Arthur D Little

Platforms

Services

Partnerships

M-Payments Making Inroads

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Dear Readers,

As predicted, the m-payment sector has developed quickly since the release of Arthur D. Little's Global M-Payment Report last year. M-payment services have been launched and expanded in many markets across the globe. Specifically, m-parking solutions have gained interest, and other small payments like m-ticketing for public transportation will continue to make up the vast majority of sales via mobile phones. Also, the international m-payment standardisation group Simpay, a collaborative effort of Vodafone, T-Mobile, Telefonica and Orange, announced its decision to close down its global initiative at the end of June 2005, which will encourage the development of solutions adapted to local needs and payment landscape.

The purpose of this report is to provide an update on the events in the m-commerce/ m-payment sector over the last year, and to highlight developments in particular countries. For companies already active in m-payments, it will provide an overview of current trends and a review of the activities of companies in other markets. For companies currently considering the introduction of m-payment services, it will provide ideas and guidelines on where to begin and lessons learned from other markets.

Through the course of our research, we conducted qualitative interviews with selected industry experts from diverse industries, such as mobile operators, banks, credit card companies, payment service providers, suppliers and regulators. We would like to sincerely thank all those who contributed to this Report. We trust our findings will prove useful to our readers. We are convinced that leaders in many industries reading this report will identify starting points to strengthen the value of their business by leveraging the opportunities afforded by m-payments.

Yours sincerely,   December 2005

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Introduction

As an update to Arthur D. Little's Global M-Payment Report 2004, this report will discuss the changes in the m-commerce sector since last year's report, current industry trends and lessons learned from successful m-payment providers.

In 2004, Arthur D. Little completed a global survey on m-payments to provide a framework to discuss industry dynamics, strategic and operational issues, and challenges and opportunities for the future. Our survey was conducted by our global network and comprised more than 100 interviews with industry experts from diverse industries, such as mobile operators, banks, credit card companies, payment service providers, suppliers and regulators, in 32 countries. The study was welcomed by the m-payment community across the world, as one of the most detailed studies available on the global development of m-payments.

We define m-payment as a type of transaction processing in which the mobile handset plays a key role in the initiation, authorisation and/or realisation of the payment. Based on our global survey, we estimate that the m-payment transaction revenues will increase from $ 3.2 billion in 2003 to $ 37.1 billion in 2008.

The purpose of this report is to provide an update on the events in the m-commerce/ m-payment sector over the last year, and to highlight developments in particular countries. In this report, we set out to address three primary questions:

- How has the m-payment / m-commerce sector changed since last year's study and what are the current trends in the industry?

- What lessons can be learned from successful m-payment providers?

- How has the m-payment sector developed in individual countries?

Part 1 Current Trends in M-Payments

A failure of global standardisation efforts will lead to the development of solutions based on characteristics of each market; most players have focused thus far on micro payment applications like m-parking or m-tickets for public transportation.

There are several current trends in m-payments that will affect the development of the sector in the near- and medium-term:

- The disintegration of Simpay will lead to a focus on solutions developed on a national level in each market.

- Micro payments, such as for parking or public transportation tickets, continue to dominate m-payments.

- Macro-payments are currently focused on event ticketing; in some countries, m-payments are being actively marketed to corporate customers.

- M-payment technology is currently focused on SMS with a growing interest in RFID.

1.1 The disintegration of Simpay will lead to a focus on solutions developed on a national level in each market.

The announcement by Simpay to close down its global initiative has left many potential m-payment providers disoriented; however, providers with ready solutions can now invest in them without being held back by a slow-moving standardisation organisation.

Simpay was founded by the mobile operators Vodafone, T-Mobile, Telefonica and Orange, as a standardisation initiative with the goal of developing an interoperable mobile payment infrastructure and potentially a European clearing house. It was felt that a standardised European brand would make the recruitment of merchants easier, and that large content providers such as Disney, EMI and Bertelsmann, would welcome a relationship with a single payment provider to be able to offer content directly to consumers.

Originally, Simpay was expected to provide a single platform to deal with the routing, clearing and settling of mobile phone payments in as many as 20 European countries. However, the group was plagued with delays and, at the end of June 2005, announced its decision to close down its global initiative, while allowing the member operators, Vodafone, T-Mobile, Telefonica and Orange, to utilise Simpay's intellectual property rights in their respective national markets. This announcement was followed by an announcement by First Data Corporation that it had closed down its Encorus mobile payments unit, which had been chosen by Simpay as transaction processor.

The development of global standards will continue to be slow due to the large number of industry bodies that are rather focused on vested interests. Instead, we believe national solutions will be developed, which are adapted to local needs and payment landscape. Several operators indicated in last year's interviews that they were confident in the Simpay initiative and that they would await its launch prior to setting up their own m-payment solutions. These operators are suddenly left disoriented and need to quickly come up with an m-payment solution so as not to lose momentum; otherwise they run the risk of falling behind. On the other hand, most of Simpay's shareholders were already pushing their own m-payment brands on the national markets and can now invest fully in these solutions without being held back by a slow-moving standardisation organisation.

1.2   Micro payments, such as for parking or public transportation tickets, continue to dominate m-payments.

> *Large numbers of small payments will continue to make up the vast majority of sales via mobile phones; real benefits to all players in the value chain will come from making these services as value-added as possible.*

For mobile operators, the first step into m-payments is usually to offer top-up of pre-paid cards through m-payments, bypassing the need for producing and distributing scratch cards. Telenor Mobil, an advanced m-commerce provider, still identifies pre-paid top-up as one the main focuses of its m-commerce strategy. However, Telenor, as well as a number of other mobile operators and m-payment providers, is moving into other areas of m-payments in addition to the classic telecom-related services. In Exhibit 1, we show examples of providers which are offering m-payment products with types of settlement other than to just the mobile pre- and post-paid bill. Most often the payment solution is linked to the user's bank account or his credit card. In addition, there is greater variety in the types of transactions, including transactions for mobile services, as well as online, machine to machine (M2M), face to face (F2F) and phone to phone (P2P) transactions.

Exhibit 1:Several providers of m-payments are extending their scope to new services in addition to the original telecom-related segments.

Source: Arthur D. Little analysis   Note: M2M (machine to machine), F2F (face to face) and P2P (phone to phone)

When m-payment providers are moving into new types of transactions, they have to bear in mind that m-payments are an enabler for other services; users are not buying a payment instrument, but an m-commerce service with a user-friendly payment solution. A major hurdle to be overcome in the development of m-payments is the high degree of consumer satisfaction with traditional payment methods, such as cash, debit- and credit cards. On the supply side, mobile operators agree that basic m-payment services, in most cases, provide too small margins for the operators to make the business viable.

