

UPWARDLY MOBILE

An Analysis of the Global Mobile Payments Opportunity

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UPWARDLY MOBILE An Analysis of the Global Mobile Payments Opportunity

In the good old days, your office couldn't reach you 24x7, Apples and Blackberries were found at fruit stands and you only came across an Android when you relaxed with a science fiction novel. Also, in the good old days, people drove in circles looking for an address or a payphone, they stood in line at the bank for every financial transaction and they ran from store to store searching for the best price. Today in most developed markets, you can not only place a call but with a couple of clicks on a mobile phone you can pay a bill, send money to a friend, search for the best bargain, donate money to charity and pay for practically anything. In emerging markets, consumers are finally being included in the formal financial system. Workers who are employed anywhere in the world can now text their wages back to family members at home and no longer have to travel hours at a time to pay utility bills.

The meteoric rise in mobile phone subscriptions — now almost 6 billion worldwide — has transformed communication. It's not only about voice. Today's mobile phones can serve as a mobile payments platform or shopping mall. Mobile Payments touches a large number of industries. This is increasingly true in low-GDP countries and for lower-income consumers with basic phones.

In emerging markets, mobile phone penetration now outpaces the availability of banking and other financial services, giving rise to the mobile phone as a portal for the provision of these services. Once consumers are comfortable with the concept of electronically stored monetary value, more advanced mobile banking functionality can be introduced. There are more than 125 Mobile Payments pilots in progress today. Successful deployments like M-PESA in Kenya have forged a path for others to follow, based on massive adoption of the platform, gaining 60% penetration of the country's adult population in just four years since being launched.

In developed markets where access to financial services is more commonplace, the Mobile Payments opportunity is based more on providing feature-rich products that enhance the consumers' banking or shopping experience. Mobile commerce is already transforming the way consumers shop, blending of the online and off-line into a single homogenous view. Adoption will depend on using mobility to enhance the consumer's buying experience and leveraging mobile information to create additional consumer value.

It's not just telecom providers and financial institutions, but an ecosystem that also involves consumers, private corporations, governments, retailers, technology companies and processors.

In the report that follows, we look at what the Mobile Payments opportunity could be and examine the factors that contribute to a successful Mobile Payments ecosystem. We look closely at Japan and Kenya — two countries with leading Mobile Payment offerings — to help to provide a blueprint for how future offerings should be structured. We then take a global tour to examine the key mobile payments offerings around the world.

Journey Towards Mobile Payments



BY 2013, THE NUMBER OF SMARTPHONES & BROWSER-EQUIPPED PHONES WILL EXCEED THE NUMBER OF INSTALLED PCs.

Contents

Mobile Money Matters	7
Journey Towards Mobile Payments	9
Defining Mobile Payments	11
The Mobile Payment Opportunity	12
The Case for Mobile Payments	16
Value for Different Players in the Mobile Payments Ecosystem	25
Mobile Ecosystem Success Factors	29
Mobile Payment "State of the Union"	33
Regional Perspective – North America	34
Regional Perspective – Japan	38
Regional Perspective – Europe	41
Regional Perspective – Africa	44
Regional Perspective – Asia, excluding Japan	46
Regional Perspective – Central / Latin America	48
Corporate Perspective – Major Telecoms	51
Corporate Perspective – Major Banks	52
Corporate Perspective – Major Processors	53
The Path Ahead	54

Mobile Money Matters

With almost 6 billion mobile phone subscriptions globally, the rise of Mobile Payments can have material and widespread financial and social consequences. Our analysis indicates that multiple constituents — consumers, entire industries as well as governments — are likely to be affected by this trend.

Mobile Payments, by definition, sits at the intersection point of the telecom ("Mobile") and banking ("Payments") industries. These are two of the largest industries in the world, with a combined market capitalization of \$4.8 trillion. But exposure to Mobile Payments is not limited to just these sectors. Other industries — technology, retail, services / processing and transportation — also have a vested interest in the successful adoption and expansion of Mobile Payments.

In most countries in the world, mobile phone penetration outstrips the availability of banking and other financial services and so the concept of using the mobile phone as a portal for "financial inclusion" has a strong backing. Developed properly, Mobile Payments adoption can positively affect billions of consumers. The trend also lends itself to "network effects", and this report offers insights into the value creation that has resulted from successful implementations to date, particularly in Japan and Kenya. The consumer implications of and strategies for Mobile Payments can vary by country and also depend on the user's economic status.

In an emerging economy, financial inclusion through Mobile Payments offers high potential to leapfrog the traditional payments infrastructure due to its lower cost as well as offering the potential to close the gap between those with access to financial services and those without. Mobile Payments can also improve take-home incomes by reducing the friction associated with cash transactions. We see a long runway of product improvements in the emerging market. Most likely it will start with a simple transactional account to allow consumers to send money. Once the infrastructure for payments and accounts has been set up, a more robust set of financial services like savings accounts and investments should follow.

In a developed economy where the majority of the population has bank accounts, the value of Mobile Payments lies in the potential for greater convenience, real-time financial control and possible savings due to more relevant marketing offers

Given the potential for widespread beneficial consumer impact, our view is that there are undeniable policy implications for governments around the world. The growth of the M-PESA Mobile Payments infrastructure in Kenya has benefited the individual users (numbering in the millions), the 32,000 enabling agents and various enabling technology companies and obviously, Safaricom. One can think of many other use-cases with a tangible benefit. For example, disbursing a loan via mobile phone to a remote farmer in India or to a group of co-operative businesswomen in Zambia can eliminate wastage and corruption and put money to work where it is needed the most. Similarly, remitting money via mobile phone to the Philippines or Malaysia has benefits over historical / unofficial means of money transfer such as *hawala*. Presumably, such developments can improve a country's tax income and reduce its social outlay.

We believe the Mobile Payments trend will have widespread effect on Consumer; entire industries like Banking, Telecom and Retail; as well as Governments....

The consumer benefits of enabling Mobile Payments are different for emerging markets and for developed economies...there is more potential to leapfrog traditional infrastructure in emerging markets....

...widespread beneficial consumer impact implies there are policy implications for Governments around the world as well.... While growth estimates differ, there is no denying that Mobile Payments represent a massive opportunity...

...but there are many challenges — political, social, economic and technological — on the path to greater Mobile Payments adoption.

How big is the Mobile Payments opportunity?

A wide range of growth estimates exist for Mobile Payments. Juniper Research predicts \$670 billion in transaction value by 2015; the Yankee Group projects \$545 billion in payment value by 2015 and Canada-based IE Market Research Corporation estimates \$1 trillion of transaction value by 2016. Some of the difference in these estimates is due to differences in the type of transactions being measured and some of it is likely due to differing assumptions about the evolving economics of Mobile Payments. In spite of differing views on the magnitude of Mobile Payments' market size, there is no denying that Mobile Payments represents a massive emerging opportunity.

From an investment opportunity standpoint, we note that telecom and banking tend to be leading verticals in Emerging and Frontier markets as well – for a discussion of Frontier markets, see the prior Citi GPS report titled **>** Call of the Frontier. The Search for a New Generation of Emerging Markets by Andrew Howell – and the development of Mobile Payments in these countries is symbiotic. Mobile Payments can help the case for the growth of these markets as well as be helped by the growth of these markets. Beyond these leading verticals, a wide range of investment opportunities exists within Mobile Payments ecosystems.

Not a Clear Road Ahead

The growth of Mobile Payments raises many questions, the answers to which can change the face of Industry as we know it. Will the Banking industry control the mobile financial portal and dramatically enhance its own reach and influence? Can telecoms successfully develop Mobile Payments as a revenue stream that can reverse the current trend of voice and data margin compression? Can the technology industry successfully enter the Mobile Payments industry and own the customer relationship? According to the McKinsey Global Payments Map, payments revenue totaled \$277 billion in revenue in the U.S. alone in 2010 – Does Mobile Payments have the power to shift power in this relationship, away from the traditional credit card processing ecosystem (issuers, acquirers and payment networks)?

Notwithstanding the market potential for Mobile Payments (and sometimes because of the attractiveness of it), the road ahead is not a clear one. There are many challenges that need to be overcome. Some of these are political challenges, some are social, some are economic and some are technological. For example, it is unclear which entity in the ecosystem will retain the primary relationship with the customer. It is unclear which set of regulations - financial or telecom related should apply to Mobile Payments. Consumer and Retail adoption are not guaranteed — for example, in a developed market, where most merchants have the ability to accept widely used card payments, why would they invest in new payments infrastructure? Perceptions about mobile security as well as the dependability of the mobile communications infrastructure can hurt consumer adoption as well. In this report, we discuss many of these challenges and we also discuss the success factors for Mobile Payments to become reality. We also provide a global survey of what Telecoms, Processors and Banks are doing throughout the world. By analyzing what has been successful, we provide guidelines for a successful transformational mobile ecosystem of the future.

Journey Towards Mobile Payments

Payments are progressing from cash to electronic.

Until a few decades ago, cash — paper money and coins — was the only store of monetary value available to the large majority of the world's population, and exchanging cash was the only practicable way to transfer this value. Of course, those with access to banking and other financial systems had additional alternatives. Over the past few decades, the use of electronic payments has grown dramatically, first with the rise of credit card usage and then with the proliferation of debit cards. Perhaps less well-known to individual consumers but highly important in terms of today's overall payment volume are the non-cash payment mechanisms, such as clearing houses and wire transfer systems. The widespread availability of non-cash payment mechanisms has been generally limited to those with a bank account. So, even in developed countries, a meaningful part of the general population does not have access to these payment mechanisms.

Figure 1. History of Payments Shows Rapid Recent Changes Leading to Mobile Payments



Source: Citi Global Transaction Services

The last decade has seen the rise of various payment alternatives. The proliferation of Internet connectivity and usage has given rise to various online payment mechanisms such as PayPal and AliPay. But as long as the ability to go online is tethered to a traditional computer, near-universal access to online payments is still limited.

