



Mobile payments in Asia Pacific

INFORMATION, COMMUNICATIONS & ENTERTAINMENT

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Introduction from Sean Choi and David Collins



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This KPMG thought leadership report explores the development of the market for mobile payment systems in Asia Pacific. We believe the significance of this market cannot be overstated, as new technologies have the potential to play a key role in the expansion of commerce to an ever-wider segment of the world's population. This is especially true in Asia Pacific.

The expansion of commerce and the growing reach of globalisation are being driven by two significant factors. The first is the rapid adoption of mobile and wireless technologies, particularly in emerging markets such as China and India. The second is the availability and evolution of micro-finance, particularly to support rural or underdeveloped communities. These are both trends that mobile payment systems can help to facilitate.

As this report shows, mobile payments have potential applications throughout the region, in both developed and developing markets. The rapid changes taking place in emerging markets, combined with the fact that existing fixed line networks are often underdeveloped, offer persuasive reasons to believe that systems will be developed that can facilitate wealth creation and genuinely transform people's lives in the poorest parts of the region. Ultimately, the evolution of mobile payments systems has the potential to allow global organisations to access a far wider market, including people in previously hard-to-access locations.

The caveat is, of course, that issues of trust, security and affordability also need to be overcome. This report explores the recent developments in the context of these significant challenges. Mobile payments are necessitating new forms of interaction between telecoms companies, financial institutions, software and content providers. As in any supply chain, it is important to understand the processes and security capabilities of other parties in the relationship. It is even more important when potentially sensitive or personal information is flowing between these parties.

Ultimately, the adoption of mobile payments will therefore depend on, and be driven by, consumer confidence. In this respect, all of the participants within each respective business model needs to share some responsibility for its successful adoption.

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This mobile payments report is the first of two papers produced by the Telecoms Research Project (TRP) in collaboration with KPMG, the second being on online games, a sector of rapid commercial growth and in which mobile payments are coming to play an increasingly important role. TRP Corporate is the consulting, services and training arm of the Telecommunications Research Project based at the University of Hong Kong.

Mobile payments (m-payments) are any chain of payments that are initiated by use of a mobile device. Across a wide range of commercial sectors, from the mobile network operators (MNOs) themselves and the handset manufacturers, to transportation companies and payment platform providers, to banks and retail stores, to advertisers and third party content providers, there is a growing investment in m-payments as a way to reach and retain new customers, to generate more traffic, and to reduce cash payments and transaction costs. This increasingly includes using the mobile phone to provide service to the 'unbanked' in less developed regions. Driving these developments are advances in technologies, in security, and in regulations, but most of all in the level of acceptance by stakeholders.

A key point that emerges from the research is the current diversity of m-payment systems or ecosystems that involve different stakeholders (MNO-centric, bank-centric, vendor-centric, payments platform-centric, etc), involve different business models (B2B, B2C, C2C, and one-way and two-way P2P), and in Asia Pacific vary across national markets (the 'leaders' Japan and Korea, the 'giants' China, India, Indonesia and Philippines, the 'tigers' of Hong Kong, Singapore and Taiwan, and the 'mid-markets' of Malaysia, Thailand and Vietnam). Understanding this diversity and the market opportunities it gives rise to is a key to wise business investment.



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Introduction



M-payments are payments made using mobile handsets and other devices, either to directly purchase or to authorise payment for goods and services. Such devices are playing an increasing and evolving role in the wider development of electronic payment systems around Asia Pacific.

This report considers how m-payment business models are developing, who the key players are along the value chain, and how these value chains differ according to the economic, regulatory, security and risk factors in each country.

Mobile network operators (MNOs) have played an important role in pushing the technology necessary for m-payments. In many cases, however, the early efforts to launch m-payment services were met by suspicion from financial institutions, including banks and card companies. Just a few years later, these stakeholders are now collaborating to trial a range of services including:

- m-banking
- m-wallet solutions that store credit or debit card information on a SIM chip
- pay-as-you go or 'contactless card' technologies
- text messaging systems that can facilitate or enable payments.

This report identifies the distinct patterns of adoption that can be seen in different markets around the region. These can be grouped as follows:

- The leaders: Japan and Korea are widely acknowledged as global leaders in the adoption of digital technologies, and this is also true in m-payments, albeit in rather specific areas.
- The mobile tigers: Somewhat surprisingly, the most mobile-penetrated territories on the planet — Hong Kong, Singapore, Taipei — have shown little comparable adoption of m-payments, except in the use of contactless cards for transportation and some limited retail usage.
- The giants: The very large but less-developed markets of China, India, Indonesia, and the Philippines are demonstrating rapid take-up across a range of areas from remittance and bill payment to e- and m-ticketing.
- The mid-markets: Thailand, Malaysia, and potentially Vietnam appear to fall somewhere between the extremes above, with strong adoption in a few areas such as top-up and gaming, but less extensive adoption in the more traditional areas of m-banking, and the industry verticals.

“There have been major advances in technology, especially in the ‘secure element’ aspect of SIM cards.”

MNOs are approaching m-payments strategically, in their bid to retain customers and develop wider sources of revenue from lines of business which can be strongly complementary. Fixed-mobile convergence is one manifestation of this, as it gives telecom operators an opportunity to unify their payments platforms on an internet protocol basis and offer discounts or loyalty points on m-payments as part of a bundled service.

M-payments as a channel

The speed with which mobile technologies are being adopted shows no sign of relenting. In 2002 the number of people in the world using mobile phones overtook the number of fixed line phones. In developing countries, even people without bank accounts often own mobile phones and have incorporated them into their way of life.

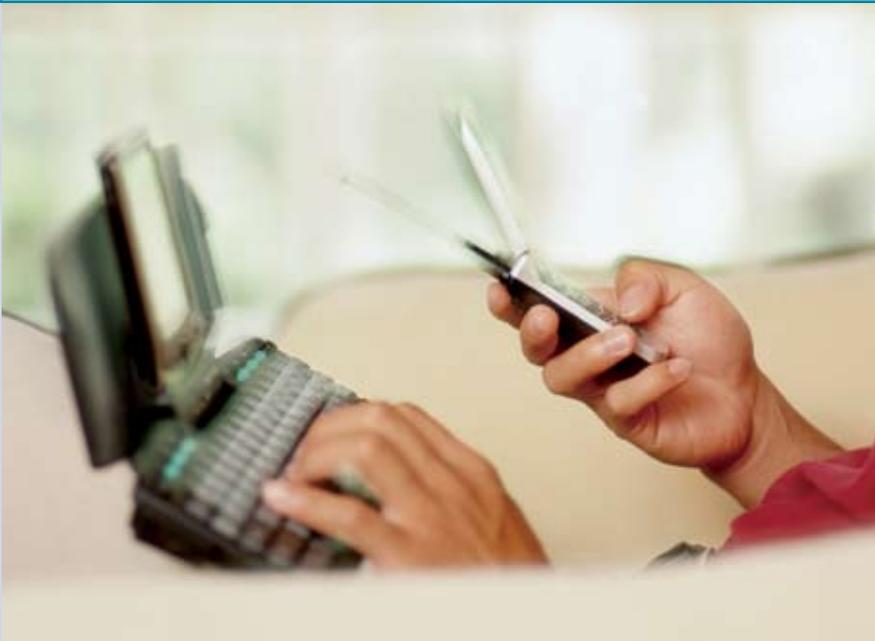
Along with the spread of mobile networks globally, there have been major advances in technology, especially in the ‘secure element’ aspect of SIM cards. This has made financial institutions in particular feel more comfortable about the potential for adoption of m-payment systems.

While banks are starting to explore opportunities in m-banking, other sectors are also embracing these new technologies. For example:

- Transportation companies are offering ‘touch and pay’ access to ticket barriers where a stored-value card is either attached to the handset, or embedded in the SIM
- Retailers are offering loyalty cards, using similar means of payment, as they seek to reduce the amount of cash they have to handle and carry
- Credit card companies see mobile handsets as a means to widen their catchments of commercial transactions
- Advertisers are building web-links into posters in trains and buses and on buildings which can be activated by 3G+ phones from a short distance leading to more website visits and more purchases by mobile phone
- Vending machine operators sell soft drinks and other consumables by enabling payment by phone
- Content providers, including music and information sites, auction sites and rapidly growing Web 2.0 community sites such as MySpace and YouTube, become globally accessible to paying customers.

These initiatives show that there is not one comprehensive e-payments marketplace, but rather an increasingly diverse range of ecosystems. Payment platform companies such as PayPal can potentially link the vendors within these different ecosystems — but they can also operate quite independently of each other.

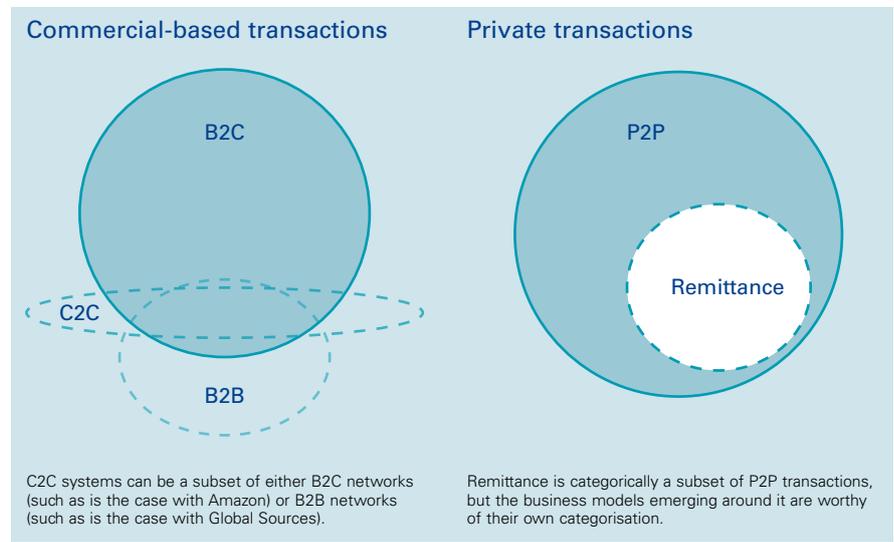
Business models and the m-payments value chain



Business models behind different transaction types

This report outlines five types of mobile payments, each driven by different incentives and revenue-earning opportunities. These are business-to-consumer (B2C), business-to-business (B2B), consumer-to-consumer (C2C), person-to-person (P2P) and remittance. These can be further categorised as commercial transactions (B2C, B2B, C2C) and private transactions between individuals (P2P, remittance).

Figure 1: M-payments business model overlap



Source: TRPC

Business-to-consumer (B2C) mobile payments

B2C m-payments can rely on either an operator-centric or bank-centric model. The defining features of B2C m-payments are integration onto (or access from) the mobile handset interface, and payment for the direct acquisition of goods or services. The handset interface is the crucial business driver, allowing consumers to use their handsets to pay for everything from groceries and lottery tickets to insurance premiums and tax bills.

Most B2C solutions are providing an alternative to cash transactions and are therefore gaining attention due to their potential to fundamentally change consumer behaviour. An important success factor for many B2C initiatives is the design of the handset interface.

However, while there has been considerable media attention focusing on B2C m-payments, there are also potentially profitable and promising aspects to other m-payment models such as online auctions, remittance, or the industry-specific applications of B2B.

Business-to-business (B2B) mobile payments

B2B and C2C solutions are largely being driven by telecommunications fixed-mobile convergence and therefore mobile transactions are simply supplementing, or extending, existing transaction practices.

B2B solutions are focused upon facilitating business process rather than on the end-payment for goods or services. This encompasses specific industry solutions (for example, logistics processes utilising technologies to track and pay for shipments and inventory), and third party platform aggregation and billing solutions, including payment gateways who do not themselves own content, but provide the platforms for accessing content.

These types of m-payments are still relatively small-scale at present. There is some significant overlap between B2B and B2C, an example being in the development of m-banking services. In Japan and Korea, corporate m-banking accounts are being offered as premium aspects of existing m-banking services. In India and China, by contrast, banking services are being targeted at the 'unbanked' in an effort to extend access.