The best strategy to address both these issues is to launch more value added m-commerce services, which offer more convenience and flexibility for the customer, clear advantages for the merchant and higher margins for the operator. For example, a basic m-parking solution covering only authorisation by mobile phone would enable a customer to make the payment with his mobile, but he would still receive the ticket from the ticket machine or cashier. In a more value-added m-commerce solution covering the entire value chain, the customer would receive an electronic ticket on his mobile, and he would have the option of extending his parking time without returning to his car. These services not only provide payment, but the entire management of the service, giving customers additional convenience and the merchant company other benefits, such as savings in distribution and collection costs, and higher customer satisfaction and usage. In the m-parking project in Vienna, the city has invested in an m-payment control solution with special handsets, which simplifies the work of the staff. The m-shopping channel of the mail order firm Quelle is the company's most cost effective sales channel. In order to be really successful in m-payments, operators will need to continue to launch new and innovative m-commerce solutions.

The purchase of tickets such as car parking and public transportation tickets using the mobile phone, will dominate the growth in m-commerce.

Since last year's report, m-parking has become very popular and has been launched in several markets around the world. For users, m-parking have obvious benefits: no need to have cash handy; the opportunity to receive a warning message when time is running out and the ability to pay and top-up from any location. For the city, the system simplifies revenue collection and encourages more people to pay rather than park illegally. In Sweden, m-parking payments currently account for 10 percent of all parking revenue in the capital of Stockholm. Even in the USA, where m-commerce services are developing very slowly, there are promising trials of the service in the cities of Seattle, Minneapolis, Miami and Santa Barbara. In Vienna, Austria, the m-parking system is now used by more than 80,000 of the city's 650,000 registered drivers, and each day 7,500 mobile parking tickets are purchased. However, in Croatia, where m-parking has been driven by the municipalities themselves, m-parking has seen the greatest success. In Croatian cities, m-parking accounts for 25-75 percent of parking turnover.

For m-ticketing, there are two possible m-payment scenarios depending on the current infrastructure used by a city's public transportation service. Proximity payments using RFID technology are best suited to transportation systems where tickets are checked at each entrance to the system. In this case, the user holds his phone against a reader and the validity of the electronic ticket is checked. This solution is currently under trial by Rhein-Main Verkehrsverbund (RMV) together with Nokia and Philips. The trial enables RMV's current customers to use Nokia 3220 phones equipped with tailored Nokia near field communication (NFC) shell covers, which identify the user through radio frequency communication directly between the handset and the payment terminal, to gain access to a local bus network in Hanau, a city near Frankfurt am Main. These systems do require significant investment, as the hardware needs to be built into all the entry gates of the transport system.

Other transportation systems do not require the user to show a ticket at the entrance, rather tickets are checked by random inspection. For these systems, mobile network-based solutions are most suitable. The customer can buy his ticket over the mobile phone interface on his way into the transportation system and the electronic ticket is delivered directly to his mobile phone, ready to be shown at a potential inspection. This solution provides a cost advantage as the solution is integrated centrally in the mobile network, with no need for additional hardware at the station.

In the retail sector, initial applications were geared towards vending machines, but this sector has seen slower growth.

Payments at vending machines were one of the first solutions developed for m-payments, but the rollout in most countries has stagnated. Most operators that have introduced this service are still in a trial phase and have only equipped a few machines with the hardware for mobile payments. Still we believe that the technology brings many advantages to customers, as well as for retail companies and believe that the use of this kind of application will increase. The customer benefits from not having to have the right amount of small change available. For the retailer, it is a way of to differentiate his products from other vending machines, shops and kiosks. The retailer can also save money in collection costs, and automatically receive sales reports and notification if the machine needs service or refill. In addition, from 2007, cigarettes may be sold in the EU only after checking that the buyer is of a certain minimum age. The m-payment solution could also confirm the age of the customer prior to confirming the sale.

1.3 Macro payments are currently focused on event ticketing; in some countries, m-payments are being actively marketed to corporate customers.

The use of m-payments for event ticketing will increase, providing cost savings for organisers and allow for additional revenues through cross marketing.

Event ticketing is another interesting opportunity for m-payment providers. In this case, the provider buys a contingent of tickets or accesses the central ticket system directly for a certain event such as a concert, party, festival, sports event, etc. The provider of the m-ticketing solution is able to position his company on the event's promotional material without having to pay the high commission normally connected with a sponsorship agreement with the largest stars, such as Robbie Williams and David Beckham. Revenues from cross selling can also be leveraged, where m-tickets for concerts can be followed up by a mobile campaign with an offer for a CD, DVD or even a direct MP3-download. Some operators actively developing this segment report a purchase rate of as high as 15 percent for these campaigns.

Business services will have a major impact on the m-commerce market with ERP-integrated services for employees' payments for taxi, gas, tickets, etc.

M-payment provider's initial focus was on the residential segment. In those countries where this segment is already covered, some operators are beginning to market to the corporate segment and have started to provide mobile business services with integrated m-payment solutions. One example is the business paybox launched by paybox in Austria. The solution integrates with the corporation's own ERP system and allows the company to manage the payment profiles of its employees directly via a web interface on the Internet. The employees are categorised in groups and the company can define which groups are allowed to use m-payments for parking, taxi rides, etc. Customers of this service report cost savings of more than 30 percent for the products included in the business paybox due to more transparent accounting and a process that is easier to manage.

Growth in retail Point of Sale (POS) mobile transactions as a replacement for cash will be slower than anticipated.

Paying with mobile phones in traditional stores brings only limited additional value for the customer. Given that debit or credit cards are already established payment methods, m-payments will see a slower growth in this segment. M-payment operators have focused on niches in this segment where credit card terminals are not available, such as in the taxi industry.

In Norway, the debit card is accepted at almost any kiosk and the incumbent mobile operator Telenor has withdrawn the m-payment ability at acceptance partners with traditional POS because the m-payment service could not compete with the debit card in terms of speed and acceptance among customers. In the USA, however, credit card companies are experimenting with adding their RFID solutions to mobile phones. Once POS-terminals are m-enabled, it may prove to be an attractive m-payment market. The value for the retailer here is a faster throughput of customers and lower cash handling costs.

1.4 M-payment technology is currently focused on SMS with a growing interest in RFID.

In some Asian markets and in the US, Radio Frequency Identification Device (RFID) and infra red technologies will increase in importance.

