Arthur D Little

Platforms

Services

Partnerships

Dear Readers,

After years of attempts and proposed concepts, some players are still only talking about m-payments, while others are already successfully fulfilling a market demand by offering a variety of innovative services and applications.

Past m-payment market forecasts have been varied and usually overly optimistic. Arthur D. Little estimates that total world-wide m-payment transaction turn-over will rise from US$ 3.3 billion in 2003 to US$ 37.1 billion corresponding to a monthly ARPU of US$ 2.08 in 2008.

In most markets, mobile operators have been the first to see the immediate advantages in m-payments, e.g. churn reduction and increased revenues from traffic. Banks are still moving very cautiously into this dynamic business, given the large investments necessary for large-scale development, the lack of global standards and continuing uncertainty regarding uptake of the payment model. Emerging new payment companies have been faster to react to the specific m-payment market needs. However, these new players are challenged in creating a customer base fast enough to achieve profitability.

Through the course of our research, we conducted more than 100 interviews with industry experts from diverse industries, such as mobile operators, banks, credit card companies, payment service providers and suppliers, in 32 countries. We would like to sincerely thank all those who contributed to the Arthur D. Little Global M-Payment 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 provided by m-payments.

Yours sincerely,   Second Half 2004

Karim Taga   Johan Karlsson
Associate Director   Project Leader of the Arthur D. Little
Austrian Head of Telecommunications, Global M-Payment Report
IT, Media & Electronics Practice

Introduction

Arthur D. Little's objective in completing this global m-payment survey was to provide a framework to discuss industry dynamics, strategic and operational issues, and challenges and opportunities for the future.

For our purpose, 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.

For the customer, an m-payment transaction involves four steps: preparation, initiation, authentication and termination. In the first step, preparation, the consumer must download and install any necessary software and configure his mobile device; this is done only once before a customer makes his first m-payment transaction. Second, when the customer wants to make a purchase, the merchant sends the purchase request to the payment service provider (PSP), i.e. a mobile operator, credit card company or an independent PSP. The third step is authentication of the transaction by SIM (subscriber identification module) or PIN acceptance to the PSP. The final step is termination of transaction process, when the customer receives a receipt and is logged off.

Arthur D. Little set out to address four primary questions in the course of our survey:

- – What is the current state of the m-payment sector?

- – What are the current trends in the industry and what lessons have been learned from the last five years?

- – How will the market develop over the next five years?

- – What are the key challenges to be overcome, both industry-wide and by the various stakeholders, in order to be successful?

Part 1   The Current M-Payment Market

The development of the m-payment market has been hindered in the past by insufficient marketing, the lack of standardisation of payment systems and the failure of the various stakeholders to understand the importance of partnerships in delivering better end-to-end solutions.

Past m-payment market predictions, which estimated that the global m-payment market (in terms of total transaction volume) could be as much as US$ 15 billion in 2003, proved to be overly optimistic. In fact, global m-payment revenue in 2003 was only an estimated US$ 3.2 billion.

Why has the m-payment segment not seen the explosive growth many industry experts and analysts expected? Clearly, the difficult economic and financial climate since the year 2000 did not help, given the large investment necessary to develop an m-payment network. The industry was also hindered by insufficient marketing to clearly communicate added value to the customer, the lack of standardisation of payment systems and the failure of the various stakeholders to understand the importance of partnerships to deliver end-to-end solutions.

In this chapter, we will assess the current m-payment market by summarising the value chain, the various types of transactions, and how the sector has developed by region. Finally, we will look at the factors that have contributed to the successful launch of m-payments in some countries.

The m-payment value chain involves a complex array of players, such as mobile network operators, banks, credit card companies, independent payment service providers, platform and handset vendors, etc., which can each benefit from entering into the m-payment market.

Figure 1:   The M-Payment Value Chain
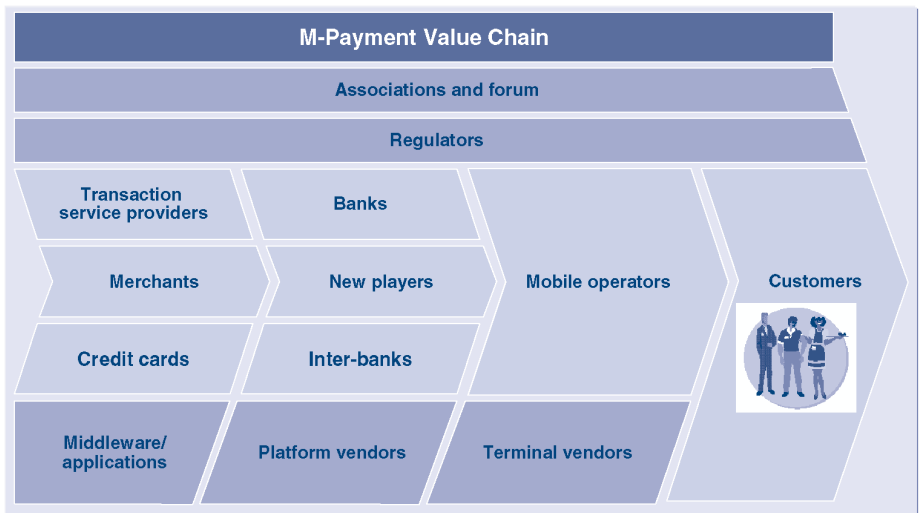
Source: Arthur D. Little analysis

Mobile operators are well positioned to benefit from m-payments; they have strong customer relationships, possess the necessary billing infrastructure and control the customer handset. As the voice market matures, mobile operators are moving into data services in order to increase margins and ARPU. An obvious first step into m-payments for the mobile operators is to offer top-up of pre-paid cards through m-payments, bypassing the need for producing and distributing scratch cards. Operators with more innovative m-payment services, such as m-parking and m-ticketing, achieve higher margins through additional service fees. Also the revenues from cross selling can be leveraged, where m-tickets for concerts can be followed up by an SMS offer for a CD or DVD. Some operators report a purchase rate of around 10 percent for these campaigns. The advantages of m-payments for mobile operators are more than just financial; in our survey, mobile operators saw differentiating themselves from the competition as a key benefit of m-payments.

