



## Mobile Payments in Asia

As a new retail payment technology, mobile payments (m-payments) have the potential to facilitate global commerce by reducing transaction costs.<sup>1</sup> Estimates show that the value of worldwide m-payments will reach \$235.4 billion in 2013, with approximately 245.2 million users.<sup>2</sup> As market leaders in testing new technologies, consumers in Asia have begun to utilize m-payments in a variety of everyday retail transactions far ahead of their North American and European counterparts. In 2013 alone, Asian consumers will make nearly \$74 billion in m-payments, compared to \$37 billion by North American consumers, and \$29 billion by Western European consumers.<sup>3</sup> However, even the technologically savvy consumers in Asia currently use m-payments on a limited basis, which raises questions as to whether this technology can be more widely adopted in Asia and eventually, globally.

This *Asia Focus* report explores the use of m-payments in Asia and evaluates the challenges it faces regarding wider adoption. Specifically this report clarifies what an m-payment is, identifies which factors are facilitating and hindering the use of m-payments by consumers in certain economies of Asia, and summarizes key issues this new payment technology presents to government regulators. The Asian economies considered in this report include Hong Kong, India, Japan, Singapore, and South Korea.

### What Are M-Payments?

The defining element of an m-payment is the access channel used to transmit transaction data, not the specific access device used in the process. Specifically, transaction data must be transmitted via a mobile communication network and this can be done via any mobile device, such as a mobile phone or a tablet computer. The payment amount can be charged to a credit card, debit card, bank account, or account with a mobile network operator (MNO) whose information is stored on the mobile device, or stored on the provider’s computer network.<sup>4</sup> Credit transfers or direct debits that are initiated or authenticated<sup>5</sup> via an internet website accessed by a mobile device are considered internet payments and not m-payments.

M-payments can be further classified as proximity payments or remote payments depending on the circumstances of the transaction. Proximity payments are traditionally made when the customer is within a physical retail environment. The physical environment does not

necessarily have to include a traditional point-of-sale (POS) device (such as a cash register) but could utilize an interactive kiosk, vending machine, or a merchant-owned mobile device. Transaction data for proximity payments can be sent using a contactless near field communication (NFC) device,<sup>6</sup> a contactless smart card chip,<sup>7</sup> bar code, quick response (QR) code,<sup>8</sup> or numeric code. Remote payments describe any m-payment transaction that occurs outside a physical location. These could include person-to-person payments or digital transactions such as buying a mobile application, a ringtone, or music. Transaction data related to remote payments can be sent through the mobile network by either a webpage viewed by the mobile device, an application downloaded to the mobile device, or a text message sent to and from the mobile device.<sup>9</sup> *Appendix 1* provides details on what the user would experience when sending payments through the various data transmission options discussed.

M-payments are distinct from mobile banking. Mobile banking refers to the access of a consumer’s bank account, credit card account, or other financial account via the financial institution’s webpage or proprietary mobile application accessed through a mobile device. Transactions can be confirmed via a text message, but this is not considered an m-payment as the financial transaction was initiated through the internet and not the mobile network.<sup>10</sup>

### Factors Supporting the Use of M-Payments in Asia

The economies of Hong Kong, India, Japan, Singapore, and South Korea are home to some of the most technologically savvy and progressive consumers in the world. These economies are often the first to adopt new technologies, including new advancements in mobile devices and new payment technologies, such as m-payments. To better understand what factors are facilitating the use of m-payments in Asia, the following section evaluates the adoption of m-payments in these selected Asian economies.

#### Infrastructure

Physical infrastructure is a key component of m-payment technology. Through partnerships between private technological firms and government institutions, the Asian economies considered in this report have built the necessary infrastructure to enable the use of m-payments in a variety

