värmland, etc.) the same solution and providers are chosen, and the same registration can be used¹.

Assuming that there had been one common national solution for SMS payments, then it had been straight forward to exploit and re-use this solution for other types of payments, e.g. in shops, restaurants, coffee shops or for sport/music events. Due to the multitude of different solutions, the incentives for both consumers and merchants to extend these payment solutions to other areas would be much lower compared to a common national solution.

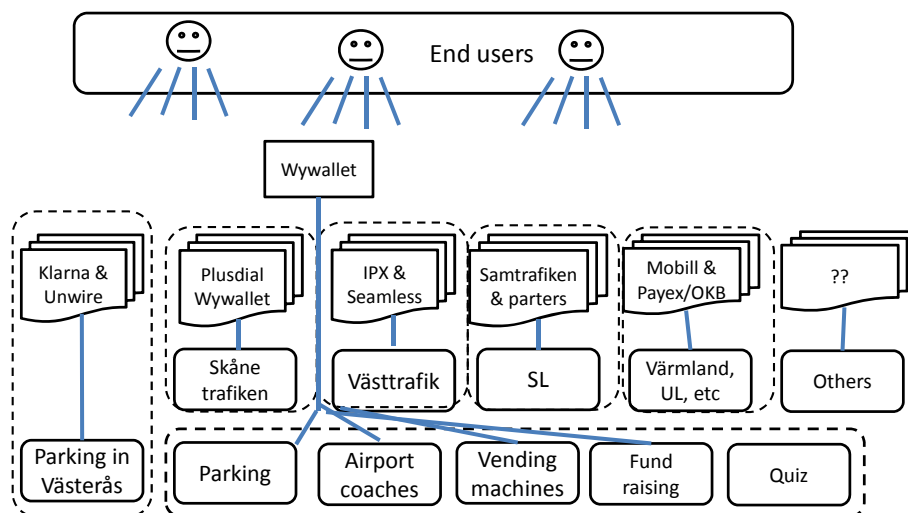


Figure 10. A map of business relations for the new way to provide SMS payment services, multiple teams provide services and solutions to different businesses; consumers need to register for multiple accounts (providers) in order to use different services.

¹ <http://www.mobill.se/se/nya-reglet/>

ANALYSIS USING THE ACTIVITY SYSTEM APPROACH

The Activity system framework proposed by Zott and Amit (2010) was applied to the investigated cases. This framework helps to draw some conclusions about the activity system and the design themes indicating the major value creation drivers for the new payment solutions.

Mobile Payments for P2P and PoS Transactions

Novelty of the P2P and PoS payment solutions requires from providers to create new activities and link them in a new structure. The activities are performed by the actors providing the service (a bank or a payment service provider) and the actors making use of the service (e.g. a retailer or a restaurant).

Since the mobile payment service is new and not previously provided by the actors *novelty* naturally is one of design themes. Another clear design theme is the *lock-in* of customers:

- Banks and credit card companies want their customers to use existing accounts. The mobile solutions will increase the value of existing accounts and, hence, the market position of the actors would be protected.
- Actors offering new payment solutions want to establish relation with new customers. Creation of new user accounts is usually a requirement for use of the new solution. However, services requiring a new user account will challenge the existing payment solutions, i.e. it will be a force hindering the lock-in effect resulting from the use of bank and credit card accounts.

As far as we can see, the design themes *complementarities* and *efficiency* are not drivers for these new solutions.

Transport Ticketing Using SMS Payments

Looking into the “old” and the “new” SMS payment services the following conclusions can be made from the perspective of the activity system and the activity design themes:

- The activity system *content* is the same, the same basic sets of activities are performed.
- The activity system *structure and governance* are changed since the activities are linked in new ways and performed by new actors. The mobile operators do not participate any longer, they are replaced by payment providers.
- The *novelty* of the design scheme is not about the content but about the *structure*, i.e. how the activities are linked and how they are *governed*.
- When it comes to the *lock-in* design theme it seems to be an inverted lock-in since many users were too used to the old SMS system and did not want to change.
- The *efficiency* as a design theme is not clear, no improved efficiency can be identified.

SUMMARY AND DISCUSSION

A range of new mobile phone services have been introduced for P2P and PoS payments. These services are based on different types of technologies and account structures. For public transport local transportation companies have selected different solutions and providers. The solutions seem to work technically and can be deployed and taken into use in a short period of time.

Many new actors and in new constellations have entered the mobile payment market. These new actors mainly come from the financial and IT industries, banks, payment service providers and financial solution developers. The mobile operators are not actively involved in the payment services; their main function is just to provide the network connectivity. The new mobile payment services are offered by sets of cooperating actors responsible for different parts of the service, typically the payment services, end-user billing, and (if applicable) ticket issue.

Consumers are offered a big variety of mobile payment services, where several of the new solutions are independent of banks and mobile operators. The consumers need to register a new account. Both the registration as such and the multitude of providers and related accounts are potential obstacles for adoption of the new services. The issue of additional accounts for mobile payment can be split into different sub-barriers: i) to register to a new payment service (at all), ii) to register to a new payments service with a new actor, iii) to download an app to the phone, iv) to have an additional account to manage and possibly fill.

A need of multiple account management might be critical for service adoption by consumers. At the same time, the scale of the service usage is limited to several retail or restaurant chains. Moreover, some mobile payment solutions can only be used in e-shops, and are not accepted in retail shops or restaurants. This leads to a high market fragmentation, and problem reaching a critical mass of consumers needed for mobile payment to take off, and, as a consequence, results in the “chicken and egg” dilemma. Another important aspect is that the mobile payment service cannot be provided without coupling to the bank cards. Taking in to account limited acceptance of mobile payment solutions by retailers, traditional credit/debit cards seem to be a better solution. Indeed, they can be used everywhere, provide centralized account control and management being safe and convenient at the same time.

The need to register new user accounts for buying SMS tickets resulted in a substantial reduction of the number of sold tickets and made transactions during February 2013. Compared to the same period 2012, the number of SMS tickets for public transportation has decreased 50–80 % in cities like Malmö, Uppsala, Västerås, and Örebro. The largest loss has been reported for fundraising, e.g. there is a 92% decrease in funding of Swedish Red Cross.

From a user perspective, we can identify the entry point for a mobile payment service. For P2P it is about money transfer, a bank service using existing bank accounts would be the preferred solution. Also for PoS payments a bank service would be the natural choice if it is used by many merchants. Services offered by retail chains (where consumers frequently make purchases) may be one entry point but this would not be the case for restaurants (less frequent visits). For public transport a mobile payment and ticket solution may be accepted, since, it is used frequently for a specific service. The phone is feasible as a ticket, since, it is carried by the user. Parking is different since the ticket or permit is linked to the car, it could be a paper ticket in the car or a data record in a data base linked to the car.

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