Consumer-to-consumer (C2C) mobile payments

C2C transactions occur directly between end-customers but across a business platform specifically established to facilitate the exchange. One example that stands out in particular, is eBay. The company's payments arm, Paypal, has greatly facilitated C2C e-commerce by holding buyers' money in escrow accounts until the customer confirms receipt of goods, thus removing the risks of non-delivery or of faulty goods.

With such a substantial platform to build from, Paypal has also been the leading player globally in C2C m-payments. Locally, however, an increasing number of new players have been springing up in the last few years, such as Alibaba's Alipay in China. The proliferation of community-based sites such as YouTube and Facebook suggests there is potential for a dramatic increase in C2C traffic. And with much of the traffic already diverging onto mobile devices there is no reason to doubt that transactions won't follow.

“The growth of online gaming and virtual worlds has helped to drive the growth of online payments.”

Person-to-person (P2P) mobile payments

P2P m-payments are private transactions between two individuals. Being typically SMS-based, they have often taken off in spite of any telco-interface efforts, rather than because of them. This may involve the dissemination of top-up credits (for example transferring minutes or minutes-value in exchange for a good or service), an m-banking transfer of funds, or digital barter such as in the exchange of content or virtual world goods. Thus, commercial platforms may be involved in the transaction, but the transaction is a direct one from one person to another.

The growth of online gaming and virtual worlds has helped to drive the growth of online payments, leading to transactions of virtual goods, or purchases of game attributes. In some cases these transactions may be conducted directly between customers (C2C), where they are facilitated by, or take place, within the online world.

Payments for transactions in gaming and virtual world participation across Asia are already switching to mobile as it is often seen to be more secure than paying from a computer. One reason is that in almost all cases the individual's phone is their own phone, whereas for many gamers, the computer is a shared device. Another reason is that less information is usually required in a mobile transaction as the user will have pre-registered with a service provider, and therefore they are less open to identity theft.

Peer-to-peer lending models have also been springing up on this basis, led by the likes of Zopa in the UK, Prosper (US), Smeva (Germany) and Boober (Denmark). A similar service, PPdai, was recently established in China.

Remittance mobile payments

Remittance can be viewed as a subset of P2P payments, since it is usually one-way P2P transaction. Examples include a parent using their mobile to remit a taxi fare to their child across the city, or a domestic worker in Hong Kong remitting their monthly wages to their family in the Philippines.

The success of this model and the phenomenal uptake in countries like the Philippines has caught the industry by surprise. As the transference of monies or top-up credits has grown, so have the innovative means people have found to use remittance for transactions. As a result, one-way remittance systems have grown into two-way P2P business models in a number of countries.



Emerging business models by country

With strong mobile phone penetration rates and large rural populations, Asia Pacific's emerging markets are rife with possibility — be it for transactions access to the 'unbanked', or simple gaming payments and top-ups to the underserved or youth market.¹ Industry experts have long pointed to the role of younger generations in the adoption of new technologies such as m-payments. This appears to be equally true for young economies, where the population has grown up using such devices, and where earlier behavioural patterns are less entrenched.

The leaders: Japan and Korea

Japan's m-payment market is unique in several respects, principally due to the dominance of NTT DoCoMo. DoCoMo's strategy, effectively a rerun of its successful iMode mobile data service model, is to build the supply side of the market by offering attractive commercial terms to banks, card companies, transport companies and merchants, and simultaneously to attract customers on the demand side through an aggressive handset subsidy policy.

In 1997 DoCoMo and Sony jointly invested in the development of the chip that drives the contactless FeliCa IC chip and is now embedded in all kinds of contactless touch-and-pay cards (Figure 2). Since 2003 the FeliCa chip has been added to DoCoMo's 3G service to create an m-wallet inside the phone. DoCoMo rents space on the m-wallet at favourable commercial terms. The carrier has also subsidised the installation of card readers nationally and created strategic alliances with merchants, banks, retailers, and convenience stores.

3G competitor KDDI has teamed up with Mitsubishi-Tokyo UFJ Bank to create Shinginko (New Bank). Around 5 million KDDI m-wallet phones and around 20 million DoCoMo FOMA phones have been sold.²

¹ Krista Becker, "Mobile Phone: The New Way to Pay?" Emerging Payments Industry Briefing, Federal Reserve Bank of Boston, February 2007
² "Sony seeks to break out of Japan with FeliCa," *Card Technology*, 1 April 2007

Figure 2: Japan's major smart card services

EDY	Operated by bitWallet and co-invested by Sony and NTT DoCoMo. There are some 23 million subscribers and 4.5 million mobile subs, with 49,000 stores, between them generating 15 million transactions per month. Edy can be used with ANA, am/pm, Circle K, Sunkus, and various taxis. Edy is not interoperable with Suica.
Suica	Operated by JR East Railway in the greater Kanto area. Suica has provided fare payment since Nov 2001, retail payments since 2004 ³ , and mobile payment since Jan 2006. However, only 350,000 customers had signed up to mobile Suica as of 2007. ⁴ 19 million commuters make more than 200 million uses of Suica per month.
iD	NTT DoCoMo operated service ⁵ which is interoperable with Suica, and enjoys some 55,000 acceptance points (including FamilyMart, am/pm, Lawson, 100 Yen shops, McDonald's, ANA, JAL, Toho Cinemas chain, and Tower Records). DCMX provides the mobile phone based credit payment service. ⁶
Pasmo	Introduced in 2007, Pasmo operates across 26 railways and 75 bus companies in the Tokyo metropolitan area, and is interoperable with Suica.
QUICPay	Claims more than one million registered users on cards and phones, and 30,000 acceptance points (including Toyota Finance Corp., Kanachu Hire taxi company, bookstore chain Shosen Group, Tohan Co., parking lots). Interoperable with iD, JCB, contactless card J/Speedy. Popular in Nagoya area, where Toyota HQ is located.
Smartplus	4,500 acceptance points (including gasoline stations, Nippon Oil Corp., Showa Shell Sekiyu KK). Backed by Mitsubishi UFJ, UFJ Nicos, Visa. Compatible with Visa Touch format, not interoperable with iD.
Nanaco	Contactless smartcard and e-money service from Seven & I Holdings (7-Eleven stores, with 12,000 stores around the country, started service in 1,500 stores in Tokyo), plans a mobile wallet version. Will not accept Edy or Suica. ⁷
Waon	Contactless smartcard and e-money service from the AEON Group, no mobile wallet version yet.

Source: TRPC

The m-payments story in Korea is very different from that in Japan. In Korea, early initiatives by the carriers and banks fell apart due to mutual distrust. Competing hardware offerings amongst the carriers further fragmented the market compounding the problems. However, since then the market has been driven by payment gateway service providers such as Danal, Mobilians, Infohub and Inicis.

³ There are 12,000 stores in the Suica network.

⁴ At first JR East limited mobile Suica to holders of its credit card service 'View' but after 10 months it opened up the scheme to holders of all major credit card brands in Japan and the three largest banks.

⁵ In association with Sumitomo Mitsui Card, Mizuho Bank, UC Card, Credit Saison.

⁶ There have been 2.6 million mobile credit card registrations in Japan.

⁷ Wants to avoid paying commissions to either JCB or NTT DoCoMo on transactions.

The adoption of m-payments in Korea is being keenly watched around the region, as a recent issue of *Card Technology* magazine explains, "What happens in South Korea matters to mobile network operators and banks considering launching m-payment schemes throughout the rest of the world because new mobile technologies often get their first large-scale tryouts in Korea, before being slowly adopted elsewhere."⁸

Payment gateway services took off when Koreans began purchasing characters, attributes and other accessories for online game participation as well as content downloads and Internet access time (through top-up payments). Danal, in particular, made a business of targeting young people without a credit card who need a cashless way to purchase goods such as downloadable music, video, or weapons and attributes to be used in online computer games. Despite the fact that third party payment gateway fees are significantly higher, these services have become the popular method of paying for content, competing against the mobile credit card services such as SKT's Moneta. Mobile phone companies take 5 percent of the transaction and the authenticating companies (the mobile PG service providers) receive 3 percent. The credit card companies by contrast charge 3.5 percent. 70 percent of all digital content — more than USD 1 billion — is now charged directly to phone bills instead of traditional credit cards in Korea.⁹

Online merchants have taken this system and enabled users to make larger purchases as monthly limits have been lifted from USD 20 to USD 120. As usage has grown, the system has expanded out to further enable users to pay for cable TV bills, newspaper subscriptions and membership fees for clubs and associations.

Marginalisation has induced the carriers and finance companies to find common ground. In 2007, SKT teamed up with Visa while rivals KT Freetel joined with MasterCard to relaunch m-payment services. These offerings are designed to migrate from a USIM-card (for 3G phones) to near field communication (NFC) technology when it becomes more widely available in handsets in 2008. Other initiatives in Korea include Korea Smart Mobile T Money, a Korean version of Mobile Suica, operated by the Korea Smart Card Company in association with SKT, and a government sponsored effort to develop electronic tag technology for logistics and inventory management.

The mobile tigers: Hong Kong, Singapore and Taiwan

In Hong Kong, Singapore and Taiwan, the market for m-payments is largely being driven by smartcard developments. DoCoMo and Sony's FeliCa chip powers Singapore's ezLink card and Hong Kong's Octopus card. Taiwan is focused upon NFC deployments and the competitive efforts of Visa and MasterCard.

⁸ "Mobile-Payment Battle Is Brewing In South Korea-Again," *Card Technology*, 15 February 2007
⁹ Moon Ihlwan: "In Korea, Cell Phones Get a New Charge," *BusinessWeek Online*, 2 March 2006; Rebecca Buckman "Just Charge It — to Your Cellphone," *The Wall Street Journal*, 21 June 2007

In addition to their payments facilitation role, Visa and MasterCard are taking an active role in driving the development of the market through co-branding and cross promotion — lessons they have learnt from earlier trials elsewhere. Mobile service offerings are being co-branded with the likes of Costco, Watsons, and a variety of gas stations as a way of leveraging existing customer bases and consumer spending.

Because of their long involvement in the market, the two credit card companies have helped to develop the NFC market by accustoming Taiwanese customers to tap-and-go purchasing through the proliferation of contactless IC smartcards. Their successes have led them to sponsor similar development in mobile applications in Taiwan.

Figure 3: Taiwan's NFC trials

Name	Service provider	Payment solution	Partners	Notes
Visa Mobile Application (VMA)	Chunghwa Telecom	VisaWave	Cathay Financial Holding Co.	<ul style="list-style-type: none"> • HTC smartphones • NTD 3000 transaction limit (no signature) • Can be used at VisaWave readers in other countries
MasterCard Paypass	Taipei Mobile	MasterCard	Taipei Fubon Bank	<ul style="list-style-type: none"> • Nokia handsets • Vivotech infrastructure • E-coupons • Small ticket purchases (<\$25)
EasyCard	Taipei Smart Card Corp (TSCC)			<ul style="list-style-type: none"> • Touch-and-go cards for fares on MRT trains, buses, and at parking lots, combined with simple m-banking • BenQ smartphones • Targeting MRT passengers

Source: TRPC



By 2007, there were 1 million VisaWave cards in Taiwan, and 100,000 MasterCard Paypass smartcards.¹⁰ By contrast, there were some 9 million EasyCards in circulation, and TSCC's aim is to create an e-wallet version to be downloaded to NFC compliant handsets — similar to the Suica development path in Japan.

The Giants: China, India, the Philippines, and Indonesia

India and China may be the two largest growth markets for mobile subscriptions but a significant disparity exists between the 480 million subscribers in China and the 150 million subscribers in India, as of March 2007. China's penetration levels are far higher than in India in both urban and non-urban markets, and with only two mobile operators, new services can, in theory, be rolled out to a large captive audience.

In practice, new products and initiatives in China are often rolled out locally, initially in the first-tier cities and then in other parts of the country. Awareness of m-payments therefore varies in different parts of the country, despite the high overall level of penetration. Given their dominance, potential investors need to closely track the initiatives of key players such as China UnionPay and China Mobile at the national level.

