Smart Cards and EMV Adoption in China

Opportunities and Obstacles

Emerging Asia

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Smart cards offer many benefits to consumers, merchants and banks, such as an ability to store information and improved security through fraud reduction technology. While basic smart cards have been introduced and successfully embraced by consumers in many Chinese cities, EMV compatible smart cards face some barriers and a low acceptance from the banking industry. However, Emerging Asia believes that the increased security offered by smart cards combined with the EMV cards' electronic credit transaction functions will drive EMV implementation in China.

Background

A smart card, or integrated circuit (IC) card, is a pocket-sized card with embedded integrated circuits that can process information. Smart cards are far more versatile than traditional magnetic stripe cards, due to their ability to store transaction information and add / deduct value accordingly. Smart cards that combine transportation ticketing with payment applications in convenience stores, supermarkets, fast-food restaurants, parking services, vending machines and other point-of-sale applications are becoming increasingly popular worldwide. In China the advantages of these multi-purpose cards are also proving to be popular with over 80 cities reportedly using smart cards for a varying number of applications. In cities such as Hong Kong, Beijing, Shanghai and Shenzhen, multi-functional smart cards are not only used for transportation, but also for payment of electricity, gas and water bills.

Representative Application	Traditional Payment Method	Estimated Share of Smart Cards as Payment Method in 2007	Expected Share of Smart Cards as Payment Method by 2010
Subway (Beijing)	Cash & Paper Ticket	80%	100%
University Cafeteria, Bookstores (Suzhou)	Cash	40%	80%
Home Electricity Bills (Shanghai)	Cash	40%	70%

While smart cards offer useful functionality in a limited urban or regional context, there are a large number of competing or overlapping systems that result in an inability to use the same card for all transactions. For example, a transportation card may be different from the card used for utility payments. While smart cards offer some ease of use, it is inconvenient for consumers to carry around a variety of different smart cards in their wallet. Furthermore, even those smart cards issued for a particular purpose such as transportation may not be interoperable in another city, if each city has adopted its own particular transportation smart card system.

The future, then, is in smart cards that provide consumers with the ability to use the same card for numerous different transactions, unlimited by geography. Traditional credit cards have offered this convenience through adoption of global acceptance of brands such as VISA, MasterCard, American Express, Diner's Club, JCB, UnionPay, and others. Marrying the convenience and security of smart cards with the widespread acceptance of such global brands is the obvious way to promote and increase the use of smart cards.

To this end, EMV is a smart card payment standard designed jointly by Europay, MasterCard and VISA. The standard was established in order to build a standard platform for smart card credit and debit payment systems. It is anticipated that over the next 5 to 6 years, traditional magnetic stripe cards will transition to smart cards with an embedded chip. The IC chips are able to calculate independently, encrypt and decrypt, and store information, greatly improving the security of card payments and reducing the risk of certain types of fraud.

While ordinary smart cards have been widely accepted for a variety of daily transactions in urban China, EMV payment standard cards have only achieved limited penetration to date.

Global Drivers for EMV Migration

Migration to the EMV standard from legacy magnetic stripe cards is currently a large project within the global banking and credit card industry, and a key driver for this migration is the increased transaction and data security offered by the technology. With the development and widespread acceptance of the EMV standard, crimes such as credit card fraud (identity theft, and crime from stolen cards) which have exposed banks for many years are substantially reduced by the use of IC chips. This technology, which combines IC chips and a personal identification number (PIN) is a major development in the evolution of credit/debit card transactions. Since the EMV standard offers increased protection from fraud, in recent years credit card issuers worldwide have begun to transfer fraud liability to merchants using non-EMV compatible payment terminals, further spurring the adoption of the EMV standard.

Migration Strategies and the Chinese EMV Standard

Because of many perceived barriers to EMV migration in China (addressed below), the process is being conducted gradually. China-specific drivers for EMV migration included the 2008 Beijing Olympics and the 2010 Shanghai World Expo, along with the domestic banking industry's desire to combat fraud as domestic and international credit cards are used with increasingly higher volumes in China.