The ubiquity of the mobile phone presents a potential solution to the persistent lack of access to internet connectivity as well as to financial services.

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The ubiquity of the mobile phone presents a potential solution to the persistent issue of lack of access to internet connectivity as well as to banking and non-bank financial systems. Technological evolution — specifically the increasing penetration of smartphones — has also introduced an exciting new dynamic to this equation. On the one hand, mobile phone proliferation has the potential to drive "financial inclusion" by truly democratizing electronic payments as financial access is brought to every mobile phone. On the other hand, mobile Internet and smartphone growth are driving demand from the high-end user that looks for 24x7, location-independent financial payment tools with rich functionality. For the first time, using mobile, it is possible to provide quality financial services that meet the specific need of customers in every point along the economic spectrum.

Although the current market size for Mobile Payments is relatively small, this is partly because we are still early in our journey towards widespread access for Mobile Payments. In fact, in most countries cash is still the primary means of exchanging monetary value.



#**_***

South Korea



Germany

Japan

...but the move to electronic cash through Mobile Payments has robust growth prospects.

However, taking the developed the emerging opportunity together, we believe Mobile Payments is one of the more exciting investment frontiers within financial payment processing. The growth prospects are quite robust, both in terms of transactions and in terms of dollar volume.



Figure 3. Robust Mobile Payment Transaction Growth (in millions)

China

South Africa

Source: McKinsey & Company

Source: CapGemini World Payments Report 2011



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USA

Canada

France





Cash is still the primary means of

exchanging monetary value...

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Mobile Payments is a combination of wallet container, payment services and payment instruments.

Defining Mobile Payments

Mobile Payments is an all-encompassing term that has various definitions. From a strictly logical or functional standpoint, there are three primary components of a Mobile Payments solution: a wallet container, payment services and payment instruments.

- Mobile Wallet Container The wallet container is a piece of software that enables 1) storage of payment instruments such as credit and debit card and 2) their connection to various payment services. It also stores user preferences and other data in a secure way.
- Mobile Payment Services These are the various ways that consumers can pay using their mobile wallet. Some examples include:
 - Retail Remote Payments (m-commerce): This is a traditional e-commerce model adapted for the mobile phone. For example a person can make a purchase online with Amazon.com (e-commerce) or on their phone with Amazon's mobile website or application (m-commerce). M-commerce differs from e-commerce in two important ways. 1) The screen real estate is much smaller therefore the shopping experience needs to be streamlined. 2) The keyboard is generally harder to type on, potentially leading to consumer frustration.
 - Retail Proximity Payments: These are a replacement for traditional "swipe" payments made with credit and debit cards at retailers. In developed markets these payments are made in-person at retailers. Moving them to a mobile phone requires contactless Near-Field Communications (NFC) technology found in contactless credit cards or bar codes displayed on the phone (e.g., Starbucks). In emerging markets, retail payments are often made through a text message.
 - Person to Person Payments: This allows consumers to make payments from their mobile wallet to someone else's mobile wallet. Although both the sending and receiving wallets are normally on the same system, it's not required for them to be. In emerging markets, this use-case is critical — allowing family members who earn money in the city to "send money home" through text messages. In developed markets it's less important, and instead is often touted as the "how to split the bill" application.
- **Payment Instruments –** Instruments that allow a consumer to access funds.
 - Credit / Debit Cards: These are electronic versions of the plastic cards that are stored in a consumer's physical wallet. In a developed market these are the critical payment instruments that a consumer will use when making a mobile payment.
 - Stored Value Account: In an emerging market, many consumers are unbanked. This means the mobile wallet itself needs to act as a bank and facilitate the storage of value. For example, if a consumer is going to send cash they earned from a job it the city back to a family member in their home village they need to first convert it to electronic stored value. Stored value accounts also exist in developed markets and are often used to provide corporate rebates.
 - Other Payments Instruments: In developed markets, a mobile wallet may have non-traditional instruments that can be used for payments like coupons and reward points. For example, it is possible to use your Citi ThankYou points to purchase digital music.

The Mobile Payment Opportunity

Based on data available from the Bill & Melinda Gates Foundation, which supports the GSMA Mobile Money for the Unbanked (MMU) program, there have been 117 live deployments of mobile payment services and 91 planned mobile payment implementations worldwide (as of February 2012).

The majority of the new and planned deployments are emerging market based.

The vast majority of these deployments involved emerging market wallets. Note that in an emerging market, creation of a mobile wallet allows the reception and storage of newly electronic flows. Because an emerging market wallet provides users with a stored value account and therefore the ability to store funds in a way that they haven't had before, it opens up not just outflows of payments, but inflows as well.

In a developed market the stored value functionality is not new or unique - other payment instruments that store value are more common - and so the mobile phone is more likely to be a conduit or access mechanism for transaction and information flow compared to emerging markets.

Figure 5. Mobile Payments — Emerging Market View vs. Developed Market View



Source: Citi Investment Research and Analysis, Citi Global Transaction Services

Looking at both the developed markets and emerging markets, we believe the Mobile Payments opportunity has two facets — the "Smartphone" opportunity, which is primarily found in developed markets, and the "Financial Inclusion" opportunity, which is global in nature but has the greatest growth prospects in emerging markets.

The Developed vs. Emerging Market Opportunity

In developed markets, an increasing number of consumers are smartphone users The main opportunity in developed markets and they generally already have a bank account. Therefore the main opportunity is to promote feature-rich product. with these users is to provide a feature-rich product. A smartphone offers applications that allow the consumer to make all of their payments via their phone, whether it's credit, debit or public transit. It is also an integral component to a mobile commerce experience along with mobile advertising, search and selection. In emerging markets, financial inclusion is Most phones — especially in emerging markets — are not smartphones. So, in emerging markets, using a mobile phone as a portal for the provision of financial the primary use-case. services often starts with basic functionality; e.g., the exchange of airtime minutes. Once mobile wallet usage takes hold for such basic functionality and the emerging market user's population is comfortable with the concept of electronically stored monetary value increases, more advanced mobile banking functionality should be a much easier "use-case". As mobile phone penetration globally is high relative to bank account penetration, using the mobile phone for financial services allows an otherwise unbanked population to be "included" in the financial system.

...two of the most advanced Mobile Payment systems in the world today are in Japan and Kenya....and they are likely to serve as prototypes for future mobile wallet initiatives....

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Interestingly, of the two most advanced mobile payment deployments in the world, one is in a developed market (Japan) and the other is in an emerging market (Kenya). There are many differences between the two services, as you might expect, including the underlying technology, the main purpose and the sources of revenue and value creation. But while both systems could be improved upon, they are likely to serve as prototypes for how future mobile wallet initiatives will be shaped in each of these segments going forward.

Figure 6. Summary of Mobile Wallet Markets in Japan and Kenya

	Japan	Kenya
Main Mobile Wallets	Edy (BitWallet), iD (NTT DOCOMO), Suica (JR East)	M-PESA (Safaricom)
Active Mobile Wallets	~21 mil	~15 mil
% of Population	~17%	~37%
Cash Use in Economy	~87%	~94%
Main Use of Wallet	Payment in Store, Vending Machines, Transit	Peer-to-Peer Payments (Remittances)
Technology Used	Contactless (RFID)	SMS (Text-based)
Funding Source	Prepaid and Postpaid	Prepaid
Revenue Sources	Merchants	End Users
Revenue Types	Merchant Discount Rate, Float	Cash Out Fees, Transfer Fees, Float
Source: Citi Investment Resear	ch and Analysis, Celent, Financial Services	Assessment

Japan shows stellar data points on Mobile Payments relative to other markets but we note that the market appears to have reached a saturation point.

Developed Economy Brief Example – Japan

Japan is frequently cited as a Mobile Payments success story — justifiably so, based on the statistics listed below. A more detailed analysis follows later in this report.

- 55% penetration of mobile-payment enabled phones translates to ~65 million potential mobile wallets.
- 17% of mobile wallets are active users, or ~21 million active mobile wallets.
- 9.5 million Mobile payment acceptance terminals.
- 74% of new phone shipments are equipped with mobile wallet functionality.

These are stellar data-points relative to other markets. Although market-specific factors helped reach the above milestones, there are also similarities with other developed markets — so there is much we can learn from the Japanese Mobile Payments experience. It is important to note that the Japanese mobile payment market appears to have reached saturation in the past few years.

There are several possible reasons for this seeming saturation. In our view, the relatively closed nature of the wallet; the development of the market as a prepaid and low-value credit market and the relatively lower penetration of traditional card payments in Japan are responsible.

The chart below summarizes the main flow of economics in a typical mobile wallet transaction in Japan. Note that the size and destination of the revenue generated depends on several variables (pre/post paid, size of transaction, etc.) but it is important to note that the flow emulates a typical credit/debit card transaction that we see in developed economies today (merchant-supported economics).



Figure 7. Representative Economics of ¥800 Mobile Wallet Payment in Japan

Emerging Economy Brief Example – Kenya

M-PESA, the service offered by Safaricom in Kenya, is generally considered as one of the most successful Mobile Payments ecosystems in the world. The statistics below can be considered an element of the emerging market Mobile Payments use-case with regards to monetization.

- M-PESA launched in 2007 and as of November-2011, the provider had 14.9 million clients, which represents about 60% of Kenya's adult population.
- In the six month period between April- and November-2011, M-PESA transactions reached \$3.15 billion dollars in value. Note the 2011 GDP estimate for Kenya was \$36.1 billion.

There is a lot to learn from the Kenya Mobile Payments experience, even though it is well understood that there were market-specific factors that may have helped the market take shape in Kenya.

The chart below summarizes the economics of a typical person-to-person (P2P) money transfer transaction in Kenya's M-PESA system. The primary sources of revenue are transaction fees and cash-out fees, the latter of which Safaricom shares with its network of agents. In this example, the total revenue collected for the transaction is KSh55, which represents north of 7% of the initial transaction amount.