NTT DoCoMo, the world's largest wireless telecom operator, is far ahead of the game with its contactless mobile wallet edy, a combination of i-mode and FeliCa, using RFID technology. DoCoMo is moving to a post-i-mode business model based on FeliCa. The combination of i-mode and FeliCa enables the user to shop with his mobile phone or to use it as a membership card.

In Europe, where more providers are participating in the entire m-commerce value chain, most payments are made via SMS. One significant advantage is that the provider can create a payment solution that is very robust and works on all handsets. This also enables the mobile operator to control the customer and leverages the advantage of m-commerce as independent in time and space.

PayPass™ is a contactless payment program using RFID technology from MasterCard that provides consumers with a simpler way to pay in addition to using the traditional credit card. Using *PayPass*, consumers simply tap their payment card or mobile phone on a specially equipped merchant terminal, eliminating the need to reach for cash and coins, hand their card to a clerk or swipe the card through a reader manually. The new solution is ideal for quick payment environments where speed is essential, such as fast food restaurants, gas stations, drug stores, movie theatres, and sports arenas. In August 2005, Citibank started offering *PayPass* to its customers in New York.
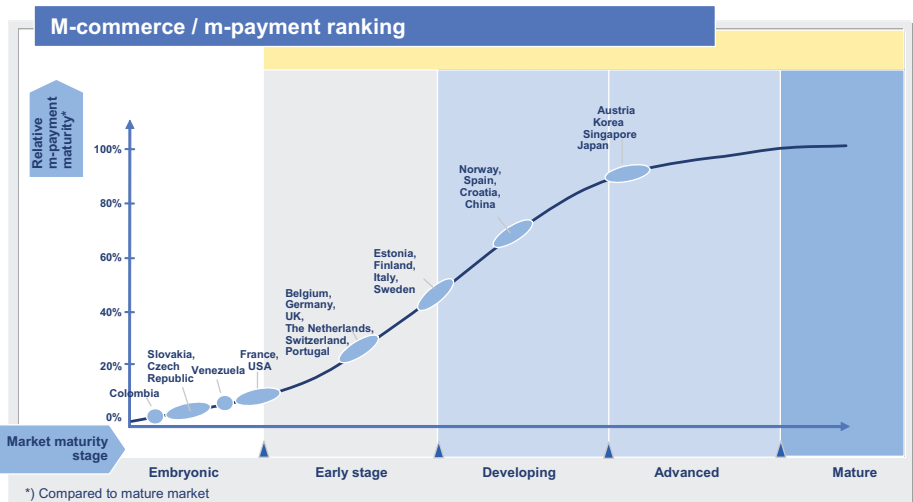
Part 2 Global Ranking and Country Overview

In the global ranking, Austria, Korea and Singapore have maintained their leading positions as the most advanced m-commerce markets; Japan has advanced to join this group due to its strong focus on m-payments.

Our ranking of the m-payment sector in each country is based on several parameters: the breadth of m-commerce services offered, how well the services are integrated among all the participants of the value chain, and to what extent the market players have solid and clear strategies for mcommerce.

This year, we rank Austria in Europe and Korea, Singapore and Japan in Asia as the most advanced m-payment markets (see Exhibit 2). In Austria, there is the broadest offer of m-commerce services available to the users with some m-commerce providers participating across the entire value chain from payments to providing the paid services to the customer. M-payment providers in Asia are successfully focussing on the payment part of the value chain with the authentication of the payer and the transfer of funds. All countries that are considered advanced m-payment markets are characterised as having at least one mobile operator partnering with other participants within the dominant platform.

Exhibit 2: Austria, Korea, Singapore and Japan remain ahead of the curve in terms of m-payment market development.

Source: Arthur D. Little analysis

Many of the Latin American countries that participated in the study are still at the lower end of the scale in terms of m-payment development. However, in Venezuela, mobile-based products are currently being developed for low income residents who do not have bank accounts.

In the Czech Republic and Slovakia, there are no new real m-payment applications currently in the market. M-payments for beverages at vending machines or for car washes at petrol stations were discontinued in 2004 and no similar applications have re-appeared during the last year. This year, we have improved the ranking of France and USA, due to the launch of some smaller m-payment projects, mainly related to m-parking.

Austria

paybox beginning to market m-payment solutions for corporate customers

As one of the most advanced m-payment markets, Austria has the broadest m-commerce offering of any market; it is possible to pay with the mobile phone for almost any kind of consumer product. As shown in Exhibit 3, Austrian consumers can spend an entire day without carrying cash, credit or debit cards.

Exhibit 3: In Austria, consumers can spend an entire day without carrying cash, credit or debit cards.

Buys the tramway ticket on his way to the station and avoids the queues in front of the ticket machines

On the way to the office gets invitation to friends in Berlin and buys train ticket Vienna- Berlin on mobile phone

The client meeting is running well and lasts longer than planned, the parking ticket is extended without having to go back to the car

Orders pizza to the entire office for lunch and pays the whole bill via mobile. Colleagues pay their part of the bill phone to phone.

Is late for next client meeting and decides to take the taxi. The trip is paid via mobile phone.

It is time for a coffee, in Vienna there are several m-payment coffee shops

In the evening informs himself about the offer in cinema and theatre. Decides for theatre and buys ticket over mobile phone.

Gets a pack of cigarettes from the vending machine just outside the tramway station

Visits a client together with a colleague by car and pays the parking fee with mobile phone

On the way back fills up the car at the petrol station. Buys a coke from an m-payment vending machine on the way back to the office. Everything paid for by phone.

During the lunch delivers a Lotto tip and orders tickets for the Britney Spears concert next week, tickets are insured: money back in case of illness

On the way back decides to buy some wine as a gift to his friend in Berlin. The wine is paid by mobile and will be delivered to the office

Next client meeting in an m-payment enabled restaurant.

Right after the theatre, receives a call from his daughter. She wants to be picked up after having visited a friend. Money for taxi is transferred via mobile phone directly to the daughters phone

Arthur D. Little analysis

Currently more than 1,500 vending machines in Austria are m-payment enabled. This solution is advantageous as, especially for cigarette vending machines, the customers' transactions are characterised as high frequency larger micro payments. The solution can also check the age of the customer prior to confirming the sale of cigarettes, in accord with a European Union regulation expected to come into effect in 2007.

paybox, the m-payment offering of the mobile operators, mobilkom and „ONE", is open to corporate, pre-paid and other operators' customers. Corporate companies are now also being targeted with the business paybox. Business paybox can be connected to a company's ERP system and m-payment transactions initiated by the employees are automatically booked in the company's legal accounting system. Customers of this service report cost savings of more than 30 percent for the products included in the business paybox due to more transparent and manageable accounting process.