Financial institutions and credit card companies have key relationships with merchants and customers, extensive experience in payments and risk management, and the necessary infrastructure. M-payments enable the banks to capture margins from transactions in which they would not otherwise be involved by accessing new customer segments such as the youth segment, which does not normally have a high usage of banking services. Many banks

were initially reluctant to move into m-payments, deterred by the initial investment and a fear of cannibalisation of their core business.

Merchants have the opportunity to increase their turnover by providing their customers with the m-payment option. They should also benefit from faster payment authorisation and potentially a lower level of fraud, compared to credit card payments, within a well-organised m-payment system.

Suppliers, such as platform and terminal vendors and handset manufacturers, operate the systems and develop the applications for m-payments, and can benefit from the increased revenue potential from the new and possibly lucrative m-payment market. The leading mobile handset supplier, Nokia, is even looking to take a more prominent role in the process, and has begun co-operation with banks, VISA and Mastercard to design a new m-wallet application.

Finally, *customers* of m-payments benefit from the convenience of m-payment solutions. The main differentiator for m-payments is that it provides greater flexibility in time and location of usage.

A majority of m-payments are now telecom- and mobile portal- based, such as top-ups of pre-paid cards, as well as Phone to Machine (P2M) and Face to Face (F2F).

There are five categories of transactions, based on payment channel used for the transaction:

- *Telecom and mobile portal* – transactions between the mobile or telecom operator and the customer, such as the already large market of handset customisation, such as ring tones, logos, wallpapers and games, and top-up of prepaid phone subscriptions. For example, a parent with a contract mobile subscription can use an m-payment solution to top-up his children's prepaid mobile subscriptions. The parent's mobile bill is charged the total amount and the mobile operator avoids further distribution costs. For these transactions, the mobile operator acts as payment service provider; if a merchant takes part, he can be paid between 40-85 percent, and the mobile operator retains the remainder of the revenue. In 2003, telecom and mobile portal-based transactions accounted for approximately 65 percent of total m-payment transaction revenue.

- *Phone to Machine (P2M)* – m-payments to vending machines, for purchases of a variety of goods, from soft drinks to train tickets. For example, a consumer wants to buy cigarettes out of a vending machine and sends an SMS with the code corresponding to the cigarette brand he wants to purchase. The m-payment system signals to the vending machine to hand over the cigarette package. In most countries there is a minimum age limit to

purchase tobacco; in this example, the m-payment solution can check the age of the customer prior to confirming the sale. In most P2M transactions, there is an independent service provider, which receives 3-7 percent of the transaction; the mobile operator gets 5-15 percent and the merchant receives 75-95 percent. P2M m-payment transactions equalled approximately 16 percent of total transaction revenue in 2003.
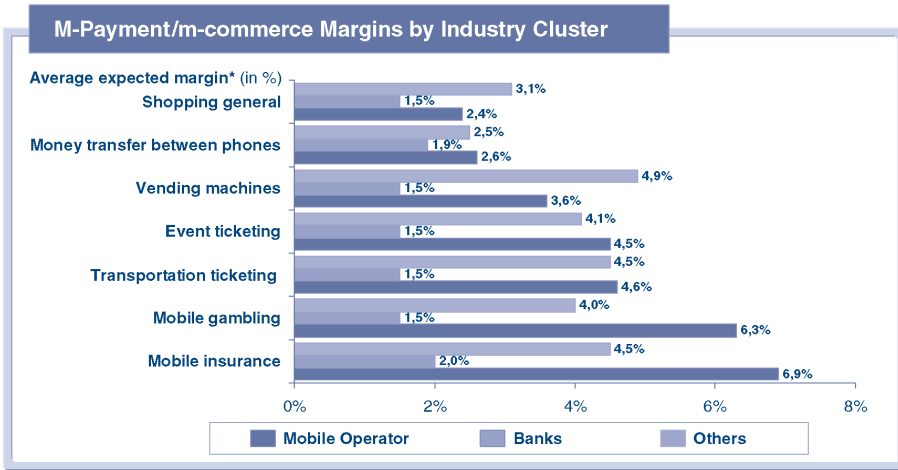
- *Face to Face (F2F)* – m-payments at point-of-sale (POS) in retail stores, gas stations and taxis. If the F2F transaction involves a credit card company as payment service provider, than the customer pays 100 percent plus possibly a traffic fee and a small transaction fee, the credit card company charges a normal margin of 2-7 percent and the merchant is paid 93-98 percent. The mobile operator receives SMS traffic fee or a minimal transaction fee. In 2003, F2F transactions accounted for an estimated 12 percent of total m-payment transaction revenue.

- *Online* – purchases over the fixed or mobile Internet. Examples include purchases of books, CDs, DVDs, event ticketing or response to mobile phone push advertising. M-parking, one of the most popular initial services to be launched, is also in this category. For example, the customer sends an SMS with the desired parking time to the m-payment server. The server replies instantly with a parking ticket; 10 minutes before the parking time expires, the m-payment server sends a reminder and the customer has the possibility to prolong his ticket without having to walk back to his car. In Online transactions, the mobile operator, as payment service provider, pays the merchant between 85-95 percent of the transaction total. Online transactions accounted for only an estimated 6 percent of total m-payment transaction revenue in 2003.

- *Phone to Phone (P2P)* – payments for purchases over auctioning platforms like eBay, payments where customers pay their share of a restaurant bill to their friend who then pays the restaurant, transmission of pocket or emergency money to children, etc. In these cases, the customer sends an SMS with the amount to transfer and the mobile phone number of the recipient. The m-payment server calls back and requires a PIN to authorise the payment. The money is then transferred to the recipient's phone account. If the P2P transaction is processed by a payment service provider, the customer pays 100 percent plus an SMS fee to mobile operator, and a transaction fee or an annual subscription fee to the payment service provider, and the other phone owner receives 100 percent. In 2003, P2P transactions accounted for less than 1 percent of total m-payment transaction revenue.