> *The 2008 Beijing Olympic Games and 2010 Shanghai World Expo were together expected to generate an estimated 1 trillion RMB ($140 billion USD) in consumer spending. Authorities had upgraded the POS and transaction systems to meet the EMV standard in key Olympic cities to allow greater convenience for the expected influx of foreign visitors. Chinese authorities have found it challenging to do so in a limited timeframe while incorporating the latest fraud prevention mechanisms.*

Chinese banks are increasingly issuing credit cards with international brands such as VISA and MasterCard, and this will accelerate over the coming years. In comparison to Chinese domestic UnionPay-only cards that require a PIN, international cards requiring only a

signature have been more prone to fraud. For this reason Chinese banks are moving closer towards implementation of EMV smart cards to reduce potential fraud expenses.

Chinese domestic banks began building an EMV-standard card acceptance environment in Beijing, Shanghai, Ningbo and Qingdao to enable foreign tourists to use their overseas issued EMV-compatible cards at the Olympic Games and the Shanghai World Expo. This adoption will later extend to other top tier cities in China. In the coming years, the industry will seek to cooperate with retailers to improve and expand acceptance and functionality and bring about more widespread use of EMV-standard cards in China.

Within China, the key players in regulating the introduction of EMV smart card technology are the People's Bank of China (the Central Bank) and the Chinese UnionPay organization. UnionPay is China's only domestic card brand, and by far the most widely accepted one within China, miles ahead of VISA, MasterCard and American Express. In 2005, the People's Bank of China and UnionPay jointly developed the PBOC 2.0 standard, a Chinese technical and security standard for smart cards, which applies to both contact and non-contact smart cards. This standard is also known as the 'Chinese EMV' and is broadly similar to the EMV standard. However, the introduction of this separate standard means that electronic payment terminals (EPTs) in China must meet both the EMV and PBOC 2.0 standards, so that domestic and overseas issued cards can both function on the same machine.

Barriers to EMV Migration in China

There are a number of obstacles to EMV migration in China. Acceptance of the technology remains low, with banks conscious of the significant costs required to update existing credit cards. Furthermore, sharing of equipment and information from different industries has been slow and impeded the development of EMV-compliant cards. In general, concerns in relation to cost, risk and technology have slowed the migration to the EMV standard in China.

Cost

Relatively high costs associated with EMV migration in China are a key reason for the slow introduction of EMV cards in China in comparison with developed countries. Aside from the cost of the replacement card itself, the replacement and upgrading of POS and EPT terminals, ATMs and software systems will also cost billions of RMB. In China, the expenditure for replacing nearly 1 million EPT terminals and 1 billion bank cards, and upgrading systems and training staff will run into several tens of billion RMB. The card alone costs 10 times more than a traditional magnetic stripe card. The question of who will bear this cost – consumers (directly, or indirectly through higher bank fees) or banks absorbing costs as an investment – remains to be answered. To date, magnetic stripe cards have almost always been provided 'free' of charge by banks, but with EMV-standard cards, banks may levy a charge in order to recover their costs. This will be unpopular with many consumers.

Perceived innovation

In contrast to most developed countries, credit cards are not as popular and widespread with consumers and merchants in China. The most common payment cards are debit cards, which already require a PIN for transactions. Even a large percentage of Chinese credit card transactions require PIN verification, which is quite different from the signature verification

system used in most other countries. Within China, this widespread use of PINs is considered vital to maintaining security. Accordingly, banks in China have less motivation to push EMV-standard cards though they are even more secure than the existing cards widely used in China.

Technology

Chinese banks appear to be comfortable in tackling the technology required to manufacture smartcards and upgrade their software. However, it has proved more difficult to unify standards, and share information, equipment and databases across different industries, regions and cities (which are independently introducing cards). Banks alone cannot solve these problems, as it is necessary for government and other organizations to provide technical support.