While mobilkom austria has claimed from the beginning that paybox is the ideal standard for nation-wide m-payments in Austria, other operators were not so enthusiastic about promoting their competitor's platform. The other four Austrian operators T-Mobile, „ONE", tele.ring and H3G set up their own standard, MIA, and began to acquire merchants. MIA, however, only supports charges made to the customer's mobile bill, and thus is not accessible to pre-paid subscribers or to corporate customers without authorisation of the company that pays the bill. MIA is also growing much more slowly than paybox in terms of number of merchants offering the solution.

In October 2005, the most active mobile operator within MIA and the 3rd mobile operator entrant, „ONE", announced that they had acquired a sixth of paybox shares. This means that immediately after approval by authorities, the two companies will start connecting their transaction interfaces. In the second quarter of 2006, we can expect to see the first combined m-commerce offerings from the three companies: mobilkom, „ONE" and paybox.

One of the major strategic challenges to overcome, critical for ensuring widespread access to m-payment, is to create open standards, not specific to any operator or payment scheme, and ensure interoperability across platforms and services. Without an m-payment standard, companies will not invest into m-payment platforms because they will not be able to reach a broad enough market to make it viable. In Austria, they have achieved a major milestone in the right direction. With „ONE" participating in paybox, merchants with a paybox interface are automatically able to serve the customers of „ONE". In addition, merchants acquired by „ONE" and connected with MIA will be able to serve the customers of paybox and mobilkom. We expect this development to further boost the usage and uptake of m-payment services in the POS segment.

Belgium

Banksys developing m-payment solution for small merchants without POS

As we reported in last year's study, Banksys, the inter-bank payment service provider, was given a mandate by the banks to develop m-payment activities and had developed an m-payment platform for prepaid recharging called Banxafe. Currently, two mobile operators have joined this platform and we expect the third operator will eventually join as well.

Building on the success of their prepaid reloading solution, Banksys is now planning to enter the POS market with a so-called MPOS solution for face to face (F2F) mobile payments. A merchant can initiate a transaction within the MPOS service by sending the customer's GSM number and the amount of the transaction to the application server. The server then sends an SMS to the customer to confirm the transaction. The solution has a high level of security as the user confirms the transaction with a PIN that is directly checked in the SIM card security banking application. The security chip produces a cryptogram based on the PIN that is then sent to the server.

Banksys' focus in marketing its MPOS m-payment solution will be the 160,000 smaller merchants in Belgium without a POS terminal, such as medical offices, self-employed businessmen (such as lawyers, architects, engineers, plumbers, electricians and gardeners), and smaller traditional merchants.

As this solution requires a new SIM card, it will take some time before a large portion of mobile phone users will be able to use the service; it takes on average 4-5 years to replace 90 percent of all SIM cards based the current SIM card life cycle duration. The first operator started offering m-payments 2.5 years ago and we estimate that 40-50 percent of its user base now owns m-payment-enabled SIM cards. We expect that 50 percent of the total Belgian population will be able to make m-payments by 2008-2009, possibly even earlier. As the m-payment-enabled SIM cards are significantly more expensive than normal SIM cards, we do not expect mobile operators to take any action, such as providing the new SIM cards free of charge, to speed up the shift.

For m-payments, Banksys has maintained the connectivity provider business model already in place for digital content services such as ring tones, logos, etc. When a payment is made, the merchant receives the entire price of the transaction directly into his bank account and the customer is credited for the same amount. The mobile operator invoices the merchant and the customer directly for the costs of the transaction (including transport and commissions); the charge will appear on the customer's telephone bill/pre-paid account. The mobile operator then pays a fee to Banksys for its operational role.

China

M-payments making up for low penetration of credit cards

There are more than 300 million mobile phones in China, but only a small number of credit cards in circulation. Now a handful of companies are out to profit from the difference by letting people pay their bills by mobile phone. During the past year, China's two cellular-service giants, China Mobile Communications Corp. and China Unicom Group and a few start-ups have been developing systems that link consumers' mobile phones to their bank accounts. Cash is king in China, and these companies see a lucrative opportunity in the nation's rudimentary payments system and its population of 1.3 billion.

SmartPay, with 175 employees in 8 offices, allows Chinese mobile phone users to pay for goods and services through their mobile phone. The company has partnerships with seven banks, including two of the country's largest state-owned institutions, China Construction Bank and Agricultural Bank of China. It offers services in five provinces, with plans to add one additional province per month. At the end of 2004, SmartPay had 100,000 registered users. SmartPay gets customers and marketing from China Mobile and China Unicom in exchange for a share of revenue.

The simplest application for this service is payment or top-up of phone bills and has been launched in several parts of the market. Shanghai Unicom customers can also pay for long distance VoIP minutes, ISP access, online time, ticketing services and other products with their mobile phone.

China Unicom, the second largest Chinese mobile operator, has announced its own non-cash payment systems. The operator has a partnership with China Merchants Bank Co., allowing customers to check their balances, pay phone and utility bills and purchase goods.

Croatia

Expanding retailer base and improving services

As one of the most advanced m-payments markets in Central and Eastern Europe, m-payment providers in Croatia are focusing on enlarging the retailer base and the upgrading personal banking applications.

T-mobile has extended their M-pay service by allowing the customers to automatically top-up mobile prepaid credits (their own or friends) using USSD technology. One of the solution's new features is that customers are now able to view the current status of bank accounts and credit cards which are registered with the M-pay service, enabling users to pull the information themselves, contrary to the push information that they can usually get from each of the institutions separately. With M-pay, users can now also pay most of their utilities bills, TV subscription, and landline and mobile telephone bills.

One of the world's most innovative m-payment applications, SMS parking, has been now extended to 23 cities in Croatia. Croatia was one of the first markets worldwide to launch m-parking and here it was the municipalities themselves that drove the development and took the initiative to co-operate with mobile operators. M-parking market share vary from 25 percent of parking turnover in Zadar to 75 percent in Dubrovnik.