During our global m-payment survey, we found that the various players in the value chain have very different expectations of margins from m-payment transactions. Figure 2 shows that banks are expecting payment margins of 2 percent on average, while mobile operators are expecting margins on average

of 4 percent. Mobile operators and other players, such as payment service providers, are generally expecting higher margins than banks as they are often providing additional services in addition to the basic transaction.

Figure 2:   Margin Expectations by Industry

M-Payment/m-commerce Margins by Industry Cluster

Average expected margin* (in %)

Industry	Mobile Operator	Banks	Others
Shopping general	3,1%	1,5%	2,4%
Money transfer between phones	2,5%	1,9%	2,6%
Vending machines	4,9%	1,5%	3,6%
Event ticketing	4,1%	1,5%	4,5%
Transportation ticketing	4,5%	1,5%	4,6%
Mobile gambling	4,0%	1,5%	6,3%
Mobile insurance	4,5%	2,0%	6,9%

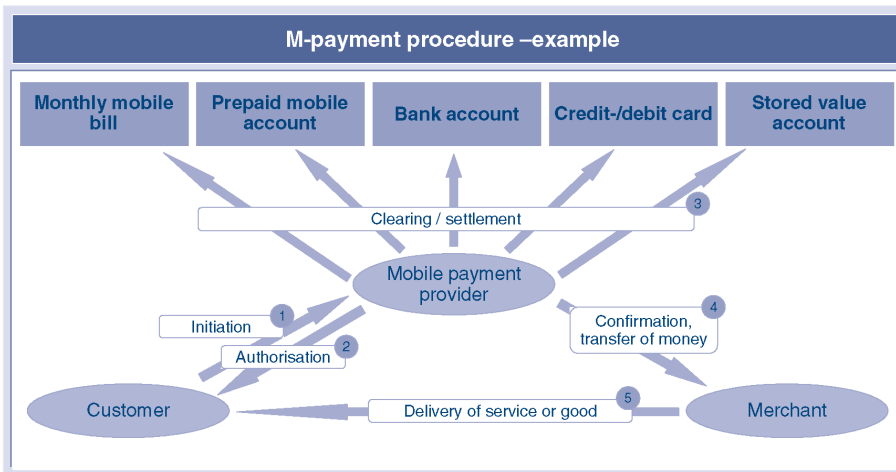Legend: Mobile Operator | Banks | Others

Note: Traffic revenues excluded
Source: Arthur D. Little global m-payment survey

M-payment transactions can be processed in one of three ways: billing, m-enabling and m-wallet. Billing is when the transaction is billed directly to the user's mobile bill and is mainly used for micro payments (smaller payments which do not require more than network authentication). M-enabling transactions includes solutions where the mobile phone is used to enable a payment over a traditional credit card or debit card. In some cases, the mobile operators enable a direct debit of the customer's bank account. M-wallet covers payments in which a separate electronic account associated with the mobile phone is billed. For micro payments, the process involves prepaid or debit card payments to the electronic account. Macro payments (larger payments which need additional authentication, such as with a PIN code) are normally done via direct debit of a bank account or via credit card.

Figure 3:   The M-Payment Transaction

M-payment procedure –example

Monthly mobile bill | Prepaid mobile account | Bank account | Credit-/debit card | Stored value account

Clearing / settlement 3

Mobile payment provider

Initiation 1
Authorisation 2

Confirmation, transfer of money 4

Customer

Delivery of service or good 5

Merchant

Source: Arthur D. Little Analysis

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M-payments have developed differently by region; Asia is leading in m-payments and Europe follows close behind, while Latin America and the United States are currently embryonic markets.

M-payments took off early in Asia, where consumers tend to be very technology-friendly, and mobile users enjoy doing more than talking on their mobile phones.

While slower to get started, mobile operators in Europe, specifically in Austria, Norway and Spain, have been successful in launching not only traditional applications to raise data ARPU, but also innovative retail m-commerce solutions, such as m-ticketing and m-parking.

In the United States, the m-payment sector is still embryonic, due to the relative fragmentation of the banking and mobile phone industries and the extensive availability of widely accepted and convenient (including online) payment mechanisms. However, given that the US has the highest proportion of personal computer users and credit card holders in the world, coupled with a high mobile growth potential, it may prove to be a very attractive m-payment market once POS-terminals are m-enabled.

While low bank account penetration in Latin America limits the m-payment potential, some mobile operators are already developing new business models in order to serve "non-banked" users. In Venezuela, a country with medium mobile penetration and a large pre-paid base, a top-up service from the mobile phone with access to the user's bank account is already available.

We have identified five models for how markets have developed depending on which participant in the value chain has driven the process: mobile operator driven, bank driven, government driven, independent payment service provider driven and industry driven.

The driver of the market takes on the risk of being the first to invest into a new business in which the market demand is uncertain. Initial capital expenditure, depending on the solution, can be significant and may take a couple years to pay back.

However, there are significant advantages to being the market driver. The market driver can design a solution that is the most advantageous to its business and, if successful in achieving critical mass, its system will become the de facto standard on the market. This will give the market driver a strong negotiating position and real strategic advantages vis a vis its potential partners and late entries to the market. He will also benefit from having the best knowledge of customer behaviour in terms of m-payments.

When an m-payment market is in its initial stages or is trying to grow in a large, very liberalised business environment, anarchy tends to reign. Anarchy exists when different stakeholders push their own payment platform with little co-operation, closed interfaces and proprietary solutions. Examples of countries that can be described as in m-payment anarchy are Italy, UK and Germany, where roles of the value chain players are unclear (as far as customer ownership is concerned), and a lack of strong business models limits the co-operation among the different players. In the UK and Germany, we have seen content aggregators moving in to fill the void, as currently the largest market for m-payments is related to digital content. Bango in the UK and Jamba in Germany are examples of content aggregators, which have launched their own m-payment services.