In India, low usage fees, low technology handsets and a multiplicity of operators presents an equally challenging environment for the delivery of new services. As in China, the degree of development and deployment varies from one city or region to the next.

The business models gaining traction are similar. In both markets, it is the third party independent gateway providers who have driven market offerings and current market dynamism, while the mobile operators and banks have been exploring payments developments and launched various initiatives. In India, companies such as mChek, Obopay and Paymate are able to provide a platform for wide take-up with cross-carrier access. In China, activity in the sector has been very active with different companies focusing upon specific payment areas such as city-wide bill payment and lottery initiatives (SmartPay), corporate purchasing, telebanking and back-end integration (Yeepay), consumer online auctions and virtual markets (Alipay and China Paypal), top-up (paipai), gaming (QQ), and CDMA-based m-banking and m-wallets (China M-World). This is in addition to the state-backed start-ups, China Union MobilePay and Unicom Huajian.

China has benefited from a stronger online market with significant overlap between online and m-payment service offerings. Most of China's banks offer online banking and bill payments. Likewise, China Mobile's Monternet service is widely used by its mobile users to pay for mobile valued added services which are then consolidated in mobile phone bills.

¹⁰ "Battleground: Asia-Pacific," *Card Technology*, 1 May 2007



While the Indonesian and Philippines mobile markets are far smaller than China and India, the Philippines has distinguished itself as a leader in SMS and subsequently early m-payments. Indonesia offers much of the same potential as the Philippines — a large, developing country, underserved by infrastructure but with high access to (and usage of) mobile phones, and a large migrant population interested in remitting money home. However, security and authorisation issues have undermined much of the business case for the country. Indonesia has some of the highest levels of Internet credit card fraud in the world.¹¹ As a result many overseas financial institutions and firms such as Paypal refuse to offer electronic payment services and online commerce sites such as Amazon.com have begun to apply special restrictions or even prescribe outright bans on purchases made from the country.¹² Compounding the situation, there are no laws protecting Indonesian consumers from electronic errors made by banks, ATMs, or Internet banking.

However, while Indonesian m-payment services are still limited, there is significant potential given strong growth in the industry, bank interest in using m-payments instead of ATM (and other capital-intensive) networks, and recent growth in the remittance market.

This is also an area of potential for both the Chinese and Indian m-payment markets. China has a ratio of just 530 point-of-sale terminals and ATMs for every million people. Accordingly, cash is used in 83 percent of all payment transactions in China.¹³ With the majority of terminals housed in China's cities, practically all rural transactions are cash-based. Building up this network of cash machines and point-of-sale terminals will not only cost billions of dollars, but will also take time. By contrast, a payment settlement solution based around top-up/remittance that brings together the banks and mobile phone networks might only cost tens of millions of dollars, since most of the infrastructure is already in place.

Two additional features in the China landscape make this prospect feasible. First, the Chinese government views the development of a low-cost, non-cash payments network in rural areas as critical to increasing rural spending and closing the wealth gap with urban areas, and has directed the banking sector to come up with a new system for rural payments. Second, the mobile industry is an industry where the government expects China to take a lead in developments globally. Companies such as SmartPay have thus adapted their focus away from bill payments and towards person-to-person top-ups, and have done so with the models of the Philippines' carriers Smart and Globe fixed firmly in their sights.

In India there are about 200 million households, or 800 million people, who have no access to banks or formal financial services.¹⁴ Many of these 'unbanked' are migrant workers who want to send money back to their families in the

¹¹ Robert Go: "Online credit card fraud rocks Indonesia," *Straits Times*, 5 May 2004

¹² *Straits Times*, 5 May 2004

¹³ Jan Bellens, Chris Ip and Anna Yip, "Developing a new rural payments system in China" *McKinsey Quarterly*, May 2007

¹⁴ *Business Today*, 31 December 2006

rural hinterlands. A related offering is micro financing, with third party payment providers able to provide the payment transaction and disbursement solution. P2P solutions enable transfers over the phone with money disbursed closer to home through local micro financing agencies.

Mid-markets: Thailand and Malaysia

What is notable about the 'mid-market' developments is that emerging m-payment offerings are not open platform offerings, but proprietary offerings or 'walled garden' approaches to m-payments.

M-payments developments in Thailand have been rather limited to date. However, service offerings appear to be developing and as service providers become more responsive so the market may gain momentum. The models that have seen take up are simple bill payment and top-up services. These have been built organically into m-wallet offerings by the two mobile providers.

Thailand's current AIS m-payment service enables subscribers to take care of utility bills, life insurance premiums and vehicle installments, as well as mobile service payments and top-ups. However, this is the fourth iteration tried by AIS suggesting that the Thai market is not one of nascent demand, but one that will need to be built slowly over a period of time. After a year of business, an earlier mPay joint venture with DoCoMo was able to garner only 100,000 users conducting, on average, one transaction worth THB 260-270 (USD 8.80) per month.¹⁵ On top of its bill payment service, AIS also added a P2P remittance service in mid-2007.

True's 'True Money' service is a SIM-based mobile wallet. Started as a limited bill payment, m-banking offering, it has slowly expanded the service into an m-wallet by building out supply-side offerings in deals with cinemas, fast food chains, and eventually stores. Users are charged THB 10-15 for each transaction made via bank accounts, and up to THB 30 for transactions occurring outside Bangkok. Users can transfer funds to anyone within the network, including overseas, to a maximum of THB 30,000 per transfer, with each transfer costing THB 5.

Malaysia's m-payment market has developed more quickly, but less organically than the Thai market. Emerging services have received government support, but uptake in the market has been limited. Existing services are focused predominantly on bill payment and m-banking, growing slowly into m-wallet services, remittance and top-up/transfer offerings.

Maxis and Maybank in Malaysia both provide a simple m-banking service for subscribers (bill payment, balance enquiries, fund transfers), which can also be used to top-up Maxis accounts, download Maxis content, and pay for products

¹⁵ Srisamorn Phoosuphanusorn: "M-Pay aims for 800,000," *Bangkok Post*, 2 August 2006



such as pizzas and movie tickets. In May, Maxis also began international remittance services, but only with Globe subscribers in the Philippines. Maxis customers are charged RM 5 (USD 1.47) per transaction — less than half of what the banks charge for sending money overseas¹⁶ — plus a 15 sen (4 US cents) SMS fee per transaction. Subscribers can remit up to RM 500 a day and RM 10,000 (USD 2,940) per month. Of the RM 4-5 billion that is remitted internationally per annum, Maxis expects mobile international remittance to account for 20 percent of the total.¹⁷

Another Maxis competitor, Digi, is providing many of the same services as of mid-2007 — except that its remittance business is focused on Indonesia and its banking partner is Citi's Global Transaction Services.¹⁸

An interesting twist on the payment gateway model has been provided by Mobile Money International (MMI), a small Malaysian company, that focuses on enabling m-transfer functions (limited m-banking or m-wallet services). This is in contrast to the early Korean PG provider focus upon content and downloads — perhaps reflecting the more conservative, less digitally aware make-up of the Malaysian market. MMI's transaction processing fee is between 1.0 and 1.5 percent, in contrast to the existing bank rate of 1.8 to 3.0 percent (depending on merchant size). By 2007, MMI had some 12,000 partner merchants. The largest partner merchant is Tenaga Nasional Berhad (TNB), Malaysia's main energy provider, however, the vast majority of the merchants are small.

As in Thailand, the market is moving slowly to initiate NFC services. 'Touch-and-Go' transport smartcards, used for expressway tolls and public transport, are provided by Rangkaian Segar and are working on trials with Maxis.¹⁹

There are two possibilities for future development in these mid-markets. The first is in the growth of P2P and remittance usage nationally. The second is in the development of content, or value-added, downloads — both of which could dramatically drive these markets.

Industry perspectives on m-payments

In recent years, companies from a wide range of sectors have adopted and participated in different types of m-payments. The transport industry, for example, is the champion of contactless or 'touch-and-pay' solutions, whereas the retail industry has driven m-wallet applications. Each of these types of m-payment have different value chains.

¹⁶ Conventional methods like banks and licensed remittance providers currently charge a service fee of between RM 10 and RM 20 per transaction.

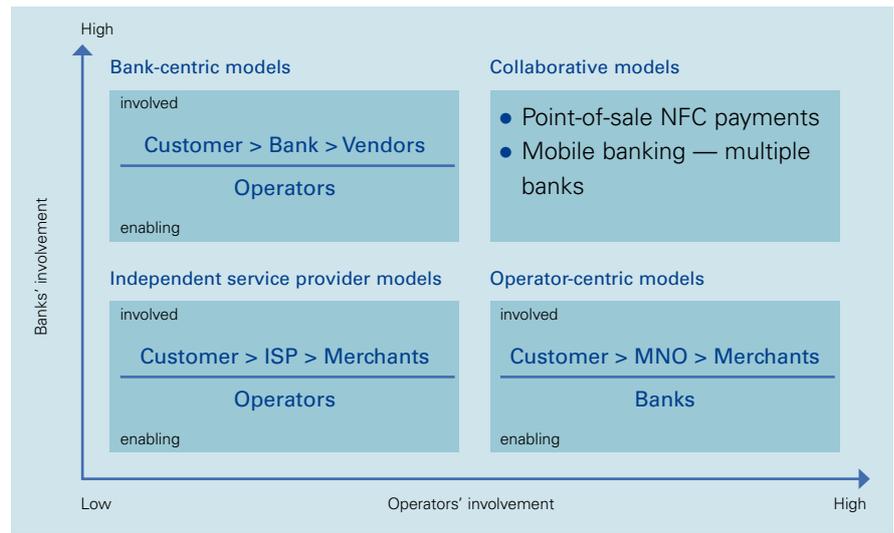
¹⁷ Surin Murugiah: "Maxis expects RM 500m annual domestic remittance for M-money," *The Edge Financial Daily*, 7 May 2007;

"M-Banking — Malaysia: Dial M for money," *Retail Banker International*, 16 May 2007

¹⁸ *The Edge Financial Daily*, 12 April 2007

¹⁹ *Business Times*, 26 February 2007

Figure 4: Bank-centric vs. Operator-centric business models



Source: M.Stomar, "Mobile Payment Value Chain and Business Model", Mobey Forum www.mobeyforum.org

This section reviews the industries most directly involved in the uptake of m-payments: telecommunications, banking, retail, transportation, media and entertainment,²⁰ to illustrate the different paths of payments development being adopted.

Figure 5: Mobile payments business type by industry

	m-wallet	m-banking	Touch-and-pay	Top-up	Remit	Content	Payment gateway	Auctions
Telecom	Emerging		High	High	Emerging	Emerging	High	
Banking	High	High	High		High		High	
Retail	Leading		High		Emerging	Emerging	High	High
Transportation	Emerging		Leading		High		High	
Media	Emerging			High	High	Leading	Leading	
Verticals ²¹	High		High			High	High	High

Level of payments adoption by industry: ● Leading ● High ● Emerging ● Low

Source: TRPC

²⁰ "Digital media" comprises the content, entertainment and gaming industries while other vertical industries (other than transport and media) are grouped together.
²¹ Specific industrial sectors such as the energy, logistics, hospitality and medical sectors.

“Most m-payment solutions revolve around increasing customer ‘stickiness’, although there are aspirations to secure more direct increases in revenue.”

Telecommunication

For telecoms companies, the approach to m-payments is based around two variables: increasing users and increasing revenue per user. For the former, this means increasing the number of users and increasing customer loyalty, to derive stable revenues from conventional telephone services. For the latter, it means increasing the amount of traffic and/or increasing the volumes of premium-priced digital content.

For many telecom companies, m-payments, despite their revenue connotation, are still seen neither as a subscriber acquisition tool nor as a source of significant revenue. As a result, most m-payment solutions revolve around increasing customer ‘stickiness’, although there are aspirations to secure more direct increases in revenue.

Content downloads

- Carriers are well positioned to deliver payment services for mobile content not simply because they control the value-added interface, but also due to their billing capabilities. Mobile users will be offered either subscription or per-usage payment models. Payment amounts are usually small.
- Business models are for either direct distribution or third-party platforms, in which case the carrier will usually negotiate a standard minority percentage revenue share. DoCoMo’s iMode is the preeminent example of this model.