Estonia

M-parking and m-ticketing enjoying success

Several successful mobile commerce projects have been launched in Estonia, as Estonia is often used as a test-bed for mobile services by some leading mobile infrastructure providers. Mobile parking was launched by the mobile operator EMT in June 2000, and is generally considered to be the most widespread, and the most successful mobile value-added service in Estonia. In 2001, the service was a nominee for the most innovative GSM wireless service for customers at the GSM Association conference in Cannes. Currently more than 50 percent of parking revenue is paid via mobile phone in Tartu, the second largest city of Estonia.

Transportation ticketing has been introduced in larger cities. To buy a one hour ticket in the capital Tallinn, a commuter sends an SMS to a short number and receives an SMS with the ticket. The ticket has a serial number and expiration time. The cost of the ticket is charged to consumer's monthly phone bill. The controller verifies the ticket by typing the serial number into his mobile phone. In Tartu, the commuter can buy various period tickets (1-hour, 1-day, 30-days) by calling a telephone number. The cost is also charged to the mobile bill and the ticket delivered as an SMS.

Finland

Banks driving the development of m-payments

Over the last year, TeliaSonera has scaled down its m-commerce commitment by closing its Shopper-service and POS-applications, due to concerns that the financial regulator would not allow mobile operators to handle third party payments for non-telecom related services and products and the F2F user interface. Due to banks' commitment to m-payments in Finland, we predict that banks will take a stronger role in the development of a common platform.

Last year, the two banks Nordea and Sampo and the mobile operator Radiolinja launched a new m-payment service Mobiiliraha (mobile money) in Finland. The solution is based on stored value accounts that can be recharged through Internet Banking. The solution is similar to Spain's Mobipay in terms of customer experience, but with a different business model. The customer signs a contract with one bank; the merchant signs a contract with one bank and one broker. The bank is the only party who can charge the customer and has the detailed information about customer usage. The broker charges the merchant; the merchant pays the broker for getting access to the platform or, if large enough, connects directly to the platform. Mobile operators that are not also brokers only get revenue from traffic. This is an open platform encouraging competition between brokers and banks. However, as of September 2005, the solution had only attracted ten acceptance partners, mainly Internet shops.

Germany

Crandy expanding services and user base

In mid 2003, the NCS mobile payment Bank GmbH was established with the objective to further develop and launch Crandy, a system for the registration and processing of payments using a mobile telephone. By October 2004, Crandy had 200,000 registered users. The company has been granted an e-bank licence from the Federal Institute for Financial Services Supervision in Germany and, as an independent mobile payment provider in Germany, can process non-telecom-related services over the mobile telephone. The company is currently negotiating the global distribution of Crandy with international investors.

Crandy's current service offering includes money transfer to another Crandy user, prepaid top-up, payments on vending machines, purchase of mobile phone styling services, etc. The solution is based on a prepaid Crandy account that can be used for mobile payments. To top-up a Crandy account, the user has to call a premium number and pay a service fee. The service fee varies from 1.5 to 6 percent of the top-up value when calling from the fixed network and up to 33 percent when calling from the mobile network.

Teltix' public transportation ticketing solution, Händyticket (cell phone ticket), has now been launched in the German municipalities of Osnabrück, Bonn, Hamburg, Hürth and Cologne. The system is very flexible and tickets can be ordered using either SMS, phone call, WAP or Java. The solution mainly targets the segment of people travelling occasionally; 45 percent of its users buy the service 1-3 times per month, 30 percent of its users buy tickets 1-4 times per week. However, industry sources claim that Teltix is financially strained and a take-over may be expected soon.

The German association of public transportation „Verband Deutscher Verkehrsbetriebe" is developing an e- and m-ticket solution to cover all transportation tickets in Germany. This development has been under development since 2003 and has still not led to any commercial projects. Some public transportation companies are now leaving this co-operation to launch their own solutions. We expect that the market will need the support from the mobile operators before we will see any significant development in German m-payment solutions.

Hungary

M-parking and m-wallet services launched

In Hungary, the m-parking service is also the most popular m-payment application. In Budapest and a couple of rural cities, users can sign up for the iparking service. In 2003, this system won the European Parking Association's (EPA) award for the best street parking project. The award was won by the Hungarian developers i-Cell Ltd. against competitors from 19 countries.

T-Mobile has also launched an m-wallet service called M-com where subscribers can pay for parking, cinema tickets, lottery, etc. The m-wallet can be topped up with participating banks, OTP Bank, K&H Bank, Takarékbank and Volksbank, and the ATMs of Euronet, as well as with CIB Internet Bank, CIB WAP Bank and in T-Mobile's shops. T-Mobile customers holding a T-Mobile credit card can also charge their M-com balance with their mobile phones.

There is also a trial being set up in Hungary using the SEMOPS service. SEMOPS is primarily a payment service; however, mobile banking may soon be introduced using the same technology. The payment solution is similar to a normal wire transfer with the addition of a real time messaging architecture, which provides real time authorization, similar to the card concept, even in case of inter-bank transactions. The actual settlement of the payment takes place in the usual inter-bank clearing cycle.

Italy

Credit card and transaction companies dominate m-payments

In Italy, specialised transaction companies dominate the m-payment market and mobile operators are participating only by delivering SMS and phone calls for the services.

Ninety-one percent of Italian mobile users are prepaid. As the users have to pay the distribution cost for recharging their accounts, they are not interested in having larger m-payment transactions charged directly to their prepaid phone accounts. Instead, credit card companies have entered the arena and offer merchants the opportunity to m-enable their credit card terminals. CartaSi has achieved the greatest impact, accounting for 75 percent of all credit card transactions in Italy. M-payment offerings from mobile operators in Italy were largely unsuccessful, mainly because Italian consumers missed a trusted brand. CartaSi leverages its trusted brand to encourage their customers also to use its m-payments products. The goal is to have a third of its customer base using m-payments products once a complete service portfolio has been built out in two to three years.

One of the latest products launched by CartaSi is a ski pass solution for Madonna Di Campiglio in the Dolomites. To use the service, the customer needs to register to the m-payment system once and to have an RFID ski pass. The user sends an SMS with the ID code of his ski pass to the server and can immediately enter the gates at the skiing resort. The service was launched in July and already had 12,000 subscriptions after one summer month.

Mobilmat is another company in Italy that is focussing on m-payments. One example from its service portfolio is the m-ticketing service for public transportation. To use the service, a customer needs to buy a series of electronic tickets in advance as transaction costs would be too high if based on a one-by-one issuance. The financial regulator in Italy does not allow m-payment providers to offer its customers a credit service. The prepaid tickets are added to the user's electronic account and ready to be ordered by the user. Each time a ticket is needed, the user calls the server and the server sends a valid ticket via SMS in return.