Figure 8. Representative KSh750 M-PESA Money Transfer Transaction



Source: Company Reports, Citi Investment Research and Analysis

The Case for Mobile Payments

Qualitatively, it is easy to conclude that Mobile Payments should have solid potential based on the twin financial inclusion and the smartphone opportunities. Several quantitative factors support the case as well — we believe the following points are worth noting.

For Emerging Markets:

- The ubiquity of mobile phones vs. the generally lower bank penetration. In spite of this, mobile phone penetration continues to grow at a healthy pace meanwhile, bank penetration has been relatively stagnant.
- Financial inclusion benefits the poor and expands opportunities for underserved individuals and communities.
- Given the broader range of services, infrastructure and more burdensome compliance regulations, banks seem to be more expensive and less efficient in offering foreign remittance than more focused money transfer organizations. Money transfer organizations have fast-growing Mobile Payments initiatives.
- For most unbanked people, the cost of a mobile (or prepaid, which might eventually converge with mobile) alternative is likely to be lower than many alternatives such as cash or traditional bank-led products.
- We believe in an extended and (possibly) multi-decade runway for Mobile Payments development and success. In our view, leaders in this market will be able to build on initial success and build a multi-product financial portfolio.

For Developed Markets:

- The robust growth rates experienced in the selling of smartphones, especially in developed countries.
- Technological advances, especially in the area of social media and mobile commerce that could help in the area of consumer adoption.

Mobile Phone vs. Bank Penetration

In most countries in the world, mobile phone penetration is higher than bank usage penetration — often significantly so. This is illustrated in the Figure 9 below.

According to Gartner, global mobile phone penetration reached an estimated 85% in 2011 from just 46% in 2006 and is expected to rise to 90% by 2014.

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Not only is mobile phone penetration already high, it is still increasing at a healthy pace. According to Gartner, global mobile phone penetration reached an estimated 85% in 2011 from just 46% in 2006 — this is expected to ramp to 90% by 2014.



Figure 9. Mobile Phone Penetration Typically Exceeds Bank Penetration (n=117 countries)

Note: From the total list of countries, we excluded countries with obvious military strife where mobile phone penetration levels were below 10% as well as certain countries where either of the two data-sets was unavailable. Penetration rate is typically defined as the number of phone subscriptions divided by the total population. In some cases this yields a rate greater than 100% due to a local tendency to own multiple phones. Source: GSMA Mobile Money for the Unbanked; Citi Investment Research and Analysis, Citi GTS

Bank penetration is comparable to mobile phone penetration in certain developed countries, such as the U.S. and France, but is much lower is most emerging markets, and regionally in Southeast Asia and Africa. Since the figure above is for a wide list of countries, we show comparative mobile phone and bank penetration levels for some specific countries in below. Based on Figure 10, a case can be made for the potential for mobile wallets in countries like Nigeria, the Philippines, Mexico and Brazil.

Figure 10. Bank Account Penetration Lags Mobile Phone Penetration in Many Countries (2009)



Note: Mobile phone penetration is defined as # of mobile phone subscriptions / # of people. Source: World Bank Mobile platforms can replace branch-based banking infrastructure in emerging and developed markets.

Because emerging markets are playing catch-up, there is a good chance that they leap-frog to new opportunities. Given the lack of a traditional branch-based banking infrastructure in many emerging markets and the lower cost and rising adoption of mobile phones, we see the mobile phone as an attractive distribution channel for financial services in these countries. Today, as branch-less banking models proliferate in advanced economies like the U.S. and Europe, we believe developing markets will take this cue to leverage the mobile platform as an easy and cost-effective way to reach new customers.

The history of the telecom industry itself gives us a good blueprint for this type of development in emerging markets. As operators in these countries mapped out their communication rollout plans over the past decades, the vast majority opted for the more advanced mobile infrastructure rather than investing huge sums of money in the aging fixed-line technology popular in advanced economies. As shown in the figure below, many countries in the Middle East, Africa and Southeast Asia have up to 50x more mobile phone subscribers than fixed-line subscribers as a result of these leap-frogging investments. Lastly, because many of these consumers have grown up only knowing mobile phones and rely on them, we believe adoption rates for financial services via this channel can actually be higher than advanced economies given the better level of trust in the system.

Figure 11. Ratio of Mobile to Fixed-Line Phone Subscription



Source: Slate, NAF, The World Telecommunication/ICT Indicators Database

Financial Inclusion Benefits the Poor

Financial inclusion expands the opportunities for underserved individuals and communities. This population's financial services choices are often limited to money lenders and other informal services. For some, financial inclusion includes access to credit. For others, it could improve the credit terms relative to what a money lender might charge. For the self-employed, it could mean more stable and supportive income because its customers have access to safer and more portable stored monetary value. Most inclusion, however, is also about payments, insurance, and savings. This enables a household with the ability to manage monthly finances and weather unexpected crises. Broadening access to payment alternatives also reduces costs, increases safety and convenience and can be a first contact with formal providers.

Access to credit and banking lessens the reliance on alternative financial systems.

Helping a hitherto underserved part of the community can help lower a government's social burden. If a population's income rises as a result of the higher transaction volumes typically associated with stored value vs. cash, it might even help the tax base of the government. The key here is that once a government understands the benefits of financial inclusion, they can help the process along with regulatory change that helps push financial inclusion through Mobile Payments.

Cost of Foreign Remittances

According to analysis from the World Bank in December 2011, the average cost of foreign remittances (the transfer of money by a foreign worker to his or her home country) totaled ~9.5% of the principal sent, which is relatively consistent with levels seen over the past several years. It is worth noting that traditional banks are among the most expensive providers of these services, while money transfer organizations (MTOs) and post offices offer these services for a lower fee, as shown below. We believe this cost disparity is because banks have more stringent compliance requirements; higher allocated costs due to a tendency to target a limited number of remittance corridors; and a greater likelihood that they have to pay more people in the value chain (correspondent bank partners, etc.) since they tend not to have a wide network of branches (agents). The point here is that a mobile remittance solution can be cheaper than a bank solution and in fact, can become a "killer-app" that drives mobile payment adoption.



Figure 12. Total Average Cost of International Remittances (% of principal transmitted)

Source: World Bank, December 2011

Public data from the two largest MTOs suggest lower overall pricing than the ~9.5% indicated above — in fact the two largest companies have revenue yields in the 4%-6% range. The highly successful M-PESA program has a ~7% revenue yield, which is cheaper than the average bank cost but more expensive than the MTO average.

Cost of Prepaid Reloadable Debit Cards

One of the fastest-growing verticals in the U.S. payment system the general purpose reloadable (GPR) prepaid debit cards segment. According to the FDIC, there are approximately 60 million unbanked or under-banked people living in the U.S., which clearly makes it an attractively sized market, even with one of the most developed economies globally.

Sending foreign remittances generally cost less through Mobile Payments than through traditional banks. While the card programs can have a variety of fees (purchase fee, monthly fee, reload fee, transaction fee, ATM fee, etc.), independent third party studies show that the cost of these programs is typically significantly less than living in a cash economy (check cashing fees, bill payment fees, etc.) and comparable or less than bank account fees for a similar consumer. As shown below, a March 2011 study by Bretton Woods showed that the GPR prepaid card programs used with direct deposit were the cheapest option given the array of alternatives for these generally low income consumers. We note that this study was done prior to the implementation of the debit interchange regulation change in the U.S., which has generally increased the cost of bank accounts for low balance bank account holders.

Given the cost advantages of prepaid products relative to traditional banking alternatives, we believe prepaid will be an important platform for developing mobile wallets, particularly in markets or customer sub-markets that are not already used to post-paid financial products.



Figure 13. Average Annual Cost of Ownership based on Projected Usage Patterns

Source: Bretton Woods, March 2011

Given the cost advantages of prepaid products relative to traditional banking alternatives, we believe prepaid will be an important platform for developing mobile wallets.

Basic banking is just to the start of the opportunity for Mobile Payments.

The Long Runway for Mobile Payments in the Emerging Markets

It is easy to get caught up in the initial economics of how the mobile wallet pilots are structured and forget that Mobile Payments are likely to evolve into a multi-product opportunity over an extended period of time. An important aspect of this relates to cross-selling new and additional services to the existing client base, similar to how many banks operate globally today. Aside from the financial benefits of selling new services, the increase in customer loyalty and reduction in customer churn has significant revenue and margin benefits as well. One industry that is potentially a good blueprint for how mobile wallets can develop is the payroll processing industry in the U.S. As shown below, the two main players in the industry — ADP and Paychex — enjoyed several decades of strong revenue growth through a combination of market penetration and additional services. Both companies began their evolution as pure payroll outsourcing solutions, but today they resemble a fully outsourced HR department in many respects.





Source: Company Reports, Citi Investment Research and Analysis

We expect Mobile Payment providers to benefit from layering on additional services.

We see similar opportunities for mobile wallet providers in the years ahead as adoption of these services takes off. While M-PESA in Kenya is primarily a personto-person remittance service today, there is reason to believe that it can be the underlying base in which many people bank in Kenya in the years ahead. To that end, we eventually see a convergence of what we are terming "developed" vs. "emerging" mobile wallets as these services are built out over time. This will likely be spurred on by growing consumer affluence in these developing regions, as well as more favorable cost curves for the underlying technological infrastructure (i.e., smartphone, NCF chips). The chart below shows how a potential mobile wallet evolution could occur over time.





Smartphone Penetration

Source: Citi Investment Research and Analysis

Smartphone penetration is increasing across all geographies.

Fundamental to the Mobile Payments opportunity is the increase in smartphone penetration across the globe. The figures below show smartphone unit growth and penetration rates by geography through the end of 2011. There are a few clear conclusions.