Top-up

- Electronic prepaid reload applications or top-ups are a major source of revenue for most carriers. The market for prepaid mobile recharge is estimated at more than USD 100 billion,²² and the value of servicing these payments amounts to more than USD 2.5 billion per year.²³
- The emergence of digital top-ups has enabled these digital credits to be transferred between users, thereby creating a virtual remittance market.
- While remittance is potentially a very big opportunity for the carriers, the direct revenues are small; the carrier benefits — again — are stickiness.

M-wallets

- The development of the carrier-driven mobile wallet market is still relatively small-scale, but holds great potential. At present, the majority of applications are SMS-based.
- More extensive systems have encountered issues of security and hardware interoperability, which are often easiest to outsource to third party providers such as Paypal.

²² Baskerville: “Global Mobile Prepaid Strategies and Forecasts,” March 2004

²³ According to Baskerville, MNOs spend up to USD 15 billion per year on prepaid vouchers and paper-based recharging, in which 15-20 percent of annual revenues are reinvested.



Banking

For the banking industry, there is a trade-off. Banks have an opportunity to increase customer numbers through m-payment systems, but also need to gauge the amount of credit that can be issued against increased risk.

Mobile banking

- The majority of developments have thus far been around simple m-banking facilities that permit account enquiries or transfers of funds. The issue for the banks has been one of customer 'ownership', along with who should bear the distribution of risk.
- The big potential for the industry may lie in the provision of access to the 'unbanked market', increasing levels of consumption at point of sale and extending opportunities for accessing credit. This can include larger transactions and purchases.
- M-payments can potentially enable the extension of microfinance, either through direct access, or through the provision of cash management and loan disbursement tools to local institutions. M-payments also facilitate the ability to pay monthly interest fees on micro loans.

Retail

For the retail industry, m-payments are about widening the opportunities for payment, particularly mini- and micro-payments, while mitigating risk and capital expenditure. The industry has had to contend with two key issues. The first is the need to pay for, and to integrate, hardware such as card and chip readers. The second is the speed of transactions.

While it is the retail industry that it is seen by many proponents of m-payment solutions as the ultimate prize, the sector has thus far failed to pay off in any significant way. Traditional forms of payment still dominate throughout the region and the uptake of solutions continues to be fragmented.

M-wallets

- While both Japan and Hong Kong are now reporting declining levels of small currency in circulation, very few retailers are yet reporting significant levels of revenues from mobile transactions. Stores such as 7-11, fast food restaurants such as McDonald's, and emporiums such as Sogo are leading the way because they can enjoy volume across a chain of outlets. In this case the application works much like a loyalty card. But for other merchants the business case has yet to become compelling leaving the onus on the solution provider to generate both sides of the market: enough supply (number of merchants) and enough demand (levels of traffic).



Touch-and-pay

- The obvious examples are the transportation cards (such as Octopus in Hong Kong and Suica in Japan) that have expanded into retail. Other markets that promise to be big are the major cities of China where mobile phone usage is extremely high and smart card usage in metro transportation is just taking off making integration a distinct possibility. This type of m-payment has the potential to be taken up quickly by retailers in cities such as Hong Kong, Singapore and Taipei, where alternative forms of m-payment are still relatively limited.

Remittance

- Most P2P, or money transfer, solutions being used for retail began as simple remittance offerings, or top-up services, that were then extended as a virtual currency (minutes-for-money) by innovative traders. The business proposition for remote retailers is a very simple and effective one: increased volumes. How scalable this offering is, however, remains an open question, particularly for urban users.

Auction

- Although revenues have been low thus far, it is difficult to see why they won't grow substantially larger. There is no reason that the level of online auction revenue won't simply gravitate to m-payment given the extra convenience of mobile access and the time sensitivity of most online auctions.

Transportation

Touch-and-pay

- The transportation industry has been one of the big drivers of smartcards (notable examples include the Octopus in Hong Kong, Suica in Japan and Oyster in the UK). The business case is a very simple one of increased convenience, reduced transaction time and integrated transportation offerings, particularly for public transportation.

A further emerging example of the use of touch-and-pay in the transportation industry is in back-end logistics of supply chain management and procurement in the airline, rail, light rail industries and trucking industries.

M-wallets

- Most countries now support e-tickets, with electronic receipts downloaded (or received) to the handset sufficing for check-in. M-payment specialists such as Yeepay in China are now expanding this service out so that the tickets can be purchased via the mobile as well as stored and presented — see Yeepay case study; in India, India Rail enables SMS ticket and timetable enquiries as well online purchase (requiring a GPRS-enabled handset). Similar transportation initiatives are emerging across the region.

Media and entertainment

The media and entertainment industry covers a broad spectrum of activities, but the primary focus has been to extract value and generate revenues from digital content. Gaming is of particular interest due to its rise in popularity in recent years and its intense bandwidth requirements for multiplayer online games.

Content downloads

- Content downloads can be provided by the MNO, by a portal or third-party gateway or directly by the content owner/distributor. Two challenges have limited the level of direct m-payment download models for content owners. First, volumes are not yet large enough to justify the infrastructure necessary to see a return. Second, content companies are grappling with the question of how to price digital content for download.

Payment gateways

- For media companies, payment gateways provide a means and a model of multi-market distribution without having to deal with telecom carriers market-by-market, nor to worry about direct billing or chasing down bad debt. This combination of content providers (media companies) and third party payment service providers has been one of the most successful drivers of m-payments take up in its current incarnation across both developed and developing Asia. MovieSeer, based in Bangkok, for example, is able to act as-platform across Asia for the likes of Sony, Warner Brothers, Fox, and iFilms.
- In most cases, pre-paid top-ups are being used to charge for content, particularly in developing markets where mobile phones exist but payment is limited to cash. Thailand, Indonesia, the Philippines, and Malaysia are examples in Asia of markets where there is a high disposable income across certain demographics for particular types of content, and the consumer can pay through the use of a top-up card or payment entered into their mobile phone. Gaming has been a particular driver of this phenomenon across semi-urban Asia. In Korea, NHN, the online gaming company, says that 60 percent of its payments for digital content come through cellphone services, versus 5 percent for credit cards.²⁴

M-wallets

- Mobile wallet business models for media companies are similar to the retail sector in that they negotiate a revenue share with the telecom company, for placement on the telecom company's menu or interface. However, the attractiveness for the media company is usually far greater than for the retail merchant as it is direct revenue, and often extends the media company's reach to areas (or countries) they would not otherwise be.

²⁴ Moon Ihlwan, "In Korea, Cell Phones Get a New Charge," *BusinessWeek Online*, 2 March 2006

Case studies

> Smart in the Philippines

In 2004, Smart Communications, the leading mobile network operator in the Philippines and a subsidiary of the Philippines Long Distance Telephone Company (PLDT) was awarded 'Best Mobile Application or Service' by the GSM Association for 'Smart Load', the first over-the-air prepaid card reloading service. The service replaced prepaid scratch cards by allowing store owners to download airtime directly from Smart and resell the airtime as top-ups to their customers, again through a download, by sending a text message to Smart to make the accounting transfer. Smart has gone from 50,000 such outlets at the time of launch to over 850,000 today — a testimony to the success of the service.

The service was part of a pioneering strategy by Smart to leverage its network for m-payments to penetrate two types of market: the 'banked' and the 'unbanked'. In what became "the world's first electronic cash card linked to a mobile phone"²⁵ in December 2000, Smart in partnership with MasterCard introduced 'Smart Money' to enable people with bank accounts to transfer money to a Smart Money account. Payments can then be made using an SMS instruction to transfer money from this account to retailers, and subscribers can assign spending rights to other persons from the same Smart Money account. SMS confirmations of their transactions are then sent by Smart to the account holder. Money can also be transferred to pre-registered individuals. This is a one-way P2P (person-to-person)

remittance system, and it has since been emulated in many other countries.

For low-income customers, or those without bank accounts, Smart began reducing the size of airtime units that could be bought over-the-air, eventually as low as 2 pesos (less than one-third of one US cent) with their Pasa Load service, introduced in 2003. This allowed prepaid card users to 'pass' airtime to their friends and relatives, again by SMS.

In 2007, Smart took their m-payment model to the next stage by announcing their 'Smart Services Hub' platform to facilitate international remittances. This is being promoted as part of the GSMA Mobile Money Transfer (GMMT) programme to help migrant workers send money to their home countries. It is also part of Smart's efforts to export its m-payment remittance system and the accompanying intellectual property. The m-payment system can also be adapted into a payroll application.

As a first step, Smart has teamed up with MTC Vodafone and the Ahli United Bank of Bahrain to provide the first remittance system in the Middle East for Filipino workers. Ten million employees from the Philippines work overseas and remit over USD 14 billion annually, equivalent to 10 percent of the Philippines' GDP. It is hardly surprising then, to find that the monetary authorities in Metro Manila are so supportive of m-payments.



Lessons learned

Smart has chosen to go beyond the MNO-centric SMS-model that it pioneered to a bank-centric model. To achieve this, Smart dropped an earlier experiment of using a non-encrypted PIN to authorise payments from the handset. It recruited 40 professionals from the banking sector and over 300 programmers and technology partners to develop an encrypted security system and the interfaces needed to work with the bank's own IT systems.

This hefty investment has created two service benefits. First, it appeals to those with bank accounts, including the better off among the lower income groups, and to those who are attracted to open Smart Money and bank-issued MasterCard accounts. Second, it allows Smart to offer domestic and international remittance services without needing a separate licence, and where a foreign bank is involved, overseas workers can remit money in any currency. Specialist remittance service providers offer similar services, but they are not able to offer the ubiquity of mobile phone access.

²⁵ "What Works: Smart Communications — Expanding Networks, Expanding Profits," Sharon Smith, World Resources Institute: Digital Dividend, September 2004

> Yeepay's B2B approach

Founded in 2003 in Beijing, Yeepay has focused on telephone payment through call centres and an interactive voice response platform. Yeepay does not consider itself an m-payment company, but has instead sought to distinguish itself as an e-payment service provider with a single platform that integrates online and offline payments (radio frequency identification primarily telephone payments). It is this platform approach that has enabled them to move into m-payments in a niche fashion, targeting specific industry verticals and the B2B space.

The low level of credit card penetration and credit card usage in China means that while customers can often order goods and services electronically, they have more difficulty paying electronically. The lack of a secure and trusted remote payment mechanism, combined with personal liability for fraud and misuse of bank card information, means that Chinese consumers are reluctant to trust merchants with personal card details. As a result, cash-on-delivery remains a huge market in the major cities.

With e-payments still in the early stages of development in China, Yeepay targeted the obvious gap in the system with a two-step approach:

- First, combining online and telephone orders with a range of merchant relationships meant they became an established third party provider, while still enabling cash on delivery as required.
- Second, targeting corporate accounts for pre-registration they minimised bad debt and built a secure customer base.

In 2006, the Chinese government decreed that all domestic air tickets should become paperless in a bid to boost economic activity and reduce waste. With customers now wanting to purchase their tickets over the phone and then check-in by simply displaying their ticket details on their handset, Yeepay chose not to compete with the established B2C players such as China Union Mobile Pay. The company decided that they would focus on corporate spending rather than compete on either price or reach, particularly as they could leverage off an existing base of pre-registered credit and debit card information.

Chen Yu, Yeepay's CMO, believes that China's payment market will be based predominantly on telephone and Internet payments in "the near future, but in about five years the trend will become dominated by online and m-payments."²⁶ As such, the company is adopting a wait-and-see approach to m-payments, moving selectively into identified business sectors. "We do not want to try competing with Union Mobile Pay for individual consumers or Alipay for consumer goods, as B2B is a more profitable space to target right now," explained Chen.



Lessons learned

In China, the e-ticket market was estimated at USD 1.5 billion in 2006, but could grow to USD 15 billion by 2008. The mobile top-up market is already worth more than USD 15 billion and is growing by 20 percent per annum.²⁷ If the corporate portion of these markets is roughly 25 percent and Yeepay can dominate the space, they will have leveraged their set-up very successfully.