Japan

DoCoMo driving strong growth on market

In response to a mobile voice market that was quickly becoming saturated, NTT DoCoMo has moved into m-payments as both an application and business platform provider. In May 2003, NTT DoCoMo launched DoCommerce, which enables users to buy items through the i-mode web-site and pay for them using their credit cards. In 2004, wireless purchases of books and music had increased by 85 percent from previous year to USD 3 million. Sales of clothing and accessories accelerated 79 percent, accounting for USD 1.3 million in revenue.

Proximity payments to POS terminals are also supported by DoCommerce. NTT DoCoMo's strategy focuses on keeping a strong relationship with its customers; while DoCoMo has formed partnerships in launching its m-payments solution, in most cases, it manages the direct customer relationship itself.

In the role of business platform provider, DoCoMo established "FeliCa Networks", a 40/60 joint company with Sony. The solution is open to other mobile carriers, credit card companies and banks in Japan. The objective is to tap what NTT estimates is a USD 258 billion market for micro payments. These are transactions of USD 30 or less made at convenience stores, super-markets, fast food restaurants, etc.

The FeliCa business platform also provides the merchant with customer man-agement. The platform provides user certification, security-related services, and hosting service. Some companies have managed to start their own new payment services supported by the FeliCa platform.

A lack of acceptance partners and places for subscribers to tap their phones has limited the take-up of contactless payments in Japan. In June 2005, East Japan Railway Company, NTT DoCoMo and NTT Data Corporation announced that they have agreed to jointly promote the usage of DoCoMo's mobile phones equipped with contactless payment cards. The service is expected to be launched in the beginning of 2006 and is expected to increase the number of acceptance points.

Korea

M-payment use widespread

Two consortia are offering m-payments solutions in Korea: Moneta is owned by SK Telecom and the other consortium comprises KTF and LG Telecom. In Korea, the payment function is now integrated in most new phones released on the market which leads to a continuously increasing share of users who are capable of using m-payments. The Korean users are getting increasingly com-fortable with m-payments, and now use m-payments on a more regular basis to pay for web-purchases, public transportation and restaurant meals. The most popular service, however, is m-ticketing for public transportation that has also been successfully introduced in other Asian countries.

With the increasing uptake, however, fraud has become a larger problem. There have been reports that hackers have been able to take control over m-payment services and the operators are continuously working on making their platforms more robust against fraud.

Lithuania

A variety of m-payment services available

With more than 100 percent mobile penetration, more than 80 percent of businesses using mobile services and a continuously increasing mobile data usage, the overall environment for m-commerce in Lithuania is favourable. In addition to entertainment and information services, the Lithuanian m-commerce offer already covers m-payments for parking, vending machines and ticketing, and all major banks in Lithuania offer SMS or WAP based m-banking.

M-parking was launched in March 2002, making Lithuania the 7th market in the world to launch the service. M-parking is growing by more than 50 percent on a monthly basis and currently about 7 percent of total parking revenue is collected via m-payments.

The Netherlands

Lack of cooperation between banks and mobile operators hindering market

In 2004, four large banks in the Netherlands announced a new standard for secure and fast Internet payments: iDEAL. Although this new standard is initially focussed on payments over the Internet, it could be extended to include mobile payments in the future. iDEAL is a replacement for the standards that were developed by individual banks and has been launched at the end of 2005. It enables customers to issue payment orders directly from their own bank account fully integrated with their familiar electronic ('home') banking environment. The orders are processed directly and the level of security is the same as for electronic banking.

Although technically a viable option, further development of the iDEAL standard towards mobile payments is uncertain due to an unclear division of roles between banks and mobile operators. Both banks and operators are fighting to maintain direct client contact and customer ownership, especially for smaller payments such as a mobile wallet function. According to major telecommunication operators, no large scale deployment of mobile payments is to be expected in the coming years.

Despite the lack of a standard for mobile payments, many successful pilot projects have been launched mainly based on SMS ticketing. Examples include railway tickets and the Efteling, a large amusement park that offers SMS tickets to its entrance gate since 2003. The main advantage for the customer is the convenience of not having to stand in line to get into the park.

Norway

A fragmented market with several niche players

The Norwegian m-commerce market is fragmented with several players focussing on specific niches of the market. Telenor, the incumbent mobile operator has an e-money concession through its subsidiary SmartCash and is focussing on top-up of prepaid accounts, betting and ticketing. Contopronto with LUUP is offering pure m-payment services and is developing its network of acceptance partners. Easypark offers its m-parking solutions in nine Norwegian cities.

Telenor's m-commerce strategy is focusing on three areas: pre-paid top-up of accounts, betting and mobile ticketing. Previously, Telenor believed that the broader the spectrum of m-payment acceptance partners, the higher the interest among customers. Telenor has learned that, especially for POS-payments, it is very difficult to compete with credit and debit cards, which are extremely popular in Norway. In Norway, VISA debit cards, for example, are accepted at almost any coffee shop or kiosk. M-payment is often too slow to compete with debit cards at attended POS acceptance outlets. As most Norwegians are using their VISA card as a debit card, the commission that the merchant has to pay is much less than for transactions via credit cards.

The primary focus of Telenor's m-commerce strategy is the top-up of prepaid accounts. M-payments have exceeded 10 percent market share on prepaid to-ups for Telenor. As this method of payment implies major savings in commission, card production and logistic costs, the company is actively pushing to increase this share.

In the area of betting, the only current player is the government-owned betting company Norsk Rikstoto, since the Norwegian government has withdrawn the betting licenses for other Telenor partners. Telenor's m-commerce service enables the customers to bet on specific horses in each race and is growing strongly in popularity.

The third focus area for Telenor is mobile ticketing. Telenor has an interesting product offering its customers the possibility to buy their flight tickets with the airline Norwegian Air Shuttle directly via their mobile phones. Ticketing services for public transportation in larger cities is being tested; however, commercial implementation is not expected before 2007 or 2009, as potential partners are waiting for a fully-functioning RFID solution. In addition, Telenor is offering m-payments for a range of Internet shops.

The m-payment provider Contopronto has re-branded its solution to LUUP and managed to attract a range of new acceptance partners. While most partners are Internet stores, other acceptance partners include pizzerias, gas stations, flower shops and night clubs.