Training

A further impediment is the considerable time and resources it will require to introduce EMV / PBOC 2.0 knowledge to bank employees, cashiers and card users, and to provide adequate technical support and troubleshooting during the migration phase.

Future Developments

The government is actively encouraging the development of the electronic payment (legacy as well as EMV/PBOC compliant) industry in China. The key reason is that in comparison to cash transactions, electronic transactions enable the authorities to better track spending and revenues, in order to better assess, and increase tax revenue. More widespread use of electronic payments will also enable the collection of better national economic data and allow the government to quickly evaluate the general economic situation and growth. The government is encouraging the expansion of electronic payments by offering tax breaks to merchants who adopt it.

The increase in the size of the electronic payments industry as a whole – whether legacy or the migration to EMV / PBOC 2.0 compliant, is good news for manufacturers of electronic payment terminals, POS terminals, and other related equipment as well as software providers and systems integrators. International brands such as Verifone have traditionally dominated the electronic payment terminal (EPT) market, but today many local manufacturers are also gaining ground by offering more attractive pricing. Emerging Asia believes that the market share of domestic EPT manufacturers will increase as the penetration of electronic payment systems increases across China.

According to a recent policy issued by the People's Bank of China, the EPT business will gradually be transitioned so that it is administrated only by China UnionPay (taking banks out of the business). This means UnionPay will deal directly with merchants, and it will have a monopoly in this area. UnionPay will not only assume a key role in driving EMV / PBOC 2.0 migration, it will also be the default option for merchants as the accepted brand.

Conclusions

There will be a gradual increase in the penetration of electronic transactions in China spurred by the Government's support of the expansion of the electronic payment industry. There will also be a spike in electronic payment acceptance in cities such as Beijing and Shanghai due to the Olympics and World Expo. This has lead and will continue to lead to increased demand for appropriate electronic payment terminals (EPTs), most likely those that are EMV / PBOC 2.0 compatible.

Merchants

As a result of the increased availability of electronic payment options in major cities due to the Olympics, World Expo, and accompanying tourism, the use of credit / debit cards will also increase in China as domestic consumers discover that an expanding number of retailers allow payment by card. This will lead to greater penetration of cards amongst the general consumer base. Retailers who are not yet offering card payment options will then be pressured to do so, or risk losing business.

Large nation-wide retail chains or hypermarkets should consider the purchase of EMV / PBOC 2.0 compliant systems in order to provide more payment options to their customers, and thereby possibly increase the size of each transaction.

Local utilities and transportation systems should consider a parallel system of accepting payment by EMV / PBOC 2.0 smart cards in the near and mid-term, and over time they should eventually phase out their proprietary smart cards as the use of UnionPay and other branded EMV / PBOC 2.0 debit and credit cards increases. This will not only allow savings on the cost of smart cards and their issuance and administration, but may also lead to improved bill collection rates by offering consumers more convenient payment options.

Electronic Payment Terminal (EPT) Manufacturers

Manufacturers of EPT related equipment should approach UnionPay and card-issuing banks in order to clarify the PBOC 2.0 standards, and then market their products aggressively in order to win share as the market sees a spike between 2008 – 2010, and then more gradual but sustained growth into the future. Foreign manufacturers will need to take price sensitivity into consideration since they will be competing with domestic brands. Focusing on the technical features, payment security and ease of use of their products may enable them to somewhat balance the effects of higher priced products, particularly with larger retailers. However, partnerships with domestic EPT manufacturers may be required in order to gain or retain share amongst smaller merchants who do not have a role in specifying the brand of EPT, and will be relying upon banks or UnionPay to make that decision. Therefore, to make their products more attractive to UnionPay et al, foreign EPT brands will need to compete on price as well.

Research Methodology for this Study

Emerging Asia's consultants conducted over fifty in-depth interviews as original, primary research across China. Interviewees included operations and technical employees at major Chinese banks, UnionPay, and at the Chinese branches of international credit card companies; government officials, independent industry observors, and analysts. This was in addition to leveraging any existing on-line secondary research, government reports, journals, etc.

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