*Asia Focus is a periodic newsletter issued by the Country Analysis Unit of the Federal Reserve Bank of San Francisco. The information contained in this newsletter is meant to provide useful context and insight into current economic and financial sector developments in the Asia Pacific region. The views expressed in this publication are solely that of the author and do not necessarily represent the position of the Federal Reserve System.*

of retail settings. Japan, for example, has one of the most sophisticated physical infrastructures for m-payments which developed through partnerships between domestic technology firms (such as Sony), NFC vendors (Mobile Suica, NTT DoCoMo, and JR East), and the Japanese government. In South Korea, early programs to build the physical infrastructure for m-payments failed due to mutual distrust and intense competition between mobile carriers and banks. Only recently, through an alliance between mobile hardware manufacturers (including Samsung), MNOs, and the public transit system, have NFC based m-payments become possible. While mobile networks and mobile devices are essential elements in an m-payment infrastructure, consumers and retailers must be willing participants in an exchange to allow consumers to pay for retail goods and public transit services at various locations via m-payments.

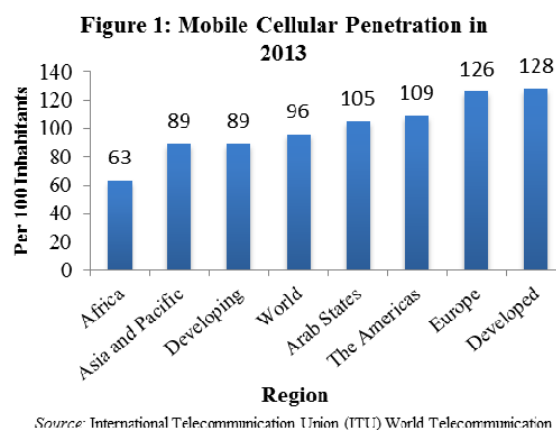
In Hong Kong and Singapore, the governments have allowed the highly competitive mobile device manufacturers and MNOs to take the lead in developing the necessary m-payment infrastructure. The Infocomm Development Authority (IDA) in Singapore has taken a more hands-on approach in promoting m-payments. It is responsible for the continued development of Singapore’s information communication systems and works with local firms and international businesses to facilitate innovation. The IDA was key in developing the current NFC based m-payment system used in Singapore’s public transportation system. Hong Kong’s government has taken a more hands-off approach than their counterparts in Singapore. While the government has yet to set specific policies on m-payments, the Office of Telecommunications Authority, Hong Kong Monetary Authority, and Hong Kong Consumer Council have issued general guidelines on consumer safety when using m-payments.

India lags behind the other economies discussed in terms of its currently weak mobile network infrastructure. India’s government is working with both domestic and international firms to expand the quality and service area of its mobile network. Although India currently lacks much of the infrastructure for m-payments in physical retail locations, it has

benefited greatly from m-payment remittances conducted via mobile devices through satellite networks.

### Consumer and Merchant Interest in M-Payments

On the consumer side, one key contributing factor to the use of m-payments is the high use of mobile phones, especially the use of sophisticated smartphones<sup>11</sup> in Asia. The mobile penetration rate (or the percent of mobile devices per inhabitant) is over 100% in Japan, Singapore, and South Korea and is over 200% in Hong Kong (see *Table 1*). The mobile penetration rate for these countries is well above the 89% for the Asia-Pacific region (see *Figure 1*). While consumers in Hong Kong, Singapore, and South Korea prefer the use of smartphones, Japanese consumers continue to favor low cost feature phones<sup>12</sup> which are versatile, internet-enabled, and m-payment capable. Mobile phone use in India lags behind the other leading economies in Asia, with only 65% of the population owning a mobile device. However, India’s demand for mobile devices is rapidly increasing as salaries increase and younger consumers push for access to technological products available to their peers in other Asian economies. In addition, a significant portion of India’s population lives in rural or poor areas where home internet services are either unavailable or unaffordable. Many Indians rely on their mobile phones for access to the internet.