²⁶ Personal interview with Chen Yu, CMO Yeepay, Beijing, 15 May 2007

²⁷ Yeepay internal statistics; see also Analysys International (www.analysys.com.cn) and "Mobile Payment in China", Maverick China Research

> The growing reach of Octopus

The world's most successful B2C application of a contactless card is the Octopus card in Hong Kong, amassing HKD 77 million (almost USD 10 million) in daily transactions, or some HKD 29 billion per year.²⁸ Established in 1994 by Creative Star Ltd, a non-profit joint venture between the metro, railway and bus companies, it changed its status in 2001 to become the for-profit Octopus Card Ltd (OCL). In 2000, the Hong Kong Monetary Authority (HKMA) granted the company a Deposit Taking Company licence that removed the restrictive 15 percent ceiling on revenues from non-transit sources. As a result, Octopus card usage expanded into retail, parking, libraries, vending machines and kiosks, and door access for commercial buildings and leisure facilities. By 2006, over 20 percent of revenues came from these services.

Octopus is now developing revenue streams in the following areas:

- Retail: OCL charges between 1-4 percent commissions.²⁹
- Data mining: Octopus has started offering discounts to customers who sign an agreement allowing Octopus to track and store data on their purchases — which is possible because each card has a separate ID — so that they can share that data on a confidential basis with their business partners.

- Branding and advertising: Octopus has begun renting out space for discount and loyalty cards on its card.
- Internationalisation: Octopus is extending beyond Hong Kong, for example into Shenzhen in China, and is supplying its system to the public transport network in the Netherlands.
- M-payments: With the convergence of contactless card technology and handsets, Octopus began to experiment with m-payments early on.

In June 2002, Nokia and Octopus launched the Octo-Phone. The contactless card was entirely independent of the phone and was housed inside a special casing for the phone that retailed at HKD 190. 'Robin-nest' blue was the only colour available, with 50,000 units sold.³⁰

Having failed to realise significant economies of scale, the trial was discontinued, but the story may well be different the next time around if Octopus can be incorporated in an NFC handset. But the Octopus card, like Singapore's ezlink transportation card, uses Sony's FeliCa chip which is currently incompatible with NFC, so convergence of Octopus and m-payments is only likely to succeed if a harmonisation of industry standards can be achieved.³¹



Lessons learned

The success of Octopus in becoming a 'trusted third party' for payments clearances was facilitated at first by its ubiquity as a de facto monopoly card issued by the consortia of transportation companies. This ensured compliance of all the card readers on buses, trains, ferries.³² It is also popular because the transaction is fast and is an easy substitute for cash. Extension into m-payments for Octopus has been hampered because these two criteria are missing.

²⁸ Hong Kong Legislative Council, "Information Note: Operation of the Octopus Card in Hong Kong", 8 June 2007

²⁹ The retailer pays around HKD 3,000 (nearly USD 400) for the card reader.

³⁰ *The Economist*, 10 December 2005

³¹ As NFC phones will have a far larger share of the world market than FeliCa, finding mutual advantage and reaching agreement may prove difficult.

³² Taxis are the one mode of public transport that have not yet adopted the Octopus card, in part because the Transport Department, which is supportive, has legal concerns over passengers being guided to retail outlets that offer special discounts for Octopus card users.

> Gaming and virtual money

Broadband mobile phone networks are making access to online virtual worlds easier and ubiquitous. Virtual money is being created in these virtual worlds, and m-payments are becoming a vital part of it. Two leading examples of virtual money are Linden dollars in the US and QQ coins issued by Tencent in China.

In the virtual world of *Second Life*, a game created by Linden Lab of San Francisco, players can explore their online 3D environment through their characters or personas which can walk or fly, interact with others, go shopping, attend concerts, own property, set up businesses, and trade products and services. *Second Life* has its own economy and a currency called Linden dollars which can be converted back into real US dollars. For one US dollar, paid out through PayPal or a credit card, one gets 266 Linden dollars, a free market price determined by supply and demand. Linden dollars can also be sold on the Linden exchange or "LindeX".

With the launch of a software kit that can translate the *Second Life* configurations to other languages like Korean and Japanese, there is concern over the promotion of online gambling taking place in the *Second Life* virtual casinos. Online gambling is banned in Korea, Japan and several other Asian countries. In Korea, the law was revised in April 2007 to add restrictions on the offline trade of cyber items, making a distinction between the selling of unwanted items and money-making or trading for profit.

In 2002, Tencent, operator of the largest instant messaging service in China, began issuing the QQ coin. This was originally intended to buy

services such as electronic greeting cards, cartoon portraits, chips for online games, and anti-virus software. Its popularity has led to smaller third-party websites accepting the coins as payments for their services, since QQ coins are easier, safer and cheaper to use than other payment systems. QQ coins are accepted for virtual items, such as game points and magical swords, and real-world merchandise, such as clothes, flowers, CDs, and makeup. At e-commerce sites and informal online currency marketplaces, thousands of brokers and users can turn the QQ coins back into cash by selling them at a discount in what is called the RMT or real money trade. The 'official' exchange rate is 1 QQ coin for 1 yuan (around 13 US cents) and QQ coins can be bought with cash, bank cards, mobile telephone cards, or stored-value QQ cards.

According to one estimate, the total volume of trading in virtual items in China in 2006 was worth about USD 900 million, with about 45 percent of that attributed to Tencent items.³³

Tencent began to tighten its QQ coin policy when the hacking of user accounts to gain access to the QQ coins became a problem. In February and March 2007 a joint statement by the Ministry of Public Security, the Ministry of Culture, the Ministry of Information Industries (MII) and the General Administration of Press and Publication (GAPP) announced they would take action to regulate the online game providers with gambling characteristics, including Tencent. At the same time, the People's Bank of China (PBOC) announced that it would bar the trading of virtual money for real currency or for buying real goods and services, to maintain "real economic and financial order."³⁴



Coming up with draft regulations and the software to monitor virtual money transactions and to enforce the law will take time. When Tencent shut down its service exchanging game coins for QQ coins, the 'capital controls' ended up giving QQ coins scarcity value, driving up their price by 70 percent³⁵. Despite efforts by Tencent to prevent a secondary market in the trading of QQ coins, as of April 2007 Taobao, China's most popular auction website, was trading RMB 500,000 (USD 62,500) in QQ coins every day.³⁶

Lessons learned

The link between virtual money and m-payments initially rests with mobile games which, like their online versions, allow users to spend virtual money on virtual items or attributes. Gaming companies have also begun to launch more ambitious mobile formats of multiplayer online games. For example, in 2006 Korea's KTF unveiled "IMO, the World of Magic", which lets up to 1,000 players log on concurrently through their mobile phones. M-payments are about to take off in these extended cyber environments, and monetary and tax authorities are taking a closer look at the implications: the former to protect the value of the national currency, and the latter to determine when virtual money revenues really become taxable.

³³ "Taobao carries on with QQ coins," *South China Morning Post*, 24 April 2007

³⁴ "Virtual Money Poses a Real Threat," *China Daily*, 26 December 2006

³⁵ "China's New Coin of the Realm?," *The Wall Street Journal*, 30 March 2007

³⁶ "Virtual currency proves real issue," *Shanghai Daily*, 9 March 2007

> A view from the bottom of the pyramid

Across Asia, millions of people rely on informal economic activity and small, local level networks for their survival. In many countries, this activity accounts for up to 30 percent of official GDP — and could encompass up to 80 percent of the population.³⁷

These people are at the “bottom of the pyramid” and they suffer in two ways. First, they have limited access to basic infrastructure such as banks and financial services, telephones, clean water, schools and health facilities. Second, they pay a penalty by being cut off from national and global markets, which can mean they pay higher prices for basic goods and services, often with lower quality.

Bringing low-cost mobile phone services into such communities is not only a way to provide telecommunications. With m-payments, it can also be a way to facilitate a range of remittance, payment and banking services. In virtually every country in Asia today, mobile phones outnumber fixed line phones, driven largely by the availability of pre-paid cards among the urban and rural poor. MNOs are awakening to the fact that this is where their next billion customers will come from.

A recent United Nations-sponsored report, entitled *Mobile Banking and Low-Income Customers*, argues that m-payments could help to stimulate economic activity among these poorest segments of society. The report

draws on experiences from South Africa, where the transaction costs of m-banking are typically lower than for conventional banks.³⁸

Two caveats are required. First, as the report notes, most users in the survey would still prefer to “deal face to face with a person rather than an electronic device, even if the device is faster.” Second, the report makes clear that it is not the very poorest who are using the m-banking service, and therefore there is an element of m-banking in low-income countries bringing accessibility to those with access — in other words, a substitution. This in itself is a gain as it means greater choice and financial savings, but it reminds us that progress is mostly incremental. What is important is how cumulative and rapid these incremental changes are.

The scale of demand is particularly significant in rural communities around Asia. Studies suggest that rural households are willing to pay between 1 to 5 percent of their disposable income on telecommunications. Although these are small amounts individually, in sum this equates to a market worth billions of dollars.³⁹

There is plenty of evidence that once people gain access to a phone, they find many ways to exploit it to their benefit. For example, in Nepal and in Sri Lanka, people phone local community radio stations where a radio host checks the Internet for them



and responds to their questions about farming issues, weather forecasts or market information.⁴⁰ In Cambodia, India, Indonesia, the Philippines and many other developing countries, small shops and kiosks can often be found in rural towns selling pre-paid cards, renting handsets or providing access to the Internet.

Mobile phones have been closely linked with a number of microfinance initiatives. A well-known early experiment, for which Dr Muhammad Yunus was awarded the Nobel Prize in 2006, was a microfinance project involving Grameen Bank and Grameen Telephone Company in Bangladesh. Grameen Bank focused upon women in poor villages, providing them with a small loan to buy a mobile phone. By selling phone services to their neighbours, the women raised their status, created a viable business and paid back their loan. Other initiatives have followed, making the market more competitive and further reducing the costs for owning and using a mobile phone.

³⁷ Allen L. Hammond, William J. Kramer, Robert S. Katz, Julia T. Tran, and Courtland Walker: IFC/World Resources Institute, *The Next 4 Billion*

³⁸ CGAP, UN Foundation and Vodafone Group Foundation: “Mobile Phone Banking and Low-Income Countries (2006)”

³⁹ R. Kayani and A. Dymond (1997): “Options for Rural Telecommunications Development,” *World Bank Technical Paper No. 359*, The World Bank, Washington D.C.

⁴⁰ Roger W. Harris (2003): “ICTs for Poverty Alleviation,” *APDIP e-Primer series* <http://eprimers.apdip.net/series/info-economy/poverty.pdf>

The next step may be the promotion of m-payments and m-banking. In India a pilot project has been launched by Bharti's Airtel MNO, the Bank of India, the ICICI Bank and the payments company mChek in the small Himalayan town of Pithoragarh. Overseas workers can deposit money in an overseas bank, and send an SMS instruction to have the money transferred to a bank account or to a mobile m-wallet in India. The recipient of the money will receive an SMS informing them of the money waiting for their collection. It is a simple model, with similarities to the Smart model in Philippines. This is part of a global 'Migrant Money Transfer' scheme supported by the GSM Association (GSMA) working with the CGAP (Consultative Group to Assist the Poor), a microfinance group of the World Bank's IFC, and the UK's Department for International Development (DFID). Together, they are conducting a survey of 20 countries to understand what is possible and permitted under existing local laws and regulations.

For banks, m-banking has represented a risk in the past, but as technologies mature and security improves — especially if banks perceive the value of serving a wider market — then there may be the potential for dramatic changes.

Unless they have a specific mandate to serve farmers, rural entrepreneurs and village community initiatives, the reality is that many large banks will choose to focus on customers higher up the economic ladder. However, if m-banking can significantly lower transaction costs, and provided banks are not required to build expensive bricks-and-mortar branches, it makes business sense to test the market.