- The penetration of smartphones has increased over time, regardless of geography.
- Smartphone penetration is higher in North America and Western Europe, and it is increasing fast in the Asia-Pacific geographies. The penetration rate is fairly low in Latin America, the Middle East and Africa.
- It seems the right approach is to assume that a Mobile Payments use-case based on richer functionality might work better in North America, Western Europe and Asia-Pacific, while a simpler text/SMS-based approach might be more suitable for the other geographies.
- An interesting consideration may be to look at certain Asia-Pacific and Latin American geographies as most appropriate for a "leap-frog effect", wherein bank penetration may not yet be widespread but newfound prosperity is leading to faster Smartphone adoption, thereby making these suitable for higher level services. Such applications might encompass retail, security (IDs) and transit.

80%

60%

40%

20%

0%

-20%

.40%

401112

Smartphone Units

-Smartphone growth rate

Figure 16. North America Smartphone Penetration



Figure 17. Western Europe Smartphone Penetration







Source: Citi Investment Research and Analysis



Handset Units

Source: Citi Investment Research and Analysis

- Smartphone penetration Note: Left axis is number of units, right axis is growth rate

Figure 18. Japan Smartphone Penetration

16

14

12

10

8

6

4

2

٥

Note: Left axis is number of units, right axis is growth rate Source: Citi Investment Research and Analysis

Figure 21. Middle East/ Africa Smartphone Penetration



M-Commerce and Cross Channel Integration

Mobile retailing is an increasingly attractive way to reach out to consumers.

Mobile technology is becoming a large focus for retailers. In 2011, The National Retailer Federation published their Mobile Retailing Blueprint laying out the case for mobile retailing. Mobile retailing consists of a single mobile experience including demand generation, search, selection and payments through mobile channels. In the past, retailers reached out to consumers through television advertisements, print media and in store associates. In the 1990s, e-commerce emerged, allowing consumers to buy directly through a website, with little interaction with bricks and mortar stores or traditional media.

The way consumers shop is being transformed through Mobile Payments.

With mobile, merchants are seeing a blending of the online and offline into a single homogenous view. Consumers are searching in stores for items and buying them online. Others are ordering products online and picking them up in local stores. For example, we heard the story of a Best Buy customer who couldn't find a DVD in the store. When she couldn't find someone to help her she went onto her phone, purchased the DVD and selected in store pickup. Ten minutes later, she went to the front of the store and picked up her DVD. While this was a positive outcome for both consumer and merchant, an increasing number of shoppers are choosing to use retail locations as digital showrooms. We can easily imagine a scenario where the customer bought online from another retailer or website. Retail locations will need to be more than place to pick up merchandise. They must provide additional services like knowledgeable sales consultants and superior integration between the mobile environment and the in-store shopping experience.

The Mobile Payments ecosystem has many participants that interact on multiple levels.

Value for Different Players in the Mobile Payments Ecosystem

The term "Mobile Payments" itself is indicative of the need for a partnership — presumably, we need one participant who can provide "Mobility" and another participant who is the expert in "Payments".

Below we discuss some of the potential participants in the mobile wallet ecosystem.

- Financial Services Financial entities can provide a range of services when it comes to a mobile wallet, including being the source/holder of funds (typically a bank) and the payment acceptance method (card network).
- Telecoms Using mobile phones as a form of payment typically forces the inclusion of telecom entities into the ecosystem. There are various potential partners, including the mobile service provider, the mobile operating system developer and the handset manufacturer.
- Consumers At the end of the day, Mobile Payments need to provide real value to the consumer in order to gain adoption. In developed markets consumers want a convenient and simple solution. In emerging markets, consumers see the benefits of financial inclusion.
- Institutions Large institutions, specifically governments, private corporations and NGO's make enormous numbers of payments and collect a large number of receivables. Mobile Payments help drive cash out of this system which greatly improves efficiency and transparency.
- Retailers In developed markets, the greatest opportunity for Mobile Payments is by integrating with the retail experience. Retailers are a large channel for any consumer payments and integrating a mobile wallet into a retail experience allows for significant benefits.
- Technology Companies and Processors In a bank-led payments world, technology companies often got relegated to the back-seat. But as the "neutral party" in a contentious Mobile Payments ecosystem, technology company ambitions are at a higher level. They often think of owning the customer now why? Because they control the user experience in many cases and that is a key to consumer adoption. Also, Mobile Payments security is a significant factor to consider.

Benefits to Financial Institutions

Mobile wallets allow banks to expand their reach into the hitherto unbanked and under-banked demographic. Traditional banking has a relatively high fixed operating and incremental cost because the traditional model requires building and maintaining brick-and-mortar branches. This can make it unprofitable (or less financially desirable) to service customers that do not maintain a healthy minimum balance using a traditional model. However, mobile banking, or "branchless banking" as it is sometimes called, allows banks to profitably move into new demographics.

As banks take on these new customers they can gain significant advantages through the electronification of cash, in the areas of Anti-Money Laundering (AML) enforcement, fraud management and smarter targeted marketing.

Mobile banking, or "branch-less banking", allows banks to profitably move into new demographics.

Benefits to Telecoms

The telecom industry's traditional voice and data products have witnessed sharp price compression over time, due to higher levels of competition and the availability of newer / cheaper technologies. There is also fear that their core voice and data product could get commoditized over time. As a result, they are looking for new areas of growth. Many see Mobile Payments as the next growth opportunity, given the many similarities between a telecom network and a payment network — both transmit information; both manage large volumes of transactions (a phone call is a transaction); both rely heavily on security and privacy; both are heavily regulated industries. On top of these factors, the payments business is attractive because it has a secular growth driver in terms of increasing electronification of cash and it has attractive economics because it comes with a good sized (say 2%-3%) interchange fee.





Source: Citigroup Investment Research, IBES Consensus, Worldscope, MSCI, Factset

Value to Consumers

We doubt whether just changing the payments form factor from a card format to a phone format adds a lot of value to consumers. However, if a consumer can benefit from carefully targeted offers combined with the ability to do real-time comparison shopping and social media functionality, then it is not just a transaction. In particular, if the ease of use improves, it can be a winner for consumers.

But the advantages are even greater in the emerging market because they allow for electronification of payments. Mobile Payments are superior to cash in a number of ways:

1. Speed: Mobile money allows consumers to transfer money much faster than using cash. Electronic transactions can settle in seconds. Settling in cash requires a real world transportation of money. Take the case of a woman in the emerging market paying her utility bill. To pay the bill she has to take her monthly electricity bill to the company collection center, stand in line with her invoice and get receipt of proof of payment. She may also need to take public transportation to the center and back home. Not only does she have to pay the cost of public transportation but she could also have to bear the indirect cost of lost wages from her going to the location to pay the bill. So a \$0.30 per transaction fee may sound expensive in that world, but the opportunity cost of 2 hours of work may be worth \$6 and the transportation cost would typically offset the fee.

Many see Mobile Payments as the next opportunity for telecoms to drive growth.

The benefits of Mobile Payments are more tangible to consumers in emerging markets.

- 2. Cost: Compared to traditional cash-based financial services, mobile money is a "bargain". The Consultant Group to Assist the Poor (CGAP) has found that on average, branchless banking services, such as mobile money, are 54% cheaper than informal options for money transfer. These informal options, which include giving money to be delivered home to a traveling friend or bus driver, are widely used in many emerging markets and are prime targets for replacement through mobile money.
- 3. Savings: Mobile Payments allow many consumers in emerging markets to have their first electronic store of value, or "savings account". According to the Financial Services Assessment at the University of Maryland, mobile transaction and savings accounts provide significant benefits for consumers. It found that lower income people are more likely to save by informal means or through assets like holding gold. For low income consumers, cash flow is often uncertain with unplanned costs happening quite frequently. A mobile wallet allows consumers to create a precautionary or emergency fund. This allows them to better manage the risk of job loss, poor health and other economic emergencies.

Value to Corporations, Governments and NGO's

Corporations, governments and non-government organizations (NGOs) are constantly looking to reduce their cost of distributing and receiving funds. Leveraging mobile innovation is one way that these organizations are making a significant difference by improving control and efficiency, and reducing the reliance on cash and the related costs and risks. In addition to efficiency, electronic and mobile money is also generally cheaper. The Consultant Group to Assist the Poor (CGAP) published a study citing Bolsa Familia, the Brazilian cash distribution program, which reduced its cost of payments from 14% to 2.6% of disbursed value by moving to electronic payments. In India, they estimate that moving to electronic payments \$15.8 billion per year.

Electronifying cash provides additional benefits for corporations, governments and NGOs:

- Decreased Leakage: Another frequently cited example of mobile money is Afghanistan's launch of M-Paisa (similar to M-PESA). Afghanistan is still 97% a cash economy but cell phone penetration is at over 40%. In 2009, the Afghan national police began a trial to pay police salaries using Mobile Payments. The results were immediate. Costs dropped by 10% due to removal of phantom payments to nonexistent policemen that were pocketed by middlemen. And most Afghan cops had assumed they'd been given a large raise as the greater control helped to reduce the amount of corruption in the system.
- Transparency / Speed of Funds Collection: Consumer goods companies take in a lot of cash. Ninety percent of direct store delivery companies accept cash or check for payment at the time of delivery. Though the company's entire financial supply chain may be electronified, the treasurers and CFOs of these companies lose track of their receivables in the "last mile" of the process. In many cases customers prefer to pay cash and find electronic payments too cumbersome. This leads to fraud risks, increased processing costs, leakage and driver safety concerns. By leveraging Mobile Payments, consumer goods companies can collect funds directly from a merchant – either through a mobile wallet or an existing bank account. This process can also reduce cash transactions in developed markets, bringing operational efficiency, enhanced liquidity risk management and maximization and potentially safe, more secure collections.

Leveraging mobile innovation is a way for organizations to improve control and efficiency as well as reduce their reliance on cash and the related costs and risks.

Value to Retailers

Mobile commerce has rapidly become a powerful shopping tool for consumers. The mobilized consumer's ability to compare prices, find deals and read reviews creates a unique opportunity for mobile payment platforms. Some retailers like Starbucks do this well. In December 2011 the company revealed that they had performed over 26 million mobile transactions on their platform. Their app provides an end-to-end experience (information, shopping and transaction in one place) and promotes loyalty.