1. In the *mobile operator driven model,* the mobile operator controls a majority of the transactions and contracts directly with merchants. Examples of mobile operator driven m-payment markets include Austria, Japan, Australia, Sri Lanka, China, Norway, Finland, Venezuela and New Zealand.

    mobilkom austria, the incumbent mobile operator in Austria, launched an m-ticketing application together with the Austrian national railway ÖBB (Österreichische Bundesbahnen) in 1999, and has since continued to develop its m-commerce portfolio with a strong mass market focus. In June 2004 mobilkom was the first operator world wide to introduce interoperable m-payments for cross border train tickets together with ÖBB, Vodafone and Deutsche Bahn. From its subsidiary paybox, mobilkom offers all mobile users a complete range of m-commerce services, including direct and online mobile shopping, m-ticketing, m-parking, vending machines, and two kinds of travel insurance. Additionally, paybox offers the service of sending money directly to another phone, as well as POS payments. In order to be able to act as a full service provider, mobilkom acquired a banking license, and today all three mobile operators in Austria have banking licenses.

    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. Also supported are proximity payments to POS terminals by scanning barcodes stored in the handset or by infrared data transmission direct to the terminal.

In the role of business platform provider, DoCoMo established "FeliCa Networks", a 40/60 joint company with Sony. Several companies are currently developing payment related trial services, such as mobile ticketing and shopping at convenient stores, using FeliCa IC chip equipped mobile phones. The solution is open to other mobile carriers, credit card companies and banks in Japan.

2. In the *bank driven* model, financial institutions form a joint venture to develop, maintain and run a payment platform, more or less forcing mobile operators to open up their systems for mobile payment. Banksys in Belgium is an example of a bank-driven model.

    In Belgium, Banksys, the inter-bank clearing house, was given a mandate by the banks to develop m-payment activities and has developed an m-payment platform that is already successfully used for prepaid recharging by the second largest mobile operator. Partnerships with the two other operators are also foreseen and we believe that the platform has the best chance to become the common m-payment standard in Belgium.

3. Singapore, one of the most advanced m-payment markets in the world, is an excellent example of a market driven by the *government*. An m-payment platform was created in Singapore via a license bid initiated by the government. All stakeholders were required to support the full value chain and interconnect with each other. A series of m-payment pilot projects are in the advanced stages. YW8, a joint project between banks, transaction service providers, mobile operators and retail, has been successful due to the emerging m-lifestyle in the country.

4. In some markets, *independent service providers,* often funded by venture capital funds or with banks as shareholders, obtain a license to process and clear transactions.

    Contopronto is a Norwegian m-payment provider with an independent payment solution that was launched in 2002. The company has also received a license from the Norwegian Royal Ministry of Finance to become Europe's first e-bank. Contopronto's platform allows cellular phone users to make payments and money transfers to any bank, credit card, business or individual through their phone. After opening an office in London, Contopronto expects to open e-money banks across Europe, giving Europeans access to a secure and rapid cellular payment option.

5. In some cases, such as in the United States and Hong Kong, m-payment development has been *industry driven;* key players in most initiatives are Nokia as handset vendor, plus local banks and settlement companies, like VISA in Europe and Asia and MasterCard in the US. The co-operation is centred on the new wallet application in Nokia handsets and Verified by VISA service.

A majority of markets are currently mobile operator driven as, in general, mobile operators are moving most aggressively into m-payments as it is an extension of their core business. However, the most developed m-payment markets in the world, Singapore and South Korea, have been government driven, which illustrates the important role the telecommunication and financial regulators play. 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 a m-payment solution to the benefit to both the players and the market as a whole.

During our interviews, we asked industry experts in the various countries about the development of m-payments, available applications, payment methods and technologies utilised. Based on the results, we have ranked the various markets on their m-payment market maturity, shown in Figure 4.

Figure 4:　　　M-Payment Usage and Market Maturity
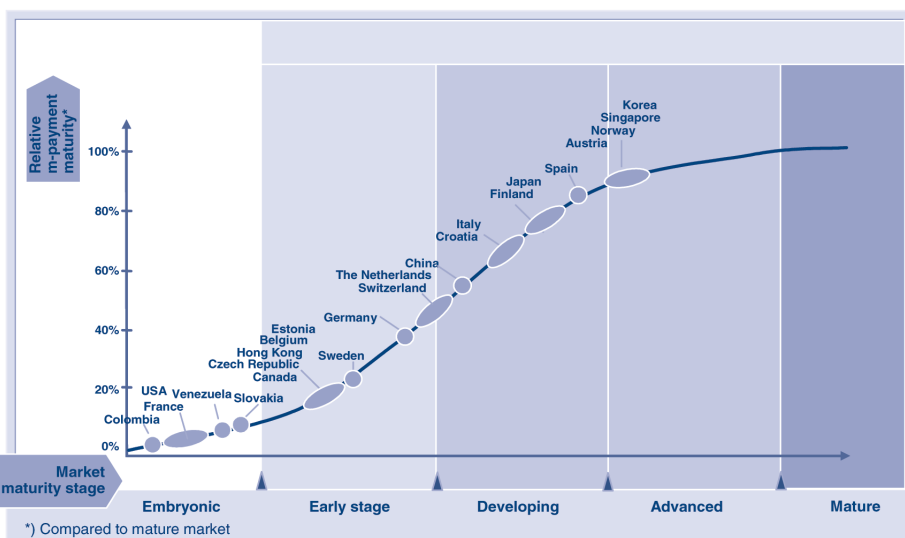
Source: Arthur D. Little analysis

Based on our research, we have identified several factors that have contributed to the growth of m-payments initially in embryonic markets:

– Well-established financial sector

– High mobile penetration, including a high share of post-paid customers

– A developed Internet market

– A regulatory environment that, at the very least, did not discourage the development of m-payments, such as requiring mobile operators to have banking licenses in order to process payments.