**Table 1: Mobile Phone Penetration in Selected Economies**

Country	Mobile Phone Penetration (year-end 2012)	Smartphone Penetration (estimated 2013)	Telecommunications Regulator
United States	98.2%	56.4%	Federal Communications Commission
China	81.3%	46.9%	Ministry of Industry and Information Technology
Hong Kong	227.9%	62.8%	Office of Communications Authority
India	68.7%	12.8%	Department of Telecommunications, Telecom Regulatory Authority of India
Japan	109.4%	24.7%	Ministry of Internal Affairs and Communications
Singapore	153.4%	72.7%	Infocomm Development Authority of Singapore
South Korea	110.4%	73.0%	Korea Communications Commission

Sources: International Telecommunication Union, *Our Mobile Planet* by Google.<sup>13</sup>

Consumers in Hong Kong, India, Japan, Singapore, and South Korea already use their mobile phones for a variety of retail transactions which eases the transition to m-payment technology. A number of financial institutions in these economies already allow customers to access their bank account information via mobile phones, either via the internet or through mobile banking applications. Through alliances between mobile hardware manufacturers, MNOs, and public transit systems, consumers in Hong Kong, Japan, Singapore, and South Korea regularly use NFC based m-payments on public transit systems. In addition, younger generations in these economies use m-payments to purchase music, videos, ringtones, and games on their mobile phones. Finally, consumers throughout Asia, especially India, regularly use their mobile phones to send remittance payments between friends and family members as geographic separation and limited banking services make other transfer options more costly.<sup>14</sup>

Innovations in the use of mobile devices are expanding the capabilities of merchants to facilitate and complete retail transactions. By providing plug-in magnetic strip card readers and NFC chip readers, payment technology companies such as Square and PayPal, are now providing merchants with the option of substituting mobile devices as POS terminals over traditional machines such as cash registers. This option is being used more and more by smaller retailers and independent, family run stores. Larger retailers in Asia are using mobile devices in other innovative ways. Luxury retailers are using tablets to allow employees to roam the merchandise floor and help customers to compare, customize, locate, and purchase merchandise.<sup>15</sup>

### **Competition for New Revenue Sources**

Intense competition between financial institutions and technology firms for new customers is also a driving factor for m-payment use in Asia. Financial institutions have traditionally driven the implementation and accessibility of new payment technologies throughout the world, because expanded product offerings attract new customers and diversify revenue streams. A recent survey of 183 global banks completed in the first quarter of 2013 by NGDATA found that 43% of respondents had plans to deploy a mobile wallet offering within the next six to twelve months. In addition, 67% of banks surveyed admitted they would prefer to be the full custodian of their customers' value.<sup>16</sup> However, banks are not the only competitors in the m-payment market. Technology and other non-bank firms are also seeking to capture transaction revenue from m-payment systems. Companies like Google, Visa, MasterCard, Square, PayPal, Boku, Monitise, and LevelUp have begun to offer m-payment products, including mobile wallets, to consumers throughout Asia.<sup>17</sup>

Another untapped revenue source consists of consumers who live in rural areas and may have little access to traditional banking services as physical infrastructure, such as roads and telephone lines, can be limited. Mobile devices have thrived in countries like India where mobile networks are relatively less costly and easier to setup than traditional telephone landline systems. The Reserve Bank of India (RBI) estimates that 41% of India's population is unbanked.<sup>18</sup> With the need for safe and

efficient banking services, consumers in many rural areas around the world have turned to mobile payments and mobile banking for their transactions.<sup>19</sup> By offering useful mobile banking and m-payment services to the unbanked and underbanked, financial institutions and technological firms could tap a large consumer base and substantial new revenue source. However, these firms will need to determine whether the potential revenue is enough to balance the initial investment cost of developing and promoting the use of m-payment technology.<sup>20</sup>

### **Challenges for M-Payment Use in Asia**

Despite the significant factors promoting the use of m-payments as discussed in the previous section, consumer use of this new payment technology in Asia is still much smaller than the use of other retail payment instruments, such as cash, credit cards, and debit cards. Of the over \$60 trillion in noncash retail payment transactions expected to be conducted in Asia in 2013, only \$74 billion will involve m-payments.<sup>21</sup> The following section evaluates the key factors undermining the widespread use of m-payments and suggest some possible solutions.