Mobile Payments — especially targeted at the U.S. — were an important point of debate at Citi's inaugural Financial Technology Innovations & Opportunities Conference, held on November 8th in Boston.

Most participants agreed that if the central purpose of a Mobile Payments push was just the incremental form factor associated with mobility, it would be difficult to change consumer and merchant behavior. Further, most participants also believed that in order to grow consumer adoption, the following elements were needed:

- Using mobility and social media to enhance the consumer's buying experience; i.e., converting the mobile payment into a richer mobile commerce interaction; and
- Possibly capturing and using the associated information flow to promote the merchant's use-case. For example, by understanding consumer purchasing behavior, Google can provide better targeting of ads.

At our conference, Google provided an excellent example of the complete integration of a rich mobile commerce from end-to-end. Google's ideal vision of a consumer experience includes search, targeted offers, research, location-based check-ins, payment and sharing via a social network, all of which the company offers today. Google felt that by touching the consumer in so many ways, it would have the best information and insight into the users' behavior and interests, thereby enabling it to capitalize on its core advertising revenue model.

Clearly, this is an ideal scenario for a single company, but we believe it is a good blueprint for how the future buying experience can become richer and better tailored to specific consumer needs and wants. We do believe that if Mobile Payments becomes just another payment form-factor it is likely to be less successful than if it is accompanied by the means to enrich a customer's life or buying experience.

Value to Technology Companies and Processors

While Financial Services and Telecom brands are currently on the front lines in the formation and delivery of mobile wallet ecosystems, technology and processing providers play crucial roles in developing the underlying applications and infrastructure necessary to deploy and optimize the end user experience in many cases. There is a wide array of technological considerations when dealing with mobile wallets, including user interfaces, interoperability, reliability and security. The latter is an extremely important aspect of overall picture, as we view "card-like" security as necessary table stakes for all participants to embrace the mobile wallet experience. Given the range of moving parts, there is a lot of room for innovation from tech companies and processors alike, which can create significant financial opportunities and perhaps move their businesses from the back-room to the front-lines of the mobile wallet revolution.

In order to grow customer adoption, retailers need to use mobility and social media to enhance the consumer's buying experience...and capture information to promote the merchant's use-case.

There is room for innovation from tech companies and processors to create significant financial opportunities. In order to create a successful ecosystem, we have distilled a few common success factors. We analyzed the success of Mobile Payments in Japan and Kenya and also considered other locations that have shown initial promise — this list includes Afghanistan, Paraguay, the Philippines and Uganda. Further, we also considered why countries with more advanced infrastructure — such as the U.S and France, for example — were still in nearly a pilot stage despite significant initial excitement.

Mobile Ecosystem Success Factors

We believe the factors listed below are important. Some of these are self-evident, while others seem less obvious. We describe them in greater detail below.

- Importance of a dominant player or coalition.
- Ability to build trust.
- Maintenance of bulletproof security.
- Presence of a "killer-app".
- Strength / penetration of traditional payment means.
- Wide availability of distribution, technology and servicing infrastructure.
- Clarity on regulatory front.

Importance of a Dominant Player or Coalition

In both Japan and Kenya, it was the dominant telecom providers (NTT DOCOMO and Safaricom) that helped drive adoption. Other players jumped into the market after it became successful. There are a few reasons why this factor is important – first, a dominant player can set the standard (this consistency is important in promoting usage); second, a dominant player is likely to have an established brand (promotes trust) and an established infrastructure (again, this promotes trust and builds utility).

We can see that the presence of a dominant player helps with a few of the other factors as well. Of course, we also note that if multiple entities with a strong (but not necessarily dominant) market presence jointly develop standards, it is effectively the same as having one dominant player — it just takes longer because the process of setting standards is time-consuming.

Ability to Build Trust

If the prospective consumer does not believe that the transaction is safe, they are unlikely to transact. So, consumer protection is a key criterion. What determines trust? It has to be a brand that is known for its service — even if it is in a different market. A broad network helps, because trust may not just be about whether the transaction is successful — it can also be about the range of locations where the transaction is possible. Lastly, we note that having high-quality customer service is also crucial, just in case there is a problem with the transaction.

It's important to remember that even if it's via a mobile device, we're still talking about money. Because of this, the brand value of a bank is tremendously beneficial to a mobile wallet. Having a bank involved provides consumers and institutions with the knowledge that their money will be held safely and securely.

A dominant player can set the standard and establish a brand and infrastructure.

Maintenance of Bulletproof Security

Given that financial ecosystems are built on trust, security of the mobile wallet is vital.

Security is a critical element of a mobile wallet. Today when someone loses their phone, they are only concerned about the cost of the phone and contact information. The situation is obviously more serious if a Mobile Payments instrument is lost.

It's important to approach this topic from a financial inclusion perspective. For someone without a bank account, cash is a highly insecure form of holding one's money. One important distinction for mobile payments is that no actual money is residing on a phone or SIM card. Instead, the money is kept in an account held by a bank or in a virtual account by a mobile network operator (MNO). What a consumer sees on the phone is a link to the account, similar to how a credit card links to your account through the number and magnetic stripe. When a phone is lost, an issuer can easily de-provision the phone for the account and link the account instead to a new phone.

The Mobile Payments industry has looked long and hard at this problem and created effective solutions to it. The first solution is the PIN. Similar to an ATM card, the wallet can only be used when the correct PIN is entered. Therefore even if someone finds a lost phone, they cannot access the mobile wallet capabilities without the correct PIN.

In more recent years, the GSM Association, created the "Trusted Service Manager" (TSM). The TSM is an industry construct that allows multiple service providers to access a single Secure Element (a hardware component containing customer information in a secure manner). This works somewhat analogously to a vault in a bank. The TSM operator owns the master key to the vault. Service providers (e.g., banks) can rent space on the Secure Element and receive their own key to part of the Secure Element. This is somewhat similar to a safety deposit key.

Another benefit of the TSM model is that the Secure Element can be opened up to other types of service providers like mass transportation, car companies, and hotels, which can benefit from proximity interactions (just to name a few.)

Finally, it is important to remember that financial ecosystems are built on trust. It is critical that consumers trust that their money is safe and that it's being protected from fraudsters, hackers, etc. Banks have traditionally provided this role in the past and will likely provide it to mobile wallet providers.

Presence of a "Killer App"

Peter Drucker, the famous management consultant, once said "For new technology to replace old, it needs to have at least ten times the benefit". A "killer app" is what drives consumer adoption. Beyond a product that the buying public will pay for, the "killer app" must be easy to use, liquid (i.e., easy to convert to/from traditional cash), widely available and price-transparent.

Sending money home seems to be the most important adoption driver for Kenya's M-PESA system, while a fast, easy-to-use transit payment application was important in Japan. In general, we believe that in-country remittance (to distinguish it from the cross-border remittance sold by the likes of Western Union and MoneyGram) is likely to be the "killer app" in many emerging markets, while transit and retail applications are typically important in a developed market.

Of course, once a "killer app" takes off and the consumer is used to using the mobile device for incremental applications, other applications can piggyback on the success of the app. So, in many emerging markets, we note that bill payment can become a second "killer app".

Once a "killer app" takes off and the consumer gets used to incremental apps on their mobile device, other apps can piggyback off that success.

Usage of Traditional Payment Means

This is not necessarily self-evident — in fact it may even seem contradictory to say that a developed country may see slower adoption of Mobile Payments in spite of well-developed technological infrastructure.

The fact is that consumers in developed countries already benefit from the easy-touse, ubiquitous and (for consumers) relatively low-cost traditional payment means. This is a high bar to overcome for a new technology application such as Mobile Payments. We are not saying that mobile payment growth is impossible in a developed market — but there does not seem to be the kind of "obvious" opportunity that PayPal exploited a decade ago with regards to the growth of online payments. This is why most industry participants are counting on the ability of social media and mobile commerce to enhance the consumer's buying experience, when it comes to mobile wallet growth in developed markets.

In an emerging market on the other hand, a mobile payment might be the first time a consumer experiences non-cash-based monetary exchange. To have one's phone be a stored value repository can be powerful. In other words, because of the lack of payment alternatives in their everyday lives, Mobile Payments can leapfrog what exists today.

Need for Widely Available Infrastructure

To drive consumer adoption, the seller of the service might need a widespread physical network. For example, Kenya's M-PESA network has over 32,000 agents spread across the country. This is consistent with our view that money transfer is likely to be the "killer app" in emerging markets — given that such money transfer is the by-product of rural-tourban migration, it makes sense that there should be a sufficient number of agents at both ends to provide adequate cash-in and cash-out functionality.

Further, the existing technology infrastructure needs to support the standard that will be used. This includes both the mobile handset and the point-of-sale payment terminals in the case of NFC-based payments.

Lastly, we reiterate the need to build and keep the consumer's trust via a well-oiled client service infrastructure to answer queries. Often this can be delegated to the same agents that provide the front-line service, but there has to be a sufficient back-stop to ensure agent honesty.

Clarity on Regulatory Front

This is important not because regulatory clarity might help mobile payment penetration, but because a lack of regulatory clarity can certainly hurt. It is better to have flexible legislative parameters that adapt to market growth rather than have inherent inefficiencies down the road because this issue was not well thought out.

Normally, there are distinct country-level regulators for telecom companies as well as financial services companies. Many questions arise due to the inherent dichotomy of this situation.

The basic question is "Which regulator has precedence in case of Mobile Payments?" Other questions include, but are not limited to...Who will enforce Anti-Money Laundering (AML) rules? Do the rules change for mobile money and mobile wallets because the transactions are typically smaller? Does mobile money explicitly get the same protection as physical money? In a developed market, if mobile commerce is to be the key selling point, will there be a need for stricter data and information privacy rules?