Easypark is a Norwegian company that aspires to be the m-commerce enabler for consumers who frequently use their car. The company, which was established in August 1998, has developed a commercial solution for parking payments. With this solution, the customer can activate- and de-activate parking by using his cell phone, while the parking attendants are equipped with mobile terminals to control the status of the parking. The solution is developed in close co-operation with the largest Norwegian public parking companies and the largest private operator EuroPark. Easypark has now entered into its commercial phase, and is operational in Oslo, Bergen, Trondheim, Stavanger, Asker, Bærum, Drammen, Tønsberg and Horten.

Portugal

M-payment solutions under development

In Portugal, the development of m-payments has been hindered by the Multibanco payment system, a widespread system of debit cards, ATM's, POS's and Internet payments. Multibanco has been present in the mobile domain for some time through the Telemultibanco service, which enables consumers to pay for services in addition to performing basic banking transactions.

Over the past year, there have been new developments in the m-payment sector, as the three national mobile operators have all introduced a Mobile POS service, basically targeting outdoor commercial activities where wired terminals are not a realistic option.

Last year, Caixa Geral de Depósitos, one the largest Portuguese banks, initiated a testing phase for a new m-payment service called CaixaMóvel. The service enables a mobile phone to replace cash in small commerce transactions up to a daily predefined amount. In order to operate the service, the consumer sends an SMS with the code of the commercial establishment where he is buying the goods or services. In return, he obtains a payment code associated with his current account. For the moment, due to its embryonic stage, the service is only available for a very limited number of applications, including m-parking in one municipality and shopping and payment for services in two universities.

The recent launch of a new payment operator, Netpay, is expected to bring new developments in the market.

Singapore

Lack of cooperation among consortia hindering further development

In last year's study, Singapore presented a good example of a government supporting the development of m-payments. The Infocomm Development Authority of Singapore and its partners built infrastructure and systems, and a number of consortia launched m-payment services on this platform with comprehensive alliances with banks, handset vendors, middle ware developers and retailers. However, the services of the different consortia are developing in parallel with little standardisation, which means that if a customer wants to buy a cinema ticket, for example, he or she can only visit the cinema chain belonging to the payment consortium with which he or she is registered. The payment provider YW8 is cooperating with Eng Wah Cinemas, while the provider Blink works with Cathay Cinemas.

In Singapore, market development and growth would be boosted by more cooperation among the various platforms leading to more open solutions that can be used on a wider scale.

Spain

Banks and mobile operators working together

Spain is a good example of a market in which, after a strong push by the regulators, banks and mobile operators have worked together to launch an m-payment solution to the benefit of both the players and the market as a whole. Since last year, the operator has extended its acceptance partner base beyond the trials in Valladolid and now counts 7,500 acceptance partners and 250,000 registered users. The most common services offered over m-payments are payments in taxis (with 5,000 points of sale), vending machines (500 POS), and m-parking (100 POS). mobipay payments are also possible at 3,000 Internet shops.

We expect the potential of the Spanish market to be much higher given that mobipay has been holding back its major rollout due to the fact that Simpay delayed its market entry. Now that mobipay does not have to wait for Simpay, we expect to see more aggressive marketing for the service and a corresponding take up in users and acceptance places. We see further potential in international expansion as mobipay has started trials in Mexico, Peru and Chile. In these countries, mobipay is more likely to actively compete with local banks.

Sweden

Expanding services in m-betting and m-parking

While the breadth of m-commerce services in Sweden has not changed dramatically over the last year, there have been developments in terms of m-betting and m-parking. The lottery incumbent Svenska Spel is offering sports betting via the mobile phone and P-Mint is offering m-parking. The m-parking service has experienced a take-up and is now offered in cities throughout the country. According to P-Mint, m-parking currently accounts for 10 percent of total parking revenues in the capital, Stockholm.

At the beginning of 2005, P-Mint, which provides m-parking services in Sweden, Finland, United Kingdom, The Netherlands, Canada and the USA, announced that it will merge with EasyPark, which has introduced m-parking in Norway and Denmark.

United Kingdom

Bango and m-parking and m-ticketing solutions boosting market

The m-payment sector has experienced much excitement in the last year in the UK, with a high profile flotation of a leading solution provider completed in June 2005, and ongoing major contract awards to technology providers tasked with expanding London's new e-money platforms in the transport sector.

The m-commerce solution provider Bango floated on the AIM stock market in June 2005, valuing the firm at £35m and raising £11m to further international expansion. As of October 2005, shares in the company are trading 65 percent above the placement price. Bango provides m-payment services to all mobile subscribers and managed solutions for content providers, and its technology supports direct billing and single click m-payment regardless of the user's parent network provider (in the UK).

Leading e-commerce portals in the UK have expanded their mobile offerings, notably eBay (UK), which launched „eBay Anywhere" at the end of 2004, offering transaction tracking and bidding from mobile devices (using premium SMS / WAP solutions provided by Volantis, a VC-financed content adaptation solution provider based in the UK). eBay also offers similar services in the USA and Germany, using different back-end systems.

In the last two years, there has been a massive expansion of electronic payment systems in the UK's capital, with Transport for London (TfL) launching two high profile schemes. The first scheme is an RFID stored value system for public transport, known as "Oyster". This system has more than 2 million cards in circulation and more than 1 million transactions daily. Though presently a non-mobile, transport only scheme, the system is now being expanded to deliver both e-Money services (redeemable credit for general purchases with other retailers) and governmental services. Proposals for e-Money implementation have already been submitted by several consortia including Ericsson, PayPal, Hutchinson UK (3), and full trials are due to commence in 2006.

The second scheme is the widely publicised "congestion charging scheme", already implemented in central London, and due for extension to West London in 2007. M-payment has been available from launch, via SMS if credit card details are already registered. Typically there are over 200,000 vehicle movements through the zone per day, and 170,000 registered SMS payees. London is the first major capital city to implement such a system.

There are other trials ongoing in the United Kingdom using RFID-solutions for ticketing and parking. Increasingly such trials include mobile interfaces, using SMS or third party m-payment aggregators. The company, Parkmobile, has introduced an m-parking service in which an RFID transponder card serves as a paperless ticket for on street parking. After parking his or her car, the driver can activate their transponder card and virtual parking meter with a single phone call to Parkmobile's interactive voice response system. The cash free parking transaction is terminated in the same way, and does not require a pay & display machine at any point. Parkmobile reports that by implementing the Parkmobile system, a 20 percent increase in parking income can be achieved. Such RFID trials look set to increase after OFCOM published draft regulations exempting RFID from wireless telegraphy licensing in August 2005.