#### **Consumer Readiness**

The clear limitation for m-payment use in Hong Kong, India, Japan, Singapore, and South Korea is consumer readiness. A survey by MasterCard found that just 20% of Japanese consumers are familiar with m-payments and only 8% are willing to use the capability.<sup>22</sup> MasterCard found similar statistics in Hong Kong, India, Singapore, and South Korea. Consumers in Asia have access to a variety of well-established retail payment methods, such as cash, credit cards, debit cards, and direct fund transfers. An additional payment method that, in essence, relies upon these established methods is redundant for many consumers. Consumers in Hong Kong, for example, are reluctant to adopt mobile payments because of the versatile Octopus card, which is a stored-value smart card that can be used on all forms of public transportation and at selected retail venues. The Octopus card has become so entrenched in Hong Kong that 95% of people between the ages of 16 and 65 prefer to use this payment method to pay for transportation, shopping, and dining.<sup>23</sup>

Another obstruction to m-payment usage is consumer reluctance to store credit card, debit card, and/or bank account information on their mobile phones. Consumers in Asia traditionally prefer face-to-face cash transactions for payment assurance and privacy reasons. Mobile phone security will need to be improved to meet consumers' safety expectations.

Motivating consumers to use m-payments over these traditional transaction methods will require considerable consumer education on the ease of use and safety of m-payment transactions. In addition, incentives such as discounts and reward systems may be needed to encourage consumers to try m-payment services. Eventually with increased use over time, consumers may need fewer incentives.

#### **Standardization**

The other key factor limiting the use of m-payments is technological standardization. Consumers in Hong Kong,

Singapore, and Japan change their mobile phones every 18 months. In South Korea, consumers change their phones 12 months. For continuity of m-payment services, all mobile devices would need to be equipped with standard m-payment protocols. For seamless carryover from existing payment systems (such as the Octopus Card in Hong Kong), new mobile devices will need to include the necessary smart card chips and NFC transmitters. Given the competition between mobile phone developers throughout Asia and different m-payment systems between countries, standardization may be difficult to achieve without government regulation.

India faces somewhat unique challenges. Its large land mass and highly segmented, heterogeneous consumer base (multi-ethnic and multi-lingual) makes it difficult to offer a universal mobile device across the country. Mobile carriers will have to tailor their product offerings by region, while maintaining key technological standards. The Indian government will need to work with technology firms to build the proper technological infrastructure to increase mobile network coverage and consumer access to mobile phones throughout the country. Despite India's complicated consumer market, the Indian government has realized the importance of rural banking services and m-payment remittances. In 2008, the Reserve Bank of India (RBI) issued guidelines specifically for m-payments, which included clarification of regulatory oversight, technology and security standards, system safeguards, inoperability requirements, and consumer protection measures.<sup>24</sup> In addition, the Indian government is working with international firms to modernize and expand its mobile network to current technological standards.

### **Key Issues That M-Payments Pose to Government Regulators**

M-payments are an exciting new technology with considerable potential, but this new technology poses some unique challenges for regulators and financial institutions. There are many players involved in m-payments including banks, other financial institutions, MNOs, payment processing firms, technology firms, retailers, advertisers, and third-party content providers. Depending on their role in the m-payment exchange, these players may fall under the purview of different government regulators who may have different supervisory guidelines.

For example, MNOs typically do not require a special license when they transmit m-payment data for banks. However, many of these firms are becoming more involved in third-party payments processing and cross-border remittance services. As they do, these MNOs may need to apply for banking licenses under domestic laws and regulations. Government regulators must also be careful if an m-payment firm chooses to work under the umbrella of an already licensed bank as this may complicate ongoing supervision. The multiple operating scenarios for m-payment providers may vastly increase the supervisory burden of regulators.

Finally, security and consumer protection are major concerns for all players in the market. Security controls throughout the payment process are critical to authenticate the parties involved, ensure integrity of the transaction, enforce

accountability, guarantee privacy, and prevent identity theft and fraud. Although regulatory authorities in charge of telecommunications are responsible for mobile networks, in many countries it remains unclear which regulatory agency is responsible for overseeing the transfer of financial data over mobile networks. Protections for consumers will need to be instituted if mobile payments do not fall under the purview of traditional retail payment regulations. In addition, governments will need to decide if additional regulations are necessary to prevent criminal activities.