Infrastructure is vital to adoption and technology needs to support the standard that will be used.

Governments may need to create new frameworks to ensure that citizens can enter the banking world through Mobile Payments and still maintain regulatory control. Currently there are two different models of regulation — bank-led and mobilenetwork-led. In a bank-led model, consumers have an underlying account (i.e., transaction account, savings account) with a bank. They may deal with representatives of the mobile network but they are the bank's customers. In a mobile-network-led model, consumers have no direct contractual relationship with a licensed and supervised financial institution. Instead they exchange cash for a virtual currency that can be used by anyone participating in the system.

While setting up regulatory frameworks for mobile money can be difficult to get right, many emerging markets are starting to move to a proportionate legal and regulatory framework. Using the principle of proportionality, countries are matching the relative risk (i.e., small transactions, limited account balances) to the regulatory and legal requirements. Countries are creating new frameworks to ensure that citizens can enter the banking world while still maintaining high levels of control over AML and anti-terrorism financing.

Many governments are learning about the importance of mobile money to their countries. In December 2010, Citi partnered with the U.S. Department of State to host the Mobile Money Policy Forum in Nairobi, Kenya. Many of the top African central bankers and finance ministers were brought together at the forum to share best practices on mobile money with the goal of strengthening the African financial system through Mobile Payments.

Other Factors

In markets where there is a dominant player, a closed-loop system can be quite successful due to the enforced standardization. Over time, even a dominant player will need to open up its system to provide for continued growth through more functionality, consumer choice and lower costs. In a market with healthy competition, open-loop systems likely have a greater chance for success.

Providing incentives to consumers to participate in mobile wallets is important in driving adoption. This could be in the form of financial incentives (rewards, loyalty, discounts) or convenience incentives (faster payments for purchases like transit or coffee).

Mobile Payment "State of the Union"

There is clearly a high level of interest in Mobile Payments across the globe. Banks, telecom companies and financial processors are all contributing to this level of interest.

This section has a simple objective: We want to give the reader an idea of the sheer breadth and magnitude of the Mobile Payments efforts in progress currently. Admittedly, success is not assured. With equal certainty, we can say that these are efforts where success is likely to be measured in years, not in weeks or quarters. However, what is happening across the globe with regard to Mobile Payments is truly transformational and we are fairly confident in our view that while it may not change how we live tomorrow, there is a good chance the changes will be obvious by 2015.

Figure 23. A Sample of Mobile Payment Launches from Around the World



Source: Citi Investment Research and Analysis, Citi GTS

Country	Operator	Operator	Operator	Number of Wallets
Kenya	Safaricom	M-Pesa	2007	14,900,000
Philippines	Smart (PLDT)	SMART Money	2003	8,500,000
Thailand	True Move (True Corporation)	True Money	2005	6,000,000
Tanzania	Vodacom	M-Pesa	2008	3,000,000
Uganda	MTN	Mobile Money	2009	2,000,000
Philippines	Globe Telecom	GCash	2004	1,000,000
Africa	Côte d'Ivoire	MTN	2009	450,000
Haiti	Voila (Comcel)	T-Cash	2011	300,000

Fic	ure 24	I. Lar	aest	Develo	pina	Market	Mobile	Wallets	by	Number	of	Subscribers
			9									

Source: Citi Investment Research and Analysis, Citi GTS

Figure 24 above illustrates some of the interest in the Mobile Payments. It is obviously not a comprehensive list of initiatives. According to the GSMA Mobile Money for the Unbanked (MMU) program, there were 117 live deployments and 91 planned Mobile Money implementations as of February 2011, but even this is not a final updated count as new announcements are happening every week. We believe it is worthwhile to delve deeper into some of these initiatives and we do so both on a regional basis and by looking at what some of the major (potential) participants are doing.

Regional Perspective – North America

We expect mobile commerce growth in the U.S. to be robust — data from Forrester suggests growth to \$31 billion in 2015 from \$6.7 billion in 2011, or a compounded annual growth of ~47%. We would expect Mobile Payments growth to track mobile commerce growth. However, even though we firmly believe that Mobile Payments have the potential to grow rapidly, there are many challenges on the road ahead.

In the Japan example in this report, we note that a dominant player in a developed economy took multiple years to set up the infrastructure needed for Mobile Payments to become widely available. It has also taken many years to reach a mid-to upper-teens level of active user penetration in Japan. The U.S. does not have a dominant player in either telecom or financial services, and it seems as though a long list of processors and technology companies have their own views on how Mobile Payments in the U.S. should evolve. Combined with already-high card usage that is driven by an easy-to-use and ubiquitous card payment infrastructure, it provides a challenging backdrop for U.S. Mobile Payments growth.

Of course, the U.S. is the world's largest retail market and so we would expect a number of the current initiatives to continue in a dogged manner because the eventual reward for a Mobile Payments leader in the U.S. could be tremendous. Still we believe it is worthwhile highlighting the market-specific challenges in the U.S.

Lack of a Consistent Set of Cross-Industry Standards

The development of Mobile Payments infrastructure requires cross-industry cooperation, and there is a team currently working on this. Unfortunately, according to a March 2011 paper by the Federal Reserve, such standards are unlikely to be in place until the end of 2012, at the earliest.

Infrastructure Needs to be Built

Although standards are not yet in place for Mobile Payments, many major industry participants seem to be coalescing towards the NFC (Near-Field Communications) protocol as a key means for information exchange between the handset and the Point-Of-Sale (POS) terminal. That said, very few smartphones currently have NFC capability and only 5%-10% of POS payment terminals can accept NFC-based payments. While both of these figures should rise significantly throughout 2012, it is unlikely to help mass market adoption right away.

Stalemate Across Existing Partnerships

A successful Mobile Payments transaction requires collaboration from many parties — a financial services institution; a mobile carrier; a payment network; handset manufacturers; a mobile software vendor; merchants; and consumers. This is widely understood and is a guiding force behind the launch of two key ecosystems — Google Wallet and Isis — in the past 18 months. There is also hope that the Mobile Payments offering that PayPal is putting together could be viable. We have not heard much from two other possible players — Apple and Amazon.

While both Google Wallet and Isis are making progress, both set-ups could be considered sub-optimal in their current form. Google Wallet has the resources, most of its partners are industry leaders and early pilots indicate a good level of enthusiasm, but the limited number of handsets and telecom provider choices (Sprint, #3 in the market) are factors that the partnership can address. Isis, on the other hand, is owned by the leading U.S. telcos, and recently signed partnerships with three key bank issuing partners. However, their pilots have yet to launch and the shape of their product offerings are still vague.

Major Retailers May not be on Board – Resource allocation? Competition?

Mobile wallet adoption needs a critical mass of support from retailers because they are the ones that will spend resources — both time and money — to make it work. The investment is not just a POS upgrade — a major initiative like this will probably translate into a multi-year systems upgrade.

Our checks indicate that if a retailer is committed to an EMV upgrade, it may be quite difficult to simultaneously allocate resources to a Mobile Payments push. Further, the "use-case" obstacles are substantial — uncertain consumer adoption; absence of industry standards; weak macro environment implies a focus on must-do projects (either mandated or strategic priorities).

Given the above-listed obstacles, it is fair to ask what consumer usage scenario can make this a favorable decision for retailers. In our view, the possible answers must revolve around fraud reduction, consumer retention, incremental sales, and potential to reduce the unit cost of transactions.

Perhaps the most important aspect to retailers is the last point mentioned — reducing per transaction economics. To that end, a *Wall Street Journal* article in March 2012 suggested that two dozen retailers, including Wal-Mart and Target, are working together to develop a mobile-payment system to compete with the existing offerings. While few details have been made public to date, the fact that many large merchants are working on a competing product could be a hindrance to the roll-out of other mobile payment initiatives.

In other words, the right reasons exist for merchants to proceed, but it is still a difficult case to imply an urgent need to move to Mobile Payments in the U.S. We believe it is intriguing enough that current pilots will continue and even expand — but it is difficult for us to see retailers make this a centerpiece investment in 2012.

35

Consumer Adoption Remains Uncertain

Consumers need to be convinced of the value that Mobile Payments can offer. The current system of card-based payments works really well in the U.S., so just going from a card swipe to a phone tap is not an adequate reason for a significant change to existing behavior. The value proposition (i.e., rewards, loyalty, convenience) and security features of Mobile Payments needs to be built up and "sold" to consumers. Generally, behavior change can be expected to be slow when it comes to things as sensitive as payments.

What are the Presumptive U.S. Mobile Payments Players 2012 Plans?

Google Wallet

Launched in September 2011, Google Wallet currently has MasterCard, Citi and Sprint as its partners. Retailers on board include Macys, Gap, Bloomingdales, Subway and NJ Transit, among others.

For 2012, the expansion of its offering beyond a single bank issuer, card network and phone company will be key. The number of merchants will also have to increase significantly to make it more useful to consumers. Part of the push to increase the number of merchants should involve convincing merchants that the loyalty, advertising and offers features provided by Google are incremental to merchants in the program. There is also some speculation about international expansion of the program to the UK ahead of the Summer Olympics in 2012.

ISIS

ISIS – the Mobile Payments JV from Verizon, AT&T and T-Mobile – initially set out to compete with the major card networks with an exclusive relationship with Discover, but has since signed partnerships with Visa, MasterCard and American Express. Additionally, in February 2012, ISIS announced agreements with three card issuing banks – Chase, Capital One and Barclaycard, which allow consumers with eligible cards from these banks to load them on their ISIS wallets.

The service will initially launch in two test markets in mid-2012 – Salt Lake City and Austin. Assessing the features of the product offering and their reception in these key launch markets will be critical for 2012 and may dictate the receptivity of the major telecom carriers to competing Mobile Payments offerings.