In more developed m-payment markets, we found that there was usually one player, which took the lead and drove market development, whether a mobile operator, bank or the government through regulation. However, in the course of our survey, players, which had acted as market driver in their market, stressed the importance of partnerships to reach the mass market and achieve real success.

M-Payment transactions employ a variety of technologies, depending on the size of the payments and whether proximity or remote.

There are four steps in an m-payment transaction: preparation, initiation, authentication and termination. The first step, preparation, involves downloading and installing any necessary software and configuration of the mobile device; this is done only once before a customer makes his first m-payment transaction. The second step, initiation, is when the merchant sends the purchase request to the payment service provider (PSP), i.e. mobile operator, credit card company or an independent PSP. Initiation is usually performed by sending an SMS (short message service), setting up a WAP (wireless application protocol) connection or by calling the payment call centre in the case of an IVR (interactive voice response) payment transaction. The third step is authentication of the transaction by SIM (subscriber identification module) or PIN acceptance to the PSP. The final step is termination of the transaction process, when the customer receives a receipt and is logged off.

The technologies employed for remote m-payment transactions involve transmission technologies as well as technologies used for encryption, user authentication and the provisioning of mobile and server wallets. The most common mobile payment transmission technologies are SMS, Voice (IVR) and WAP.

The *short message service (SMS)* is currently the most important m-payment technology, as the service is implemented in almost all mobile devices. Via SMS, the user device can exchange data via a Short Message Service Centre (SMSC). SMS is an out-of-band transmission technology with low bandwidth requirements. It is also one of the most expensive transmission technologies for the customer.

Interactive voice response systems (IVRs) are able to guide the user through the payment process. Voice recognition may be used as an additional authentication tool.

WAP allows users to access and interact with IP-based services. While early WAP standards were optimised for low speed mobile devices with limited processing speed and graphical capabilities, WAP 2.0 introduced the support of large colour displays, frames, text styles, fonts and graphics.

Operator billing technologies, such as SMS or WAP, are usually used for micro payments and mobile content. Dual SIM and WIM (wireless identification module) authentication are examples of technologies that offer higher security and are primarily used for macro payments.

Proximity payment methodologies have already been launched in several markets and are primarily based on proprietary technologies. The key requirements for local transactions are usability and reliability. Payment transactions should be performed with as little intervention by the customer as possible.

Currently RFID, which can be used for small as well as large payments, is mostly implemented with inconsistent standards, and the user benefit is limited due to the low range of passive RFID tags. We expect m-payment solutions in the United States to be based primarily on RFID and, due to the size of the US market, it may take hold in other markets. RFID is already being used in some Asian countries.

In addition to RFID, Bluetooth has the potential for macro payment transactions, but has the disadvantage of slow set-up times, which in some cases makes it an impractical solution. Mobile EMV is seen as a possible future concept for m-payments based on bank-issued international payment cards; EMV is a technical specification developed by a consortium of Europay, Mastercard International and Visa International. Visa has recently launched the first contactless payment card based on the mobile EMV standard. The technology employs RFID technology for contactless payment with distance of up to 4cm from the card reader.

Part 2   The Future
of M-Payments

Predictions for the development of the m-payments market have been over optimistic in the past. In the last couple years, there has been progress made on developing payment standards, at least within individual markets, market players have begun to develop partnerships to better serve the market and m-payment services have been successfully launched in several countries.

Based on our global survey, we estimate that m-payment transaction revenues will increase from US$ 3.2 billion in 2003 to US$ 11.7 billion in 2005 and US$ 37.1 billion in 2008. Figure 5 illustrates Arthur D. Little's forecast for m-payment revenues by type of transaction.

Figure 5:   Market forecast – Global m-payment transaction revenues
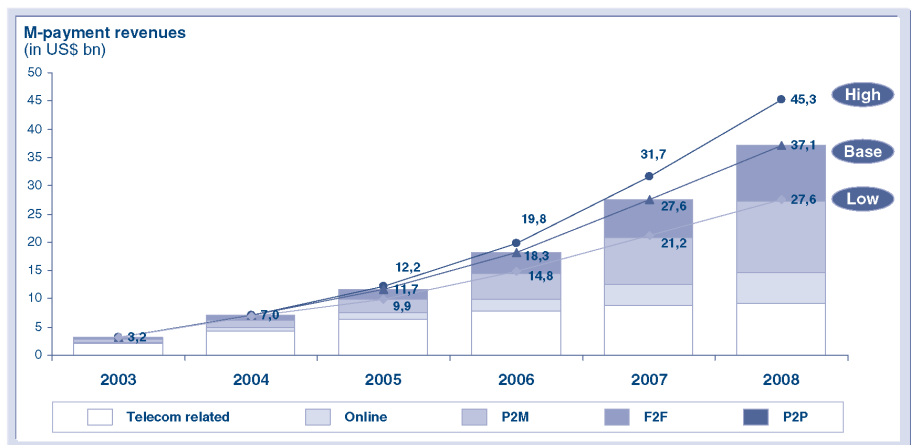
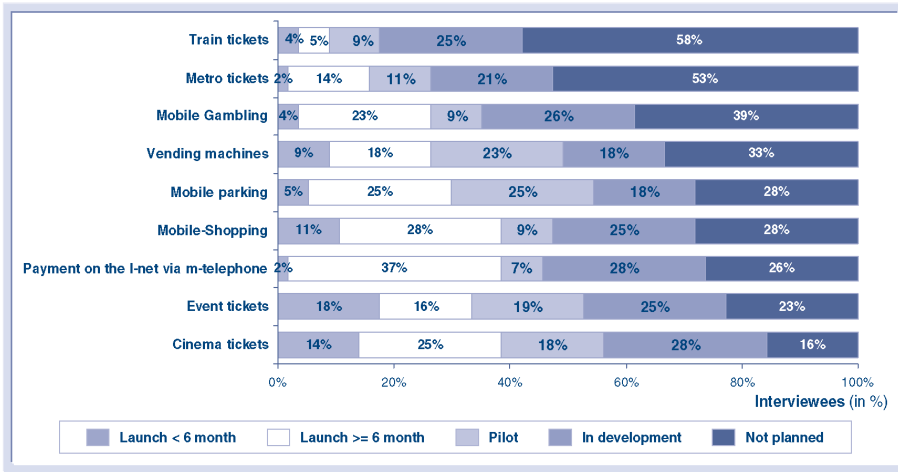Source: Arthur D. Little estimates