### **Conclusion**

Asia is home to some of the most technologically savvy consumers in the world. Consumers and businesses in these economies continually seek out innovations to improve their daily lives. This demand for innovation has encouraged the governments of Hong Kong, India, Japan, Singapore, and South Korea, to provide a welcoming environment for new technologies, including m-payments. Despite government support and consumer interest in m-payments in these economies, consumer use of m-payments is surprisingly not as extensive as expected.

From the examination of the selected Asian economies, the two most important factors limiting the wider adoption of m-payments are weak consumer readiness and the need for technological standards by jurisdiction. These issues can be resolved through the joint interaction of consumers, businesses and government agencies. These parties will first have to determine how much they value the use of m-payment technology and then commit to a plan to institute standards for mobile devices, mobile networks, and m-payments. Governments will also need to establish clear regulatory guidelines for firms involved in m-payments. Finally, education and incentives for both consumers and merchants are vital. Without education and incentives, building a critical mass of individuals who are willing to switch to this new technology from other well-established retail payment instruments such as cash, credit cards, and debit cards is unlikely.

Despite these limitations, the continuous advancement of mobile technology and changing consumer preferences for easy-to-use noncash transaction options are expected to significantly accelerate the use of m-payments over the next few years. Researchers predict that m-payments will more than triple by 2017, totaling somewhere between \$721 billion and \$1.5 trillion. Understanding the limited use of m-payments by consumers in Asia will provide key guidance for governments, financial institutions, and technology firms as they introduce this new payment technology in other global regions.

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<sup>1</sup> A retail payment is a small-value transaction that occurs either between two consumers, between consumers and businesses, or between two businesses. A retail payment instrument is any payment method that facilitates a retail payment transaction. Traditional retail payment instruments include cash, checks, automated clearing house (ACH) transfer, credit cards, and debit cards.

<sup>2</sup> Of these transactions, 71% will consist of money transfers while only 21% will correspond to merchandise purchases. Source: Gartner. 2013. "Forecast: M-payment, Worldwide, 2013 Update." <<http://www.gartner.com/resId=2484915>>.

<sup>3</sup> Gartner Research. 2013. "Forecast: M-payment, Worldwide, 2013 Update." <<http://www.gartner.com/resId=2484915>>.

<sup>4</sup> Generally, retailers prefer the use of credit card, debit card, or bank account information as opposed to charging a customer's telephone bill. If charged to a telephone bill, retailers may only receive 60% of the value of the transaction after transaction fees and other costs are deducted.

<sup>5</sup> Authentication may include entering login and password information.

<sup>6</sup> Near field communication (NFC) technology allows for contactless communication between enabled devices. NFC transmissions are different from Bluetooth or Wi-Fi transmissions, as NFC utilizes electromagnetic radio fields to establish communication between two or more devices when these devices are brought within a pre-defined proximity to each other. For security, NFC data transmissions can be encrypted. For example, Square Wallet is an NFC m-payment application for use on smartphones.

<sup>7</sup> A smart card chip is embedded with integrated circuits which can relay data with a receiving device. A contactless smart card chip can interact with a receiving device without physical contact. These chips are usually held in a plastic card, but can also be installed in a mobile device. For more on this technology, see the Smart Card Alliance at <http://www.smartcardalliance.org/pages/smart-cards-faq>.

<sup>8</sup> A QR code is a two-dimensional barcode made up of black, square dots arranged in a square grid.

<sup>9</sup> Text messages can be sent either through a short message service (SMS) protocol or unstructured supplementary service data (USSD) protocol. SMS and USSD are communication protocols defined as part of the Global System for Mobile Communications (GSM) system. Most mobile phones and tablets are configured to send either or both protocols.

<sup>10</sup> This definition of mobile banking agrees with a recent survey conducted by the Federal Reserve on mobile banking and m-payments. Source: Board of Governors of the Federal Reserve System. 2013. "Consumers and Mobile Financial Services 2013."

<sup>11</sup> A smartphone is a multi-purpose mobile phone built on a mobile operating system which features a more advanced computing capability and connectivity than a feature phone and basic mobile phone. These devices are internet-enabled and can carry out multiple tasks at the same time. Smartphones are currently fairly expensive because of their hardware and software costs.