PayPal

In 2011, PayPal has hosted a variety of demos to illustrate its vision for how Mobile Payments could work. The company is seemingly supporting a wide range of potential payment forms, including card-based payments in its attempt to move into brick-andmortar retail. They unveiled more details about their plans at the National Retail Federation conference in mid-January, including a pilot at Home Depot where consumers would use a phone number and PIN to make PayPal payments through the terminal. This pilot has since been expanded to include all of Home Depot's locations in the U.S.

Apple

Apple has been tight-lipped about its plans for Mobile Payments. The company is one to keep an eye on given its large market share in the mobile phone end-market, its huge database of iTunes financial information and its strong brand that consumers trust. Apple has been awarded several patents that relate to NFC-based technology, though it is still unclear whether the next iteration of the iPhone will include NFC. Apple is currently the sleeping giant in the Mobile Payments world, but this may change in the next few years.

Visa

In addition to its partnerships to support both Google Wallet and ISIS, Visa announced plans in May 2011 to support two company-driven initiatives related to the alternative payments landscape. First, Visa plans to launch an open digital wallet which will store both Visa and non-Visa accounts and support NFC-based payments to support mobile transactions. Secondly, Visa is launching a "V.me" account that will allow for single click ordering through stored cardholder information, much like PayPal and Amazon offer today. These initiatives are currently in pilot mode and more extensive launch plans are set for later in 2012.

MasterCard

MasterCard's U.S. mobile strategy is largely predicated on a partner strategy to date, with its heavy involvement in the Google Wallet launch in the U.S. and the upcoming launch of ISIS.

American Express

American Express is focused on preparing for the emergence of mobile payments and increasing importance of e-commerce. The company's "digital closed loop" allows them to leverage their database of cardmember purchasing behavior and direct relationships with merchants. American Express is committed to positioning Serve (their digital wallet/prepaid solution) as their answer to penetrating the younger demographic and international. That said, Serve is expected to be a multiyear strategy, so initially they will measure its success by the number of people who sign up and through partnerships such as Ticket Master. The company has also set up a \$100 million venture fund in Silicon Valley to invest in emerging alternate payment companies.

Large Merchants

As mentioned above, a March 2012 article in the *Wall Street Journal* reports that roughly two dozen retailers are working together to develop a mobile-payment system. Wal-Mart and Target are said to be part of the group, which is reportedly unhappy with the current state of Mobile Payment offerings being tested in the marketplace. While the article cites security and customer loyalty concerns, we believe a major motivating factor behind such an initiative is the opportunity to change the unit economics of a typical electronic payment transaction, which has long been a goal for larger retailers.

Other Players that May Have Something to Say About Mobile Payments

Bank Processing market leaders Fiserv and Fidelity Information Systems (FIS) both provide mobile online bill pay and P2P payments via mobile banking portals.

FIS recently announced a Mobile Wallet solution that allows customers to download an app offered by their financial institution or a retailer, attach their payment card information, and then use it to make a purchase. This solution is currently in production with a number of pilots, supports existing POS hardware, and will be forward-compatible with new technology. We would like to thank our Japanese team of Hideki Takoh-san, Hideyuki Nakanishisan and Akito Miyakawa-san for providing us with the underlying data for this section.

Regional Perspective – Japan

Amongst developed countries, Japan is often cited as the most successful market in terms of Mobile Payments adoption. This is certainly true in terms of the ability to conduct a Mobile Payments transaction in Japan - for example, the high percentage of point-of-sale devices and mobile phones that are enabled for Mobile Payments — and the capabilities and functionality in certain settings. However, industry statistics also imply that while many consumers have contactless payment accounts, only about 17% of enabled accounts are active. In spite of the differences between Japan and other developed countries, we felt it would be useful to take a deeper dive into the Japanese Mobile Payments experience.

Japan Mobile Payments Infrastructure – Clearly a Success Story

In terms of making Mobile Payments functionality widely available, the Japanese experience is an unquestioned success. The largest contactless payment system in Japan today is run by NTT DOCOMO, which according to Telecommunications Carriers Associate (TCA) of Japan has slightly more than 50% market share in the Japanese wireless market (see figure below). DOCOMO's market leadership is likely due to early investments in Mobile Payments. In 2005, DOCOMO made a \$1 billion investment in Sumitomo Mitsui Card, one of Japan's biggest credit card issuers. It has also made various other investments to support adoption, including several mobile wallet initiatives and convenience stores. DOCOMO also subsidized a portion of the contactless reader installations for merchants, reportedly spending over \$100 million in the process. In effect DOCOMO created the ecosystem - since then, other providers have also jumped in and made competing investments over time.



Mobile phone manufacturers also came on board to support the RFID technology in a meaningful way. As of 2010, 56% of mobile phones in circulation were equipped with the technology used to support mobile wallets (per Fuji Kimera Research) and approximately 74% of shipments are mobile wallet compatible (per Yano research Institute). These penetration rates far exceed NFC shipments in any market today.

We also point out that while RFID technology used in Japanese mobile wallets is different than the NFC standard being used elsewhere, Samsung and FeliCa Networks have announced a partnership to deploy a new technology that is compatible with both systems.

Japan Mobile Payments Usage – Some Interesting Outcomes

With the infrastructure largely built, contactless payment adoption in Japan has been very meaningful in absolute terms as well as relative to any other developed market. However, the percentage of active Mobile Payments users has stayed stagnant just north of 17% for a couple of years.

The data below illustrates usage statistics and information, including percentage of active users, frequency of usage as well as the areas of frequent usage.

- While, there are many contactless payment accounts and many phones that are capable of using mobile wallets, not many are active. According to impress R&D, only about 17% of the population used mobile wallets in 2010, relatively consistent with those levels seen in 2009.
- Among those who used their phone's mobile wallet functionality, slightly over 40% of respondents indicated usage a few times a week, while about 17% of respondents indicated everyday usage. These numbers were little changed from 2009 to 2010.



The range of usage options is also interesting. In-store usage is the most common option, followed by vending machines, gaming and transit. The presence of payment credentials on the Mobile Payments device also enables it to be used as a form of identification. Bill payment seems to be growing as a function as well. While transaction size data is not readily available, cash- and debit-substitution seem to be the more frequent uses; i.e., we believe that smaller denomination payments may be more common so far.

Figure 29. Frequent Uses of Mobile Wallets in Japan



What We can Learn from Japan- and What is Different

Specific technology likely matters less than consistent deployment and broad functionality

Japanese mobile wallets are based on RFID (radio frequency identification) technology — while it is similar to NFC offerings being built elsewhere, the two systems are not compatible. The contactless payment account can be used in both a mobile phone and a plastic card. The wallet tends to be multi-function in nature and can be used for shipping, transportation/ticketing, loyalty card, ID, on-line shopping and keys. Like other mobile wallets being developed around the world, Japan's system also has typical mobile banking functions like account histories, balance inquiries and top-up features.

Having a dominant player helps

NTT DOCOMO essentially created the ecosystem and laid the groundwork for others to follow — the investments in financial infrastructure by a telecom company indicates that DOCOMO understood it would need functional help outside of telecom to make this work.

Consumer adoption is slow

In developed markets where card-based transactions work seamlessly, the speed and convenience of a mobile wallet solution many only apply in certain fastpaced transaction environments (transportation, convenience stores, coffee shops, etc.). In other words, the range of potential killer apps may be restricted. Financial or non-financial incentives may be needed to move consumers along the adoption curve.

Where other developed markets could be different

Japan is still mostly a cash economy, with over 85% of its transactions occurring in cash/paper vs. around 40% in the U.S. This factor can clearly influence the adoption curve.

The way mobile wallets developed in Japan has led to a large percentage of the volume being funded on a prepaid basis. We believe the lack of pre-existing prepaid accounts (i.e., debit cards) was a hindrance in encouraging more frequent and/or larger ticket purchases via a mobile phone. We would anticipate more financial institution (credit/debit) involvement in future mobile wallet initiatives in developed countries around the world.

While the U.S. and other developed markets may have a leg up on Japan in some respects (electronic payment systems, debit environments), we believe it is important to learn about the necessary infrastructure investments and consumer adoption curves that Japan has experienced.

How Japan could be more successful

The percentage of active Mobile Payments users has stayed stagnant just north of 17% for a couple of years. To become more successful we believe that they could:

- Open up to existing banking products: The majority of current offerings are prepaid or credit products with low limits rather than traditional bank / credit card accounts. This limits both the convenience and the amount of money flowing through the system. This especially an issue as prepaid and debit are not common in Japan.
- 2. **Increase consumer incentives:** Considering the low limits on the cards, consumers need additional impetus to spend using the system. These incentives could be promotional coupons, early access to events or other methods to incent consumer behavior.
- Build a more compelling merchant proposition: Japanese mobile wallets need to add more value to the retail ecosystem. They need to allow merchants to more effectively target customers, capture data and form lasting relationships.

Regional Perspective – Europe

Telecom companies and banks have conducted numerous trials in Europe. One of the largest and most successful has been in Nice, France, which provided encouraging evidence of consumer acceptance, particularly when associated with passes for local transport. France Telecom and the other partners took this trial platform to Strasbourg in October 2011 and there are plans for other cities. France Telecom believes 2012 will see mass market acceptance of Mobile Payments. This view is shared by notable European industry participants including Visa Europe.

In our view, there are a few factors that should help in the process of making widespread Mobile Payments usage a reality in Europe.

We would like to thank Simon Weeden for his help and contribution to this section.

Considerable Progress Towards Setting Standards

Prompted by the larger European carriers, the GSM Association released in November 2011 version 2.0 of its NFC Handset APIs & Requirements. This set out at a high level the application architecture required for secured NFC. Among other things, it requires that only one secure element be active at any one time (i.e., one of SIM, handset or SD card based, reflecting the current state of handset technology). It also requires that all NFC capable handsets ship with NFC SIM set as the default active secure element cards; i.e., the operators' preferred technology for their own mobile wallets.

A Lot of Pilots and In-Progress for Longer Time

Many of the pilots have been in progress for years and have steadily expanded, thereby moving consumers steadily along the adoption curve.