We expect vast differences in the development of the m-payment sector to continue between individual markets. How quickly m-payments take hold will depend largely on market specifics, key players, and relevant regulators.

Overall, we believe that the market will continue to be driven primarily by mobile operators, but with an increasing role played by banks and credit card companies, to the benefit of the m-payment sector in general. Regulators will also play a key role, as without their support, m-payments will not take hold in any market.

In the course of our survey, we asked industry experts about the stage of deve-
lopment of various m-payment services in their markets. The services currently
under development or being prepared for launch are shown in Figure 6.

Figure 6:   Applications being launched or in development

Source: Arthur D. Little global m-payment survey

Based on our survey, we believe m-payments in the short- and medium-term
will be primarily focused on micro payments, such as m-parking and m-tick-
eting. By 2008, as the market begins to take hold and consumers begin to be
more familiar with the technology, we expect P2M to increase to 34 percent
(from 16 percent in 2003), F2F to 27 percent (from 12 percent in 2003) and
Online to 14 percent (from 6 percent). The share of Telecom and Mobile por-
tal-based transactions, therefore, will decrease to 25 percent from 65 percent
in 2003. P2P transactions are also expected to increase, but will remain less
than 1 percent of the total m-payment revenue in 2008.

We do not expect m-payments, for example, to replace credit cards in the
foreseeable future. However, in markets such as the US, where there is a very
high use of credit and debit cards, m-payments may become another commu-
nication medium by which credit card transactions are carried out.

Part 3 Strategic Challenges Facing Industry Players

In order for the m-payment market to become established, several strategic challenges will need to be addressed.

Strategic Challenge #1
The success of m-payments depends on establishing partnerships and defining clear roles and incentives along the value chain

The players of the value chain should agree on basic revenue sharing principles between industries, to avoid having different industries create different standards, which would reduce the value of m-payments for consumers and slow down industry development. The ability to charge flexibly for different types of services and applications, and to split revenues between different parties in the value chain is key to the creation of a successful environment for m-commerce.

The *mobile operator* is, in most cases, a logical choice to lead market development, as they already have a customer base and a billing infrastructure for small transactions, and m-payments is an extension of their core business. However, mobile operators will find it difficult to go it alone; they do not have a merchant network, the systems to process macro-payments or the necessary experience in risk management. For this reason, a partnership with bank or credit card company may be necessary to insure success.

As mobile operators have only limited capabilities to broadly acquire merchants in different vertical segments, they should also consider co-operation with traditional payment service providers (PSPs) and merchant acquirers. Through partnership with a PSP or merchants acquirer, a mobile operator can more quickly expand its merchant network, which is key to gaining a critical mass of customers and revenues to offset the investment into m-payments.

The banks and credit card companies are attracted to m-payments as a way to increase revenue, secure all virtual transactions and reduce fraud. However, many banks were initially reluctant to move into m-payments, deterred by the initial upfront investment and a fear of cannibalisation of their core business. While initially reluctant, there are an increasing number of financial institutions offering m-banking services, which enable their customers to build their m-payments-related experience and become more familiar with the technology.

Banks that do not develop an m-payment strategy early will be under increasing pressure from mobile operators, which tend to act faster in m-payments. By not co-operating with operators, banks risk being dependent on costly SMS or voice channels for its future m-payment solutions.

Credit card companies have an important role to play as they tend to be more innovative than banks, and understand the value of co-operation with mobile operators in the areas of identification and authorisation of the payment process. VISA and Mastercard control a global network of more than 21 million merchant locations and have more than 450 million cards in circulation. Core competencies of both banks and credit cards companies are their strong brands, well-established relationships with large customer bases, a network of merchant locations and long experience in risk management.

Co-operation, not competition, between mobile operators and banks and credit card companies will be the key to success in m-payments. The three industries are complementary; mobile operators have a billing infrastructure for processing large numbers of relatively small transactions, while banks and credit card companies have the resources to authorise lending for substantially larger amounts. Co-operation allows both industries to share the capital expenditure while creating an m-payment consortium with increased know-how and competencies.

For *merchants,* beginning with m-payments requires an up-front investment, the size of which varies depending on the solution. For this reason, the merchant must be convinced about the value it will bring, through increased revenue, access to new customer segments, increased security, higher customer satisfaction and lower costs for distribution and collection. For example, for a concert organiser, having access to an m-payment solution would not only increase revenue, but also lower operating costs, as fewer people would be needed to man the ticket booths.

Suppliers, such as platform and terminal vendors and handset manufacturers, have a clear motivation to provide innovative solutions to the m-payment industry, and, if at all possible, to be involved in the creation of a broader solution that will open the market and increase their revenue potential.

The success of m-payments in any individual market depends on the key players' ability to partner and develop a collaborative model for addressing the market and split revenues along the value chain.

Strategic Challenge #2
The sooner the players are able to co-operate on developing m-payment standards, the faster m-payments will take hold and bring benefits to all involved in the value chain.

Open standards, not specific to any operator or payment scheme, ensure interoperability across platforms and services, and are critical for ensuring widespread access to m-payment services. Without an m-payment standard, companies will not invest into m-payment platforms because they would not be able to reach a broad enough market to make it viable.