In many developing countries, such as India and in China, there is also a network of rural post offices that can act as agents for cash deposits and withdrawals, in addition to other trusted local entities. Assuming payment companies are permitted to act as intermediaries between the banks, the MNOs, the merchants and these payment agents — for example, if payments companies are allowed to act under the licences of the banks rather than be required in all cases to have separate and independent licences — there will be, for the first time, a supply to meet the demand at the bottom of the pyramid.



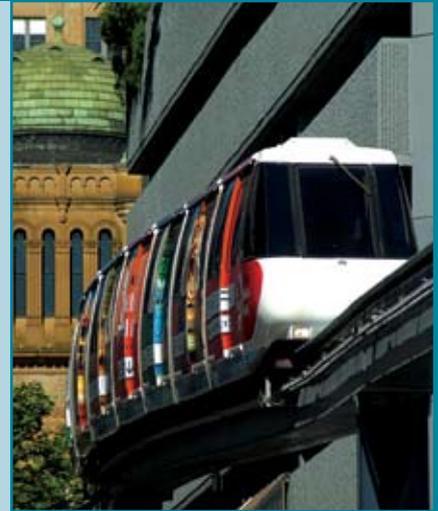
> mHITs in Australia

Up to 2007, m-payments have not taken off in Australia, and there has been little or no initiative in bringing together various industry stakeholders. Mobile network operators have been reluctant to invest in m-payment systems, preferring the relatively-known revenue streams associated with premium SMS services such as ringtones, games and news alerts. In these businesses, the mobile network operators (MNOs) either provide their own content or share revenues with content providers. Banks too have shown reluctance to venture into the realm of m-payments.

In 2008, Telstra, National Australia Bank (NAB), and Visa will launch a small trial in Melbourne for Visa's payWave system of contactless payments. Chips embedded in the user's phone will enable payment to be made by passing the phone over a reader. However, the parties involved in the trial are not committing to a commercial rollout of the technology in Australia, and even if they do go ahead it will take several years for the point-of-sale readers to appear in mass market proportions.

The most notable mass scale examples of m-payments currently in operation in Australia are for basic traffic-related transactions, for example for toll roads and parking meters. However, many of these require single purpose-specific devices such as in-car tags for toll roads.

Despite this general sluggishness, there are some emerging operators pursuing m-payment business models. For example, in 2007, a company called mHITs was awarded the *People's Choice Next Big Thing Award* for the most innovative local venture into m-payments, offering a service that allows account holders to make micro-payments of typically below AUD 10 by simply sending an SMS. It focuses on the Y-generation of young users by attracting digital online content that will appeal to this segment from content providers on more favourable revenue-sharing terms than the MNOs. However, as yet, it is a start-up in the beta testing phase rather than an established business.



Regulations and standards



Mobile network operators typically do not require special licences when they serve as access and transmission networks for banks to provide m-banking services. However, as they become more involved in third-party payments processing and cross-border remittance services, they may be required to apply for licences under domestic legislation and regulations. In some jurisdictions, such as the Philippines, the financial authorities positively encourage MNOs to offer these services because of their contribution to the country's foreign exchange earnings. In the European Union, MNOs are for the most part offered exemption from licensing, but this situation is only provisional.

Since the development of m-payments is at a relatively early stage and not yet a substantial market in terms of volume, most economies in Asia Pacific are approaching the subject with caution. Many have introduced laws and regulations governing e-payments, but not specifically covering m-payments. Yet concerns over tax evasion, money-laundering and even terrorist financing are alerting authorities to the need for vigilance over all forms of e-payments.

At the same time, governments are awakening to the advantages of encouraging m-payments as a boost to e- and m-commerce and the ancillary industries involved in them. Financial regulators and MNOs around Asia Pacific are thus on a learning curve, and while learning from each other there should be no need to reinvent the wheel. Below we examine the approaches being adopted in a number of countries, and note that the European Union's approach may offer a way forward.

Figure 6: Issues arising from m-payments

Taxation	<ul style="list-style-type: none"> • Should m-payments be subject to VAT or goods and services tax? • Should cross-border transfers be subject to taxation, and if so in which jurisdiction — in the vicinity where the mobile customer is at the time of the purchase, where the customer's network operator is located, or where the merchant is located?
Prudential requirements	<ul style="list-style-type: none"> • Should MNOs be subject to minimum capital requirements, be required to enrol into bad debt insurance, or be required to maintain a certain level of liquidity ratios? • Are the telecom licence conditions and regulations of the telecom licence already sufficient? • Should MNOs be exempted from deposit-taking licences for non-bank financial institutions? • Should MNOs be allowed to offer m-card services without the involvement of banks?
Commercial theft	<ul style="list-style-type: none"> • Are general laws sufficient to address m-payments theft and fraud?
Identity theft	<ul style="list-style-type: none"> • Where does liability lie, and should it be linked to minimum standards of security for MNOs and merchants or left to industry-driven standards?
Money laundering	<ul style="list-style-type: none"> • Should minimum levels of customer and transactions data recording and storage be mandated?
Funding illegal activities	<ul style="list-style-type: none"> • Do existing privacy and personal data protection laws clash with the need to monitor m-payments when crossing ('roaming') borders? • Do laws governing wireless-tapping and the use of encryption need revision in a world of P2P broadband 3G+ mobile networks?

These issues sometimes cut both ways. The normal concern about taxation, for example, is that any form of e-payment may evade the scrutiny of the Inland Revenue, but in China the opposite is true. It has been suggested that the major reason the Government is promoting the use of cards over cash at China's 810,000 merchant point-of-sale terminals⁴¹ is "to force merchants to report more of their sales and bolster tax revenues."⁴²

⁴¹ Report on "China Card & Payment Conference 2007" by Mr Huang Yuanchan, Vice President of China UnionPay, 7 June 2007

⁴² China will issue over 7 million contactless tickets for the Beijing 2008 Olympic Games to counter the threat of fakes. "Contactless tickets will make debut in Beijing Olympics," *CardTechnology*, 22 June 2007



MNOs and banks

MNOs and third party payment processors that facilitate m-payments which go beyond the simple one-way remittance of money have taken the first logical step towards becoming banks. Banks are deposit-taking financial institutions that use their deposits to create credit in the form of overdrafts and loans. MNOs and payment processors take de facto deposits in various ways, for example when issuing a pre-paid phone card or when storing value in an m-wallet, and they create de facto credit whenever they do not require instantaneous bill settlement, for example in cases of post-paid subscribers and monthly billing.

This does not imply that MNOs will become banks, although in developing countries they may become an alternative for the 'unbanked', as is the case in several African countries. The issue is important for two reasons. First, banks who fear competition have lobbied in various jurisdictions for financial regulations to impose proportionate prudential requirements upon MNOs and payment processors. Second, financial regulators want to know that the supply of money, including electronic money, is ultimately under their supervision. This is becoming a real issue in many countries, where e-payments, including m-payments, are directly responsible for reducing the use of cash.⁴³

Bank suspicions are a real issue. For example in 2001, when Korea's S.K. Telecom launched a funds transfer and person-to-person payment service called 'NEMO', the head of Korea's Koomin Bank issued "a warning to his fellow bankers that the likes of SKT were out to steal their business."⁴⁴ The following year when SKT launched 'Moneta', a card which slotted into a handset, it forecast 440,000 merchant card readers by end 2003, but when the time arrived banks and card companies had issued only 20,000 cards.

More recently suspicion has given way to collaboration. In 2007, both SKT with Visa Card and rivals KT Freetel with MasterCard are launching commercial m-payment services. These are not just trials. They are designed to migrate from the current technology based upon a universal SIM-card (USIM) for 3G phones to the state-of-the-art NFC (Near Field Communications) technology when it becomes more widely available in handsets in 2008.⁴⁵ Similar market launches are planned across many parts of Asia, Europe and the North America.

In the longer term, MNOs will inevitably become part of the banking and payments process in two senses: directly as vehicles for m-banking services, and otherwise as an integral part of e-commerce through the growth of m-payments. For this reason MNOs and financial regulators will have to decide where the lines for licensing are drawn. For example, Vodafone and T-Mobile in Europe have set up financial subsidiaries issued with e-payments licences as a precautionary measure, in case regulatory requirements change.

⁴³ "Number of Cell-Phone based Credit Card Users Surges to 2.6 Million," *Nikkei Report* 20 January 2007

⁴⁴ "Korean Telcos and Card Companies Clash Over Mobile Commerce," Dan Balaban, *Card Technology*, 2 October 2003

⁴⁵ By 2Q 2007, only two vendors were producing NFC-enabled handsets. Pre-3G Korea used CDMA cellular handsets which do not use SIM cards; hence in 2002 SKT used a card slot to insert a chip card. 3G handsets all use SIMs and the next generation U-SIM (Universal SIM) has more capacity to house applications for m-payments, such as OTA (over-the-air) downloads of card data and inter-operability with the NFC chip.



Financial regulations and m-payments

Surveys by the Committee of Payment and Settlement Systems (CPSS) of the Bank for International Settlements (BIS) show that Asian economies tend to follow common prudential principles and requirements towards the regulation of non-banking financial institutions involved in e-payments, where m-payments are regarded as a sub-set of e-payments.⁴⁶

Risk and security aspects of m-banking projects are generally covered by banking laws, licences and regulations, while deposit-taking licences and/or monetary authority approvals are required for non-banking card issuing financial companies. The latter includes the issue of stored value cards. Normally, the 'float' of monies on deposit at any point in time will only be sizable in the case of multi-purpose cards, and monetary authorities tend to apply regulatory 'proportionality' by setting thresholds on the 'float' beyond which a deposit-taking licence or an approval to operate is required. In Singapore the threshold is SGD 30 million. In Hong Kong exemption only applies where the maximum stored value per card is HKD 1,000 or less.

These licensing laws and regulations are important to m-payments because as soon as a card enters a mobile phone, either as part of the m-wallet or as a contactless card, the MNO or the third party payments processor has to choose whether to apply for a deposit-taking licence or to operate under the umbrella of an already licensed bank. Thus, licensing laws and regulations may impose restrictions upon what services an MNO or a payments processor can offer, making them dependent upon the existing banking and domestic payments clearing house system. This can limit the degree of independent competitive market entry that is possible. MNOs may be wary of this because it means the deposit-taking financial institution "will in these circumstances 'own' a significant part of the client relationship and have an influence on the emergence and evolution of new payment services and providers."⁴⁷

Implementing threshold policies for deposit-taking licences requires high standards of data recording and reporting by and from banks and non-banks to the Central Bank or monetary authorities. This remains a major challenge in many jurisdictions, hindering the development of laws and regulations and thus holding back the offering of m-payment services. This has been especially true in Indonesia where, in contrast to the Philippines, P2P m-payments such as m-remittances have stalled. In Taiwan, banking law requires that m-wallet and contactless card services involve a bank which must have a local physical presence. In Malaysia, the law determines that only a financial institution may issue a multi-purpose card, while other forms of m-payment, such as remittances, require monetary authority approval. In Thailand the application of banking laws

⁴⁶ "Survey of developments in electronic money and internet and mobile payments," CPSS, March 2004, BIS

⁴⁷ Ivan Mortimer-Schutts: "The regulatory implications of mobile and financial services convergence," *The Policy Paper Series*, No.6, July 2007, Vodafone-Nokia

“Since the m-payments industry is in its infancy, industry and public consultations are another common policy feature.”

to m-cards remains undecided, although the Bank of Thailand (BOT) has met with card companies to agree a code of conduct, and currently restricts e-payments to Baht and m-card schemes to financial institutions.

Other common policy aspects include industry ‘codes of conduct’ by banks and financial institutions and card-issuing companies. Also, the issuing of ‘guidelines’ by monetary authorities is designed to promote prudential ‘best practice’, to reduce security risks, ensure timely and accurate reporting of financial activities, and protect consumers from identity theft.

Since the m-payments industry is in its infancy, industry and public consultations are another common policy feature. In some jurisdictions, such as Thailand and Vietnam, this process is itself in its early stages, while in others it has progressed towards the policy-making stage. For example, China has determined that national e-payment licences will be issued only to companies with a paid-up capital of RMB 100 million, regional licences to companies with a paid-up capital of RMB 50 million, and foreign investors will be restricted to less than 50 percent equity. In Hong Kong, discretion is given to the monetary authority to judge the financial strength of an applicant against their proposed business plan.⁴⁸

Despite these common policy trends, each and every jurisdiction has its own context and characteristics.