USA

Credit card and transaction companies driving the market

In October 2004, Motorola announced that it would conduct a field trial of mobile phones enabled with MasterCard *PayPass* and Near Field Communications (NFC) technology. NFC technology enables the device to run multiple proximity applications as well as payment. In the future, these may include applications such as contactless ticketing for mass transit or events. In addition, the phone can function as a contactless reader, paving the way for a variety of marketing and promotional applications. Applications can be loaded into the secure area of the phone over the air, offering potential operational savings to card issuing financial institutions, as well as revenue opportunities to wireless network operators.

A growing number of m-parking installations are in place in US cities including Seattle, Miami and Minneapolis. Consumers like the convenience and safety of not having to come back to the parking lot to feed the meter, especially at night. Additionally parking-lot operators can better manage costs.

At the University of Santa Barbara, an m-parking solution has been installed, whereby drivers pay the m-payment company, Verrus, 25 US cents for each transaction and any data fees applied by their cell phone carriers. The system has enabled the university to realise a 26 percent increase in parking revenue. In total, the investment totalled USD 1.2 million for more than 50 wireless-networked pay stations. The university is now saving USD 300,000 annually on staffing of three parking kiosks. There are also additional benefits: there are no more lines to pay for parking, and parking-lot operators gain flexibility. Lot owners can easily raise fees if, for example, there is a concert or sporting event taking place. Freed of the constraints of a coin system, they can charge more on a selective basis.

Venezuela

Enabling m-payments for customers without a bank account

Telefonica has acquired most of Bell South's operations in Latin America. In Venezuela, this has lead to aggressive marketing with much lower prices for handsets, increasing penetration to 40 percent. Prepaid top-up is offered as an m-commerce solution and m-banking is enabled for the users.

In Venezuela, a large share of the population does not have a bank account, and this has become the focus of several companies. It is too expensive to serve these individuals via the normal channels and companies are thinking of ways to capture this segment using a new cheaper system. One of the first products could be a virtual wallet, where people without a bank account would top-up their mobile wallets by depositing cash in a shop connected to a mobile operator. The customer can then use his mobile phone to make payments.

Other countries

In some *African* countries, such as *Mozambique* and *South Africa*, operators have launched an m-credit service to enable their customers to transfer airtime credit to other mobile accounts. In *Mozambique*, the objective of this service is to allow family members to provide credit to children. However, the volumes increased significantly and operators became concerned that minutes were being resold in this way. An investigation has determined that customers were using the service to transfer credit from larger cities to families in remote areas where banking services are non-existent. In addition, credit was often being transferred to the handsets of household employees, such as housekeepers, cooks, etc. and to tradesmen hired for small jobs. This is a very different model from in the Europe, where credit is non-transferable and non-redeemable.

The situation in the *Czech Republic* and *Slovakia* has not changed significantly since last year. Low margins on tickets and public transportation make m-payments unattractive to retailers. In the mid-term, it is likely that global mcommerce products by Orange will be introduced in the Slovakian market.

In *France*, Orange has been trialling m-parking on a smaller scale and m-payments at vending machines for ice cream together with Nestlé. French financial regulation is still very restrictive on mobile operators offering m-payments for services not related to telecommunications.

In *Saudi Arabia*, Etihad Etisalat (Mobily), the new mobile operator in Saudi Arabia, launched a new M-Pay based service in July, 2005 for electronic recharging of prepaid accounts together with Ultra's regional partner, Imovation. Under the agreement, Ultra will supply M-Pay Mobile POS Terminals in the first phase of the project for 2,000 points-of-sale.

The *Slovenian* mobile payment providers, the mobile operator Mobitel and Nova KBM bank, Slovenia's second largest bank, state that more than 3,500 points-of-sale have already been equipped with M-Pay, the Slovenia-based technology company. Ultra's patented mobile payment system which has been marketed since 2002, when it made its debut. Among the acceptance partners are Coca Cola vending machines and McDonald's restaurants. M-Pay is the first cashless instrument to be used at McDonald's worldwide.

M-Pay is also well established in *Serbia* with top-up points-of-sale at the largest computer chain store, gas stations, kiosks, etc. In 2004, Ultra signed a partnership with Telekom Srbija, the Serbian national telecommunications operator, to make M-Pay available to mobile users in Serbia. The company is currently further developing its infrastructure with 15,000 M-Pay POS terminals to the Serbian market enabling mobile users to make purchases, and an electronic top-up service for prepaid subscribers. There is also an m-parking services being launched that is already very popular.

Last year, Swisscom in *Switzerland* presented a trial for m-parking for in-house parking lots in Luzern. Since then, the trial has been extended to cover some outdoor street parking lots in Zurich. Additionally, Swisscom offers m-payments for about 30 vending machines mainly located in Zurich.

Conclusion

Lacking a broad pan-national standard for m-payments, market players need to cooperate on developing an open standard on the national level in order to broaden the potential user base and increase the viability of m-payments.

Over the past year, we have seen the launch and expansion of m-payment solutions in many markets. However, there is and will continue to be vast differences in the development of m-payments among individual markets. This year, we rank Austria in Europe and Korea, Singapore and Japan in Asia as the most advanced m-payment markets. On the other hand, several countries in Latin America are lagging behind in m-payment development.

One factor critical to the widespread development of m-payments is the creation of an open standard at the national level, not specific to any operator or payment scheme, ensuring interoperability across platforms and services. Without an m-payment standard, companies will be less likely to invest into m-payment platforms because they will not be able to reach a broad enough market to make it viable.

The last year has seen little development in a global m-payment standard, due to the large number of industry bodies working on standardisation with no uniform focus or approach. The dissolution of Simpay has also negatively affected the work toward standardization. Therefore, we believe that rather than a global standard, national solutions will be developed that are adapted to local needs and payment landscape.

A major hurdle to be overcome in the development of m-payments is the high degree of consumer satisfaction with traditional payment methods, such as cash, debit- and credit cards. On the supply side, mobile operators agree that basic m-payment services, in most cases, provide too small margins for the operators to make the business viable. The best strategy to address both these issues is to launch more value-added m-commerce services, which offer more convenience and flexibility for the customer and higher margins for the operator.

As we have seen in numerous countries, there continues to be a distinct first-mover advantage in the m-payment sector. In addition to being perceived as being innovative and dynamic, the driver of the m-payment market will be able to design a system that is advantageous to its market position and strengths. Many companies that have launched m-payment services in the last few years, such as DoCoMo in Japan and mobilkom in Austria, are now benefiting from their leading position. On the other hand, entering late into a dynamic and fast-growing market could leave a company with few remaining potential partners and only more expensive options for accessing m-payment platforms.

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