A variety of standardisation bodies exist in the area of m-payments, which have been founded by different stakeholders, each with their own focus and approach.

The Mobey Forum is dominated by financial institutions and focuses on the drafting of high level requirements for m-payment transactions from a financial institution's point of view. In Scandinavian countries, especially in Finland, banks are entering m-payments and solutions are based on some of the work done by Mobey Forum.

The Open Mobile Alliance (OMA) has established the M-Commerce and Charging working group (MCC) that is also working on m-payment-related issues. The MCC currently has liaisons established with the Mobile Payment Forum, the Mobey Forum and Pay Circle.

MeT Ltd focuses on the definition of a complete framework for m-payment environments on the basis of existing standards, cooperating with other organisations that are working in the same area. MeT standards define a reference architecture for an open platform for mobile commerce, with the MeT wallet as the key concept. As a consortium of mobile device manufacturers, MeT focuses on the standardisation of mobile device functionality that is important for m-payment transactions.

PayCircle is dominated by suppliers of payment infrastructure, with Siemens, HP, Sun, Oracle and Lucent as founding members. PayCircle focuses on the development of electronic payment standards.

The goal of the *Secure Mobile Payment Service (SEMOPS)* is to create a universal electronic payment service, to be introduced in most European countries. The project is co-founded by the IST program of the Commission of the European Communities, and industry partners from different countries. The initiative's goal is to fully specify and implement a working environment for e- and m-payments.

Simpay was founded by the mobile operators Vodafone, T-Mobile, Telefonica and Orange, and is working towards an interoperable mobile payment infrastructure and potentially a European clearing house. A standardised European brand would make recruiting merchants easier. Furthermore, 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. However, Simpay has delayed the launch of its micro payment solution until 2005, and its shareholders are already pushing their own m-payment brands on the national markets.

Most experts we talked to during the course of our survey, stated that they primarily participate in these organisations in order to keep updated on what other players are doing. The standardisation work proceeds slowly and many players are launching their own proprietary solutions. While these organisations are taking steps toward harmonisation of payment standards, more has to be done in order to contribute to the growth of m-payments in the future.

Strategic Challenge #3
A trusted brand is critical to generating confidence in m-payments and achieving critical mass of customers and merchants.

While the actual level of security of m-payment solutions is very good, stakeholders also have to address the issue of perceived security and faith in the system. Our research has highlighted that perceptions of security (or lack thereof) is a major barrier to further penetration of m-commerce.

For this reason, the involvement of companies with strong brands in the development of the m-payment solution is critical to building up acceptance and trust by customers and merchants. Research shows that banks' and credit card companies' brands are most trusted by consumers.

It is interesting to note that in Europe, where mobile operators tend to have very strong brand recognition, mobile operators have been driving the process. In the United States, the market has been driven rather by banks and credit card companies, which have much stronger brands than the mobile operators.

Strategic Challenge #4
The first services to be launched should focus on the primary benefits of m-payments to the customer – flexibility and convenience – supported by powerful marketing to communicate these messages.

A key success factor for companies investing into m-payments is to achieve a critical mass of customers, and thus revenue, as soon as possible in order to offset the necessary investment in the solution. For that reason, the first services to be launched should focus on the primary benefit of m-payments to the customer – flexibility and convenience.

Through m-parking, the customer can prolong his parking time without having to leave his meeting and go back to the parking machine. M-payments would mean no waiting in lines at the metro or train station, ski resort or movie theatre. Once the customer becomes familiar and comfortable with this new payment option, more complex solutions such as m-payments over the Internet, in taxis or at vending machines, or phone-to-phone money transfers will be easier and less risky to launch.

Consumer requirements for a new payment system are relatively straight-forward; the system must work on any handset and on any network, it must be easy or even automatic to register and no change of bank account or different payment card should be necessary for using the solution. Additional costs to the consumer should be zero or very low and correspond to the value added. Finally, billing should be clear, with appropriate options (such as splitting business transactions from personal purchases). A company that meets these requirements will have a much better chance at successfully launching an m-payment solution.

Efforts to launch m-payments have often been hindered by a failure to educate the consumer about the benefits of m-payments. New players must communicate the additional value from their solutions, such as flexibility, convenience and security, and clearly communicate this message to their target markets.

Part 4 Making M-Payments a Reality

There are real risks to investing into an m-payment platform, as the initial capital expenditure is high, and the market in most countries embryonic. An m-ticketing platform could cost an approximate US$ 250,000 to develop and the take-up of m-payments in many markets so far has been disappointing. However, there are currently more than 1.2 billion mobile device users in the world and this number continues to grow rapidly, and that represents enormous potential for this new payment solution. Also, research has shown a high willingness of consumers to try this new payment option.

The future of m-payments is highly dependent on the ability of the players in the individual markets to address the four strategic challenges. Some countries are already in the process of meeting these challenges, while in others these challenges will not be solved very quickly.

Co-operation among the major players, especially mobile operators, banks and credit card companies, is critical to reach the mass market and achieve real growth. However, in many countries, these players have been more focused on protecting their current business than in investing into a new payment system with relatively lower returns and additional risks. In this case, it is likely that one player will need to take the lead and drive the market.

There are distinct advantages to being the driver of an m-payment market, and significant risks in not developing an m-payment strategy. In addition to being perceived as being innovative and more dynamic in the market, a company that leads m-payment development will be able to design a system that is advantageous to its market position and strengths. To a certain extent, the market driver will also be able to dictate the terms to companies entering the market late, and at the very least be in a strong negotiating position.

Conversely, companies that do not keep up with their market in m-payment development could find that they are missing out on a dynamic, fast growing market. Entering late could leave a player with few remaining potential partners, and only more expensive options for accessing m-payment platforms.