Japan

In Japan, the credit card and prepaid card business, and therefore m-payments, falls under the purview of the Ministry of Economy, Trade and Industry (METI) and not the Ministry of Finance, unlike other jurisdictions.⁴⁹ Historically there have been government restrictions prohibiting banks from offering revolving credit, so credit cards are in reality debit cards where the money is automatically deducted from a person’s bank account at the end of the month. This partly explains why credit card usage is so low to begin with in Japan, due not to cultural factors, but government restrictions. Filling the demand for short term credits are consumer finance companies and on the fringes, illegal loan sharks. To address this problem, the government is beginning to relax its regulations.

Taking advantage of this relaxation, DoCoMo started a consumer credit service in April 2006 called DCMX via iD, DoCoMo’s brand and platform for mobile credit cards. The iD is a platform in the sense that banks can download a mobile wallet application in compliance with the iD specs — for example, the Sumitomo Mitsui Visa card (DoCoMo holds a minority stake in that bank’s card issuing business) and Family Mart’s Famina mobile credit card — and use it wherever an iD reader/writer is deployed. DoCoMo collects a fee for the rental of the IC space on the iD card, and also a share of the merchants’ fees on other card retail transactions using the reader.

⁴⁸ PBOC: Administrative Procedures on Payment and Settlement (Consultation paper), June 2005

⁴⁹ METI: Interpretative Guidelines on Electronic Commerce, May 2006

As a credit business DCMX is a form of consumer loan, with DoCoMo imposed loan limits, and with revenue arising from interest on revolving credit. As a line of business it falls within the scope of the METI's Electronic Commerce regulations. Another regulation that MNOs need to consider as they widen their activities is the Prepaid Card Law that requires card operators to report unused amounts every six months and deposit funds equal to half of it with the Bank of Japan. While e-money is not included under this Law, the trading or remittance of e-money might be considered a violation of the Banking Law and the Investment Deposit and Interest Rate Law, and reforms to exempt these activities are under consideration.

Korea

From 1 January 2007, under the Electronic Financial Transactions Act (EFTA), companies engaged in electronic financial transactions, such as offering credit or deferred terms of payment, the means of payment and the process of payment settlements, must obtain a licence.⁵⁰ The obligations include:

- accounting separations between different lines of financial business
- meeting minimum security standards
- keeping transactions records for up to five years
- providing performance reports to the Financial Supervisory Commission (FSC)
- being subject to FSC supervision.

Under the EFTA payment companies are prima facie liable for financial damages to customers, subject to proof of reasonable security measures, which include adequate insurance.

The Act follows a period after the 1997 Asian economic crisis during which credit card fraud hit an all time high. The government's response was the Comprehensive Policies for e-Commerce Development, adopted in February 2000, followed by a national strategy for promoting e-business (e-Business Initiative in Korea) in 2001 which resulted in the E-Commerce Consumer Protection Act, and its amendments in 2005 that became law in 2006. Covered are businesses that either engage directly in e-commerce or facilitate third party e-commerce through the provision of websites and web-based payment systems.

Obligations include:

- formatting payment procedures to allow customers to confirm or change details of purchase orders
- providing steps to protect customer data and confirm payment settlement details
- displaying full details of the service provider on the website.

⁵⁰ Korea's large *chaebols* or conglomerates are prevented from direct investment in banks, a policy the FSC has recently called into question. "Ban on chaebol investing in banks 'must go'" *Financial Times* 6 July 2007



The regulations include prudential requirements for bank deposits by designated third party traders. Rules issued by the Korean Fair Trade Commission (KFTC) give powers to city and provincial governments to ensure third party traders do not abuse their position. The commercial operations of MNOs will be subject both to the EFTA and the E-Commerce Act, whenever m-payments involving trades are involved.

Lastly, under the Telecommunications Business Act the operator of an online marketplace requires a value-added service provider licence, and such companies must also file reports on their status with the Ministry of Information and Communications. They are also subject to the Information Communication Network Act that covers access to information and data protection.

China

While the mobile market is characterised by the effective duopoly of China Mobile and China Unicom, it has been the third-party payment gateways that have driven the m-payment market in China. These m-payment providers have to sign contracts with network operators and banks at the regional, not national level.⁵¹ Therefore a key issue that the regulatory framework in China will help to address is the fragmentation of market participation.

The first step towards the regulation of e-payments was officially taken with the passing of the Electronic Signatures Law by the National People's Congress in 2004. This was soon followed by a process of public consultation on the scope of future legislation that led to the introduction of electronic banking regulations and licensing by the CBRC (China Banking Regulatory Commission) on 1 March 2006.⁵² These cover telephone, Internet and mobile banking. Services to corporate and individual customers overseas are covered by the supervisory framework, but this does not apply to PRC citizens living and working overseas.

From the consultation process it has emerged that third-party payments, including e-payments, will be classified as non-banking financial business and will come under Central Bank supervision. In addition, a licensing system will be introduced, and the management of a company's customer funds will have to be handled by a bank. This requirement adds a prudential safeguard, for example the Industrial and Commercial Bank of China (ICBC) requires e-payment service providers to transfer 30 percent of their previous month's transactions to their cash deposit.⁵³ The requirement also clearly defines the division of business between banks and non-banks, such as MNOs, in the area of e-payments and m-payments.

⁵¹ UnionPay, which is owned by the Bank of China has two joint ventures, UMPay with China Mobile and Huajian with China Unicom. There are around 30 companies in China offering online payments processing, and eventually only those with licences for non-banking financial institutions will be allowed to operate.

⁵² A State Council "Opinions on Accelerating the Development of E-commerce," in January 2005 was followed by a draft "Management Regulation on Payment Organizations" put out by the Department of Payment and Clearing of the People's Bank of China in June 2005.

⁵³ "Central Bank to Supervise E-Payments," *China.org.cn*, 2 September 2005



Four categories of business will be covered: bank cards, invoice-based e-payment companies, online payment companies, and other non-banking institutions. MNOs would presumably fall into the fourth category, and how m-payments might be interpreted could differ according to the precise business models adopted. But overall supervision of MNOs is likely to fall under the Non-Financial Institution Supervision Office of the CBRC, while operational regulation could fall under the Payment Management Office (PMO) of the People's Bank of China (PBOC) due to the PMO's focus on the 'float', the monies held as *de facto* deposits by MNOs, and payment processors.

According to various reports, in April 2007 the PBOC held meetings with ten service providers and payment processors — AliPay, TenPay, Fu Fei Tong, 99Bill, YeePay, UMPay, Visa, MasterCard, PayPal and First Data — giving rise to an expectation that e-payment licences would be issued during the second quarter.⁵⁴

The State Administration of Taxation (SAT) has indicated it intends to issue taxation guidelines in the near future, and although there is resistance from the industry some provincial governments, for example in Jiangxi Province, have already made it mandatory for Net stores to get a license, so they can be taxed more easily once a law is enacted.⁵⁵ Should the new law require MNOs to keep detailed records of m-payments to third parties for Internet transactions, the costs of managing m-payments processing would increase, reducing margins or dampening demand. For example, Shanghai-based Smartpay is processing close to RMB 1 billion a month on behalf of mobile operators, mostly telephone and utility bills. Separating third-party revenue payments could be a challenging new step.

India

The Reserve Bank of India (RBI) has been grappling with rather different problems from those facing China. Additional 'Know Your Customer' (KYC) rules were introduced in April 2007 by the RBI, strengthening security requirements on banks and non-banking institutions involved in money transfers of any kind. Now they must record details of their customers sending funds, including their personal ID and all the numbered accounts they hold, and must store this as protected data for at least ten years.

To enforce the KYC rules, the many hundreds of thousands of agents and sub-agents in towns and rural villages across India, ranging from the local post office to authorised individual money exchange dealers, will need to be vetted, trained and certified by the payment processing companies in the task of enforcement. Typically, payment processors such as US-based Obopay who recently entered the Indian market, leave the cost and complexities of compliance to their local Indian partners, the MNOs for telecom regulations and local banks for financial regulations.

⁵⁴ "Rumour: E-Payment Rule To Be Published This Week," *China Tech News* 13 June 2007
⁵⁵ USITO: *ChinaTZone*, April 2007

Currently, there are no industry-accepted minimum or maximum charge threshold for m-payments, and each bank entering the e- and m-payment markets operates its own independent payments gateway. In the long run, it is anticipated the RBI will take a view on the structure of the industry, and there is likely to be consolidation around two or three competing gateways which will help bring the benefits of network effects.

Lessons from the European Union

Articulation of the common policy trends mentioned above comes out clearest in the efforts to harmonise policies across the EU, which is the key objective of the European Commission (EC). For this reason the following three EC Directives and the debates around them could provide useful guidance for countries in Asia that are still developing their own policies and policy instruments.

- The E-Money Directive (EMD) relates specifically to e-payments, and “seeks to open the market for the issuance of E-money to non-banks through the creation of ‘Electronic Money Institutions’ (ELMI) regulated under a lighter prudential regime than that required of credit institutions.”⁵⁶ Up to now, Member States have exempted MNOs and m-payments from ELMI licensing.
- The Payments Services Directive (PSD) sets out levels of information access, obligations and liabilities on the payment processors, such as banks and credit card companies.
- The Single Euro Payment Area (SEPA), which will launch in January 2008, opens cross-border credit and credit-card services to EU-wide competition, but not so for m-payments. The rules and regulations governing ELMIs, including m-payment systems, are delayed until 2009.

MNOs, banks as issuers of credit cards, credit and debit card companies, and payment processors will all be influenced by the new security measures that have been added to the payments process, including the technology of the cards themselves, in order to become SEPA-compliant.

The delay in introducing SEPA unified cross-border m-payment rules and regulations until 2009 has arisen from concerns over the levels of compliance that should be imposed under the EMD on ELMIs. Taking into account the embryonic state of m-payments and the fact that at this stage m-payments are typically micro-payments, there has been a consensus against imposing strong regulations. For example, there is scant support for imposing a deposit guarantee requirement on MNOs to protect consumers of pre-paid cards against default, nor have there been any strong arguments against permitting ELMI's to pay

⁵⁶ European Commission: *Commission Staff Working Document on the Review of the EMD 2000/46/EC*, 19 July 2006

interest on monies received.⁵⁷ On waivers from national banking and financial regulations there has been less consensus, and although the usual practice has been to grant waivers to MNOs, the stated reasons vary. While some Members States adopt a blanket or 'class' policy, others deal with each MNO application on a time-consuming case-by-case basis.⁵⁸