<sup>12</sup> A feature phone is a moderately priced, multi-purpose phone that is internet-enabled and a step above a basic mobile phone. While it can carry out a variety of tasks, its ability to multi-task is limited. It appeals to customers who do not want to pay for expensive smartphones.

<sup>13</sup> Data on total mobile phone penetration was provided by the International Telecommunication Union at <http://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx>. Data on smartphone penetration was provided by Google at <http://www.thinkwithgoogle.com/mobileplanet/en/downloads/>.

<sup>14</sup> Atom Payment Gateway suggests that mobile payments have reached more than \$1 billion in India. ICICI Bank, India's largest private sector bank is working with Movida, a joint venture between Visa and Monitise, to provide customers with a variety of m-payment and mobile banking services.

<sup>15</sup> Sources: Business Insider Intelligence. "M-payments Forecast and Update: Why M-payments Are Poised For Takeoff." 13 Jun. 2013. Kaufman, Wendy. "Forget The Register: Stores Use Mobile To Make Sales On The Spot." National Public Radio. 10 Dec. 2012. <<http://www.npr.org/blogs/alltechconsidered/2012/12/10/166890714/forget-the-register-stores-use-mobile-to-make-sales-on-the-spot>>. Morphy, Erika. "Retailers Are Loving Our Love Affair with Tablets." Forbes. 17 Apr. 2012. <<http://www.forbes.com/sites/erikamorphy/2012/04/17/retailers-are-loving-our-love-affair-with-tablets/>>.

<sup>16</sup> A consumer's value includes their monetary value, fee revenue, membership in incentive programs (such as coupons or airline miles), etc.

<sup>17</sup> Wall Street Journal. "M-payments and Big Data Survey Reveals That Creating Meaningful and Sustainable Revenue is the Big Issue Inside Banks." 10 Jun. 2013. <<http://online.wsj.com/article/PR-CO-20130610-904708.html>>.

<sup>18</sup> Reserve Bank of India. 2007. "Financial Inclusion – The Indian Experience." <[http://www.rbi.org.in/scripts/bs\\_speechesview.aspx?id=432](http://www.rbi.org.in/scripts/bs_speechesview.aspx?id=432)>.

<sup>19</sup> For example, more than 17 million Kenyans (two-thirds of the adult population) use Safaricom's M-PESA system to send mobile payments throughout the country. Around 25% of the Kenya's gross national product flows through this network on an annual basis. Safaricom is Kenya's largest mobile-network operator. See the following article in the economist for more information. T.S. "Why does Kenya lead the world in mobile money?" 27 May 2013. <<http://www.economist.com/blogs/economist-explains/2013/05/economist-explains-18>>.

<sup>20</sup> One recent effort by banks to better serve underbanked consumers was to provide remote image capture for check deposits. This product has received tremendous use since its introduction and many banks have been forced to follow their competition and provide this service in order to avoid losing customers. Sources: Board of Governors of the Federal Reserve System. 2013. "Consumers and Mobile Financial Services 2013." FDIC. 2012. "2011 FDIC National Survey of Unbanked and Underbanked Households." NGDATA. 2013. "Monetizing Payments: Exploiting Mobile Wallets and Big Data."

<sup>21</sup> Gartner Research. 2013. "Forecast: M-payment, Worldwide, 2013 Update." <<http://www.gartner.com/resId=2484915>>.

<sup>22</sup> Press Release. "MasterCard Says Japan's Overall Environment is Favorable for M-payments." 29 Oct. 2013. <<http://newsroom.mastercard.com/press-releases/mastercard-says-japans-overall-environment-is-favorable-for-mobile-payments/>>.

<sup>23</sup> Octopus Card. 2013. "Services in Hong Kong." <<http://www.octopus.com.hk/about-us/corporate-profile/services-in-hong-kong/en/index.html>>.

<sup>24</sup> Reserve Bank of India. 2008. "M-payment in India – Operative Guidelines for Banks." <[http://www.rbi.org.in/Scripts/bs\\_viewcontent.aspx?Id=1365](http://www.rbi.org.in/Scripts/bs_viewcontent.aspx?Id=1365)>.