Appendix A Approach and Methodology

This M-Payment Report is based on a global survey conducted by Arthur D. Little, backed by our own in-house research. Our survey was conducted by our global network and comprised 100 interviews with industry experts from diverse industries, such as mobile operators, banks, credit card companies, payment service providers and suppliers, in 32 countries. Our survey was structured around an initial quantitative questionnaire, followed by qualitative interviews with industry experts to confirm hypotheses arising out of the initial findings.

The structure of the questionnaire covered six key issues:

• Current and expected status of m-payments/ m-commerce in the national market

• Benefits, obstacles and key success factors for m-payments / m-commerce services

• M-payments/ m-commerce commercial structure

• M-payments/ m-commerce enabling

• Existing and future technology

• Additional questions for specific industry groups

During the latter stages of the analysis and synthesis phase, we conducted qualitative expert interviews to align our thoughts and enhance our findings.

Our secondary research included publicly available articles and conference presentations.

Appendix B   Glossary

Term	Definition
ARPU	Average Revenue per User
CAPEX	Capital Expenditure
Churn	The number of customers who discontinue their use of a service divided by the average number of total customers, over any given time period.
EMV	A consortium of Europay, Mastercard International and Visa International, which has developed technical specifications and a global standard for electronic financial transactions.
F2F	Face to Face
IVR	Interactive voice response systems
M-billing	An m-payment transaction that is billed directly to the user's mobile bill
M-enabling	An m-payment transaction in which payment is made to a traditional credit card or debit card
M-wallet	An m-payment transaction in which a separate electronic account associated with the mobile phone is billed
M-payments	A type of transaction processing in which the mobile handset plays a key role in the initiation, authorisation and/or realisation of the payment
MVNO	Mobile Virtual Network Operator
P2M	Phone to Machine
P2P	Phone to Phone
POS	Point of sale
PSP	Payment Service Provider
RFID	Radio Frequency Identification
SIM	Subscriber Identification Module
SMS	Short messaging service
SMSC	Short Message Service Centre
WAP	Wireless Application Protocol
WIM	Wireless Identification Module

Arthur D. Little's Telecommunications, IT, Media & Electronics (TIME) Practice is a global network of world/class professionals. Together we offer an unparalleled combination of industry experience, understanding of the underlying technologies shaping the global digital industries and mastery of the business processes within these industries. Our work for companies right across the value chain in TIME has two main thrusts:

We help our clients «lead the pack» - and ultimately increase their value – by revolutionising their strategies and differentiating their products and services globally.

We also help our clients enhance their performance and grow their profits by propagating best practices throughout their organisations.

We guide our TIME clients towards a deeper understanding of the strategic, operational and cultural determinants of technology, innovation and financial management, as well as transferring the skills to manage these determinants for the optimal benefit of all their stakeholders.

About Arthur D. Little
Arthur D. Little is the world's first management consulting firm, founded in 1886 in Cambridge, Massachusetts, USA. We are leading edge innovators, combining industry knowledge, functional experience and technology skills to help our clients grow and create extraordinary value. We have spent 118 years renewing and reinventing ourselves continuously – we come to our clients with a fund of fresh knowledge and experience in leading industries around the globe. Arthur D. Little people bring curiosity, creativity, integrity and analytical rigor to every job, which means fast and dramatic performance improvements. Together with our partners Altran Technologies and Cambridge Consultants Ltd we have 16,000 professionals at your disposal in more than 40 offices worldwide.

Contacts

Karim Taga
Associate Director
Austrian Head of Telecommunications,
IT, Media & Electronics Practice
+43 1 515 41 43
taga.karim@adlittle.com

Johan Karlsson
Project Leader of the Arthur D. Little
Global M-Payment Report

+43 1 515 41 47
karlsson.johan@adlittle.com

Time practice leaders and m-payment experts in your region are:

Austria	Karim Taga	taga.karim@adlittle.com
Belgium	Jean Fisch	fisch.j@adlittle.com
Canada	Martyn Roetter	martin.roetter@adlittle.com
China	Arnold Lau	lau.arnold@adlittle.com
Columbia	Adriana Acevedo	acevedo.adriana@adlittle.com
Croatia	Karim Taga	taga.karim@adlittle.com
Czech Republic	Jan Kerner	kerner.jan@adlittle.com
France	Bruno Duarte	duarte.bruno@adlittle.com
Germany	Arno Wilfert	wilfert.a@adlittle.com
Hong Kong/Taiwan	Arnold Lau	lau.arnold@adlittle.com
Italy	Roberto Marelli	marelli.roberto@adlittle.com
Japan	Yoshikazu Matsuoka	matsuoka.yoshikazu@adlittle.com
Korea	Jongpil Won	won.jongpil@adlittle.com
Malaysia	Thomas Kuruvilla	kuruvilla.thomas@adlittle.com
Netherlands	Jasper Boessenkool	boessenkool.jasper@adlittle.com
Nordic countries	Bo Lenerius	lenerius.b@adlittle.com
	Linus Elmgren	elmgren.linus@adlittle.com
Portugal	Grant Greatrex	greatrex.grant@adlittle.com
Singapore	Vinay Hebbar	hebbar.vinay@adlittle.com
Slovakia	Jan Kerner	kerner.jan@adlittle.com
Spain	Eulogio Naz	naz.eulogio@adlittle.com
Switzerland	Andreas Hürlimann	huerlimann.andreas@adlittle.com
	Morten Schmidt	schmidt.morten@adlittle.com
UK	Philip Shepherd	shepherd.philip@adlittle.com
USA	Martyn Roetter	roetter.martyn@adlittle.com
Venezuela	Adriana Acevedo	acevedo.adriana@adlittle.com

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or to

Arthur D. Little – Global M-Payment Team
c/o Arthur D. Little
P.O. Box 144
A-1015 Wien (Vienna) Austria
Phone   +43 1 515.4100
Fax   +43 1 515.4123
Email   adlittle.vienna@adlittle.com