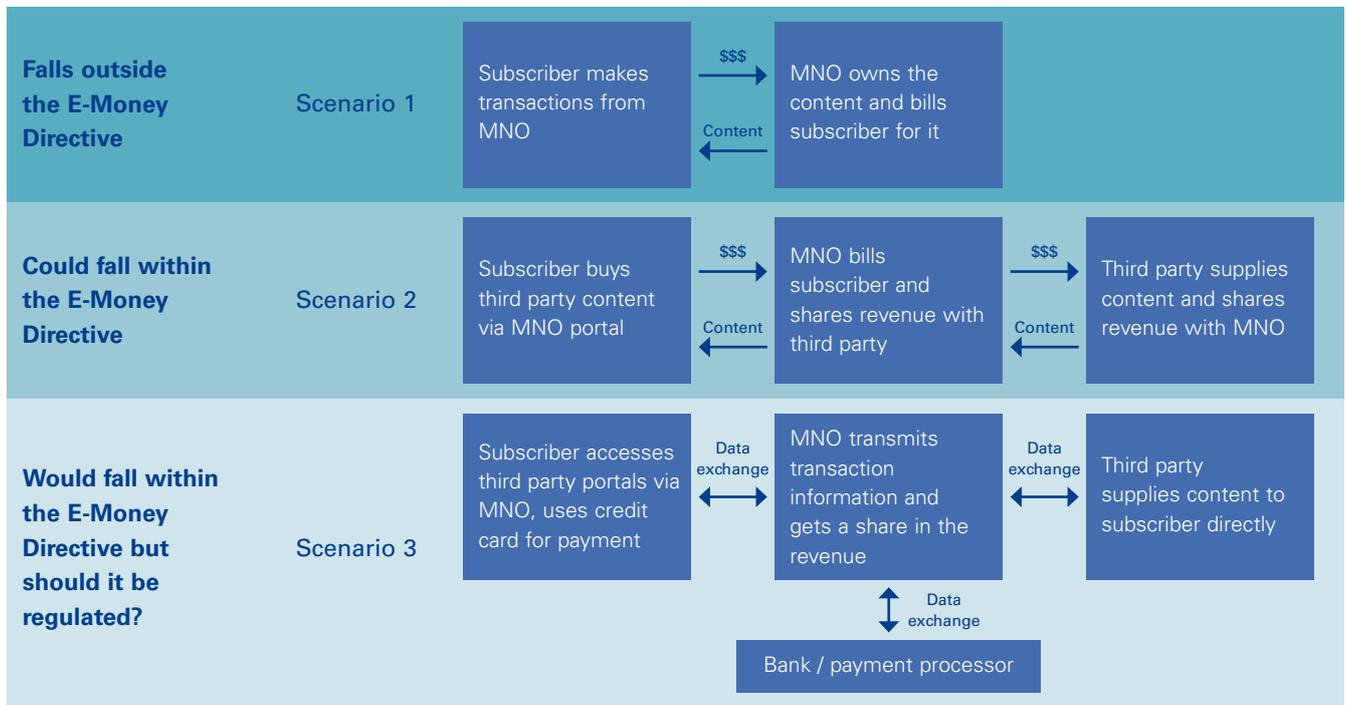
Regulations and the issue of proportionality

MNOs become part of a payments process — even if they are not themselves the payments processor — as soon as they become involved in third-party payments. However, there are several scenarios where the lines can get blurred.

Scenario 1

A subscriber buys a product online from an MNO web portal using a mobile phone, the content is owned by the MNO and the payment is handled directly by the MNO through the billing system. The MNO has neither issued money nor created credit. Conclusion: the MNO should not fall under EMD-type financial regulation.

Figure 7: Issue of proportionality in terms of how far e-payment regulations should extend to cover m-payments



⁵⁷ "The consultation revealed only one example of a firm paying interest on E-Money." Review on the E-Money Directive (2004/6/EC), Staff Working Document, 19 July 2006, p.6
⁵⁸ "Review on the E-Money Directive (2004/6/EC)," Staff Working Document, 19 July 2006, p.8

“MNOs and payment processors are not necessarily competitors to banks and other established financial institutions, but they can be.”

Scenario 2

A subscriber buys third party content, product or services, but the billing comes from the MNO. The MNO is involved in payments processing and will pay the content provider (merchant) a share of the revenue.

Conclusion: the MNO could fall under EMD-type financial regulation.

Scenario 3

The subscriber accesses third party portals through the MNO portal, uses a credit card to buy third party content, and the MNO's role may be limited to transmitting information between the subscriber, the bank and/or payment processor and the merchant.

Conclusion: the MNO as part of the payments processing chain will come under e-payments regulations, but the question becomes how much regulation?

Given these blurred distinctions, how far e-payment regulations should extend to cover m-payments is an issue of proportionality. In other words, regulation should be proportional to the level of risk that m-payments could pose to the public interest, and at this stage of development of m-payments the risk would seem to be low.⁵⁹

Conclusion: Regulations will influence the development of m-payments

The regulatory environment will delineate market opportunities and the cost of compliance, and it will also influence the assignment of risk and obligations between stakeholders. A good example of this was the ‘liability shift deadline’ — as it was widely called within the industry — on 1 January 2005 when the liability risk arising from credit card fraud within the EU was shifted from the banks to the merchants following the introduction of new levels of card security known as EMV. The banks and credit card companies regarded this as an encouragement to merchants to invest in upgrading their card readers to comply with the new standard, although codes of conduct still leave the banks with the burden of proof if a customer's card is stolen.

The other important issue is the effect of regulation on competition, efficiency and quality of service. MNOs and payment processors are not necessarily competitors to banks and other established financial institutions, including payments clearing systems, but they can be. While restrictive financial regulations will ensure they are not, proportional financial regulations are more likely to bring about the benefits of the potential for competition.

⁵⁹ See the EC's 2005 consultation and guideline papers on the “Application of the E-money Directive to Mobile Operators.” Other e-payments institutions express a contrary view, that proportionality should also ensure a level playing field and the degree of risk should not be equated with the small scale of m-payments.

Risks and challenges



The development of m-payments will be shaped by two contrasting issues, namely the interoperability of competing technologies and the reliability and security of transactions. Without interoperability, the market will remain fragmented and network economies of scale will be impossible to achieve. Without reliability and adequate security, consumers, merchants and banks will not adopt m-payments on a large scale.

As the m-payment market develops further, these challenges and complexities will increase. In turn, this may require regulatory responses.

As a result, there is a risk that key players will face increasing compliance and regulatory requirements. The cost of compliance, the need to strike a balance between performance and compliance, and the risk of non-compliance will be important considerations that shape these emerging business models.

“The cost of compliance, the need to strike a balance between performance and compliance, and the risk of non-compliance will be important considerations that shape emerging business models.”

This report has illustrated that there are many different m-payment models, each of which has a complex value chain system with different participants serving different value added functions. The effectiveness and efficiency of the process integration between these different participants will be critical to the successful development of m-payments. Increasingly complex billing requirements and revenue sharing models will require a more integrated and enhanced value chain that can ensure trust and secure flows of information between key partners.

Technologies that enable m-payments fall into well known phases. The level of technology will determine the level of secure encryption and the sophistication of secure content that can be provided.

- The shift from analogue first generation (1G) to digital second generation (2G) cellular networks opened the way for SMS text-based m-payments. The Philippines was an early pioneer.
- The shift from 2G to Internet Protocol (IP)-based 2.5G networks opened the way for WAP (Wireless Application Protocol) access to MNO-supported websites, and to OTA (over-the-air) downloads of Java-based applications. This enables credit, debit and loyalty card details to be stored in m-wallets on the handset.

- The shift from 2.5G to third generation (3G) networks and beyond is all about bandwidth, higher download and uploads speeds, from less than 1 MBps to over 10 MBps possible today.
- The shift to next generation phones is all about convergence. Smartphones are converging computers and handsets; Apple's iPhone is converging iPods and handsets; and NFC (Near Field Communications) is helping the convergence of contactless card technology and handsets.

From a security perspective, within m-payments there is a technology paradox. As a general rule, technologies become more, not less secure. Yet technologies give the mobile phone more processing power, more memory and therefore more 'reach' into the worlds of banking, finance and commerce. This also entails greater exposure to risk. As m-payments progress from simple SMS micropayments to more sophisticated money transfers, and from stored-value cards to m-wallets, both personal risk and the risks to merchants and banks grow.

As people are increasingly able to synchronise data between their phone or device and their work networks, new risks are emerging. There is the heightened possibility for a single point of failure in information systems and for leakage of private or sensitive company data. This can even entail business continuity issues.

The EU is now devising standards that should ensure interoperability of card readers and also minimum standards of encryption to safeguard consumer information, as detailed below. These developments could have important implications for other markets including Asia Pacific.

SCF (SEPA Cards Framework) and security

Part of the EU's SEPA framework is the requirement on card issuers to introduce 'smartcards' to replace cards with magnetic strips because embedded within them is an integrated circuit upon a chip, and IC capable point-of-sale terminals. (Another name for these cards is 'Chip and Pin' because, unlike magnetic strip cards, they require a four digit personal identification number rather than a signature.) These cards must conform to the EMV standard for IC card interoperability; in other words, each SEPA-compliant card issued must be capable of being read at a SEPA-compliant terminal irrespective of the issuing bank and credit card company. EMV, administered by EMVCo formed in 1999, takes its name from Europay (now part of MasterCard), MasterCard and VISA. JCB (formerly Japan Credit Bureau) International joined EMVCo in 2005.

Interoperability

Within the EU, compliance to the EMV standard is mandatory and the major card companies are working together to achieve the next generation of compatible point-of-sale terminals. However the technical specifications for these will not become available before 2009 or even 2010. Meanwhile, Visa payWave and MasterCard PayPass contactless cards are involved in trials in Malaysia, South Korea and Taiwan in competing consortia of MNOs, banks and payment processors, yet the card readers are not interoperable. This means merchants who opt to accept both types of card will need to invest in separate readers.

In Japan, merchants face the same dilemma, and although the FeliCa-based card reader is dominant, it remains the case that an international traveller cannot use their non-Japanese cards to make a contactless payment. More problematically, the fastest speeds of communication between EMV-compliant cards and readers is 400 milliseconds, too slow to be used at metro station gateways.⁶⁰

Contactless cards and mobile phones

Contactless cards are based upon a technology known as NFC (Near Field Communications) that allows NFC-enabled cards to be read by tapping them on, or passing them by, a card reader rather than swiping them through, or inserting them into, the POS terminal. NFC is a sub-set of radio frequency identification technology and can be used at points of sale such as stores, toll booths and metro stations. They can also be used as ID cards for admission to secure areas, and are now being integrated into mobile phone handsets for m-payments.

From 2008 on, NFC-enabled phones are expected to become more widely available. The NFC chip inside the phone will be connected to the 'secure element' within the SIM card, allowing information stored in an m-wallet to be accessed by an NFC card reader. Authorisation for payments involves entering a PIN.

Skimming and identity theft

To date there is no indication that the 'Chip and Pin' has been illegally cloned, however, security is never absolute without voiding practical usage, and researchers at the University of Massachusetts have demonstrated that thieves using a sufficiently powerful radio frequency identification reader can 'skim' or steal data from a contactless card at a distance further than the POS readers. The good news, according to Mohammad Khan, founder of VivoTech, a vendor of NFC software, is that with "any data that you can gather from a contactless card, you are not able to do a transaction."⁶¹ Part of this argument arises from the fact that the non-embossed verification number known as the card-validation code (CVD) on the back of MasterCard and VISA cards is not revealed through skimming, and although not all cards carry CVDs and some merchants do not require them, this problem should diminish.

"In some areas, responsibility will shift to end users as technologies develop. Organisations need to respond to these trends."

⁶⁰ "Specs On Tap for Readers that Accept both Visa payWave and PayPass"; *Card Technology*, 26 June 2007

⁶¹ "Report Blasts Holes in Contactless Card Security Claims" Evan Schuman, *eWeek*, 30 October 2006



Nevertheless, identity theft used to perpetrate fraud elsewhere in the financial system, is potentially much more harmful than the loss of a phone, and remains 'invisible' until it strikes. While NFC-enabled hand phones are not likely to be more vulnerable to theft than existing hand phones, as more people use them the danger of loss of stored-value and of identity theft may well push up financial risk.

In some areas, responsibility will shift to end users as technologies develop. Organisations need to respond to these trends, for example by embedding security issues into awareness programmes both for their customers and their employees.

3G and beyond

In tandem with the global spread of 3G mobile handsets and networks there is a complementary growth in the bandwidth capacity of SIM cards inside the handset to support high speed data downloads of video, games and information accessed from websites. Increasingly consumers are turning to P2P communications, that can allow them to uplink to community websites or send video clips. High Speed Uplink Packet Access (HSUPA, sometimes known as 3.75G or even 4G), is providing the answer.

Claims are already being made from R&D labs that speeds can be ratcheted-up to 100 MBps within the next three to five years. Such speeds may not seem relevant to m-payments, but they are. The purchases of the future will in part be extensions of the purchases of today, including downloads and uploads of media rich content as P2P, community and auction sites become ever more part of the life-style of the Y-generation and the generation following.

The key driver for MNOs and other stakeholders will be interoperability of equipment which delivers the benefits of network economies. This is behind the current efforts to reach a compliance agreement between NFC and FeliCa. Without it, critical mass will end at national borders.

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