<sup>25</sup> These are the most conservative and liberal of research firm estimates. Researcher predictions vary based on how narrowly they define the types of payments that can be considered m-payments. Some researchers follow a strict definition of mobile payments where transaction data can only be sent via a mobile network. Other researchers consider transactions partially completed via the mobile network and partially via the internet as mobile payments. Gartner Research consulting predicts a value of \$721 billion by 2017, while Business Insider Intelligence predicts a value closer to \$1.5 trillion. (Source: Gartner Research. 2013. "Forecast: M-payment, Worldwide, 2013 Update." <<http://www.gartner.com/resId=2484915>>. Business Insider Intelligence. "M-payments Forecast and Update: Why M-payments Are Poised For Takeoff." 13 Jun. 2013. )

## Appendix 1: Common M-payment Transaction Methods

Payment Type	Transmission Method	Transaction Steps	Requirements
<b>Proximity</b>	<b>NFC or Smart Card Chip</b>	A customer taps or waives their mobile device over an NFC (or smart card) enabled reader connected to a POS terminal (such as a cash register) which transfers stored payment account data to the retailer.	<p>The customer needs an NFC-enabled mobile device. Security software to protect payment information is recommended. The customer could also be issued a smart chip with radio frequency capability that is attached to the phone.</p> <p>The retailer needs to be part of a bankcard payment system network. The retailer also needs to invest in a NFC capable POS or NFC attachment for their POS terminal. These devices can be costly.</p>
	<b>Bar Code or QR code</b>	<p>There are two primary methods used for this transaction option:</p> <p>1) Upon checkout at the cash register, the retailer's system sends a billing transaction request to both the customer's phone and sales register. This generates a 2D bar code on the customer's phone and the cash register then scans the image to check for a match.</p> <p>2) Upon checkout, the POS terminal (a cash register for instance), will generate a 2D bar code. The customer scans the image with their mobile device which initiates the transfer of billing information back to a payment processor where the transactions are matched and the sale completed.</p>	<p>This type of payment transmission may require the customer to download different applications for different retailer POS systems on their mobile device.</p> <p>The retailer must invest in POS systems that can read and transmit bar code information. Sometimes it may be a mobile app that uses the mobile devices camera to capture the consumer's barcode.</p>
	<b>Numeric Code</b>	<p>To utilize this payment method, the customer must first create an account with the retailer and provide their payment information. The registration process generates a unique Common Short Code (CSC) specific to the customer's account.</p> <p>To initiate a purchase, the customer sends a blank text message to the CSC number, which sends back a purchase authorization code. This code is verified at the POS terminal and a third-party service completes an automated funds transfer from the customer's account to the retailer.</p>	<p>Customers will need a mobile device and account with the retailer to transact.</p> <p>Retailers will need to update existing POS terminals with software that can accept mobile authorization codes. In addition, retailers will need to help customers create accounts with billing information and contract with a third-party payments processor.</p>
<b>Remote</b>	<b>Text message</b>	A transaction is completed with a series of text messages. Most commonly, a customer initiates the transaction via a text message, sending a CSC to a third-party payment processor selected by the retailer. A text is sent back to the customer to verify billing information. The customer confirms this information and completes the transaction by sending a final text.	<p>The customer needs a text enabled mobile device.</p> <p>The retailer needs to contract with a third-party payment processor.</p>
	<b>Browser based</b>	Similar to a payment made through a website via a personal computer, the user accesses the retailer website through the mobile network via her mobile device. The transaction is sent to a payment processor using Secure Socket Layer (SSL) protocols over the mobile network. The transaction looks very similar to a standard internet based transaction.	<p>The customer needs a mobile device with internet access via their mobile network.</p> <p>The retailer needs to contract with a third-party payment processor.</p>
	<b>Application based</b>	The retailer creates a proprietary application which the consumer then installs on her mobile device. The application requests billing information and submits data over the mobile network.	<p>The customer needs a mobile device with internet access.</p> <p>The retailer needs to create or purchase a proprietary application for their business and payment transactions. In addition, it may need to contract with a third-party payment processor to complete transactions.</p>

Reference: Cluckey, Suzanne. 2011. "M-payments 101: Retail." *MobilePaymentsToday.com*