Company	Location(s)	Trial description	Scope	Duration	Notes
Orange	UK, Nice (FRA)	Mobile wallet - Quick Tap	50,000 POS at launch, expanded to Nice (French Cityzi NFC)	May 2011 launch, Jun 2011 expansion to Nice	Up to £15 in one payment; use Barclaycard, Barclays debit, Orange Credit Card to transfer £100 onto card at a time
	Poland	Mobile wallet	2000 customers, 35,000 acceptance points	Since June 2011	Up to PLN50 (US\$17.50) payments on PayPass; Partnered with Bank Zachodni WBK, Mastercard
	France	Location based, Mobile wallet - Payments, transportation, information transfer, loyalty programs	Cityzi project - entire city of Nice	Pre-commercial trial Jun 2009, commercial trial May 2010	
	France	Location based - time & attendance service	Commercial launch €18 per month on 1 year contract, €15 for 2 year	Since June 2010	'Mobile et Badge' offers business customers the ability to track the activity of field service workers such as cleaners, babysitters, security and maintenance staff.
	UK	Mobile wallet - O2 Wallet in London for travel, payment	500 people	Nov 07-May 08	Joint with Transport for London, Barclaycard, Visa, TranSys
	UK	Data transfer - instant feedback	London Fashion Week - Emilio de la Morena collection	Launched Feb 2008	Enable fashion buyers a chance to give instant feedback to designers by tapping chips embedded in smart posters to indicate interest in a certain designs.
	UK	Data transfer/location based - patient records transferred, log location	120 healthcare workers visiting patients	Launched June 2008	
Telefónica	Spain	Mobile wallet	1500 consumers at 500 shops in Sitges	May 2010 for 6 months	Transactions up to €20 without pin; Joint with Visa, La Caixa
	Spain	Mobile wallet/Access card	1000 employees possibly expanded to 12500	Launched May 2010	Joint with La Caixa, BBVA, Bankinter, Visa
	Germany	Mobile wallet - transportation card	Joins Deutsche Bahn travel program	Joined in Aug 2009	Touch in at start, touch out at end for journey price calculation and billing
	Czech Republic	Mobile wallet - transportation card	Provided 'limited number' of NFC phones in city of Pilsen; 200 consumers, 4 Globus supermarkets in Prague/Pilsen	Launched May 2010; Final phase started in Nov 2011	e-wallet as well as prepaid city transport coupon or library card
T-Mobile	Germany	Mobile wallet - transportation card	Deutsche Bahn travel program, 200 users Feb 08, 500 Dec 08, 2500 in 09, further expansion	Feb 2009	Touch in at start, touch out at end for journey price calculation and billing
	Poland	Mobile wallet	100 customers of Inteligo and PTC' (95% owned by T-Mobile), 10,000 PayPass locations	May 10 for 4 months	PLN 50 (€12) without pin, daily limit of PLN 300 (€70), partnered with MasterCard
Vodafone	lafone Various Countries NFC-based Mobile Wallet		TBD	TBD	Announced worldwide partnership with Visa in Feb 2012 to develop NFC-based mobile wallet for its 398 million subscribers. Initial rollout will be in Germany, the Netherlands, Spain, Turkey and the UK.

Figure 30. Snapshot of Major Mobile Payment (and Mobile Commerce) Initiatives in Europe

43

London Olympics as a Catalyst

Samsung and Visa have partnered to bring NFC Mobile Payments to the London Olympics 2012.

Transport for London intends to integrate NFC for all transport services, with all buses accepting NFC before the Olympic Games and the rest of the system including London Underground by the end of 2012.

Other Factors of Note

Many countries in Europe have relatively concentrated markets for telecoms and banking; i.e., a small number of players with fairly high combined market share. Dominant market share can certainly help in areas such as setting standards and driving adoption and the larger carriers are co-operating to ensure global adoption of their preferred standards.

Western Europe also has fairly high (and increasing) smartphone penetration and obviously there is a history of technology adoption that should also help in the case of Mobile Payments acceptance.

Transit Might be the Killer App in Europe

More than 100 tests have been carried out over the period of the past five years. Most of the applications which have been tested in these trials come under one of the following:

- Mobile wallet (loyalty cards / credit cards / couponing / discounts).
- Transport ticketing (transit cards, electronic bus tickets).
- Identification (access cards / parking cards / service discovery).
- Healthcare (location monitoring / patient record access / self-monitoring).
- Interactive displays (posters / museum displays / etc.).

While retail and transit may seem like the two obvious choices for Mobile Payments, the bias seems to be towards transit. This is helped by the slowly growing number of contactless point-of-sale terminals in transportation. There is a mobile operator bias towards transit as well, given the success of transit pilots. Daniel Gurrola, Orange's VP Strategy and Business Development, Consumer Mobile Services, said that while there are two killer applications for NFC — payment and transportation — it was transportation that is a key driver of adoption by consumers. Convenience is a key factor but a side benefit may be that in time this could reduce the fragmentation of transport ticketing across Europe. Orange is testing across the transport sector in the UK, intends to roll out NFC across most of their European presence in 2012, and is broadening NFC capable offerings. Jason Rees, Director of Mobile Payments & Ticketing at Everything Everywhere, parent of the Orange brand in the UK, stated that they intend to have tens of NFC capable devices available by Q3 2012. Other operators confirmed this while one added that loyalty has been a popular application in trials.

A Bias Towards Small Ticket-Size Payments Is Likely

Operators generally don't want to take over the billing for purchase of goods typically bought with credit cards. Customers can, in principle, use NFC-compatible handsets to support multiple credit and store cards. However, for telecom operators, the potential burden related to customer services for disputed payments and faulty goods is a significant disincentive. They see a role for themselves as a trusted brand that customers can rely on to host their payment cards, maintain confidentiality and deal quickly with logistical issues that arise, such as details being stolen or a lost handset.

As regards payments, the operators have a cost of funds issue. Their payout (cost of funds) on payments received from their postpaid customers is typically a credit card fee and often they see an even higher pay away to intermediaries on cash received from pre-pay customers, a sizable proportion of the customer base in Europe.

These factors may lead to usage limitations, which could hamper adoption of mobile phones as credit card substitutes, but there should be a role for them as a cash or debit replacement, such as through prepaid e-card accounts.

Regional Perspective – Africa

There are many Mobile Payments pilots in progress in Africa in addition to it being the home to Kenya's M-PESA, which has become synonymous with mobile money success.

From an emerging market perspective, we note a few factors that can lead to Mobile Payments success in Africa.

Presence of Dominant Providers

Several countries in Africa have dominant telecom and financial services providers. In Africa in particular, this may be more important from a distribution and technology perspective than a standards-setting perspective.

Lack of Financial Services Alternatives

This is probably the best reason to expect Mobile Payments success in Africa. There is clearly an unmet need for widely available financial services that Mobile Payments initiatives can fill.

More on M-PESA

M-PESA launched in 2007 and as of November of 2011, the provider had 14.9 million clients, which represents about 60% of Kenya's adult population. Between April and November of 2011, M-PESA transactions reached \$3.15 billion dollars in value.

How Does M-PESA Work?

M-PESA has grown from its roots as a "Send Money Home" system to providing a range of other functionality. M-PESA uses a menu that is loaded on the SIM card of the client's mobile phone. Because we have often received queries as to how M-PESA works, we describe it in detail here.



New Account Creation and Pricing

A new M-PESA customer opens his account at one of over 32,000 agents across the country. M-PESA utilizes an extensive network of agents to allow clients to "cash in" and "cash out". Once an account is created and loaded, it functions like a prepaid card account, except there is no card.

Agents are retail locations that cover the majority of the Kenyan territory and are compensated by Safaricom to perform these two functions. This network ensures that the M-PESA service is perceived as "liquid" from a client's perspective (meaning that they can easily redeem the electronic value they have in the system at any point in time). Customers can withdraw the funds either at an agent or at an ATM through a cardless transaction.

Safaricom uses a tiered-pricing structure that incentivizes creating new accounts and depositing value in the system. In general, it is free to sign up and deposit (cash-in) and clients pay tiered amounts for transferring money to each other or cashing-out. This provides an easy on-ramp to get new customers into the system.

Account-to-Account Money Transfer

M-PESA clients can send money both to Safaricom and non-Safaricom customers. P2P payment is the key use-case for M-PESA. In fact, one of the early marketing slogans for M-PESA was "Send Money Home". The goal was to fulfill the needs of families who had a child who went off to earn money in the city to support his family.

Bill Payments

M-PESA also allows multiple additional use-cases such as bill payments and other types of collections and disbursements.

Expansion into Other Financial Functions

Safaricom and Equity Bank offer a savings account called M-Kesho that also includes Micro-credit and Micro-insurance options. However, the funds held at the basic M-PESA account don't earn interest, and, instead, Safaricom deposits that forgone "interest" amount into a trust account for not-for-profit purposes.

Other Wallets in Africa

Tanzania – M-PESA (Safaricom)

Following the growth of M-PESA in Kenya, Vodafone launched M-PESA in Tanzania in 2008 through its MNO subsidiary Vodacom. M-PESA offers registered users the opportunity to buy mobile airtime top-ups, P2P transfers and bill pay. However, Tanzania did not experience the same initial adoption success as Kenya for several reasons. Tanzania has a much lower population density than Kenya, making it difficult to reach as many potential customers. Also, Vodacom is not as dominant in the market as Safaricom was in Kenya and had competition from other MNO's mobile money products. After re-evaluating their proposition, M-PESA adapted to local conditions in Tanzania and has now reached more than three million subscribers.

Uganda – MobileMoney (MTN)

In 2009, MTN launched its Mobile Payments service "MobileMoney" in Uganda as part of its deployment across several African markets. This service now has over two million subscribers, making it the largest mobile money platform in the country. MobileMoney lets make domestic money transfers, bill payments and airtime top ups. Visa's Fundamo unit provides the m-wallet technology and Gemalto provides the SIM solution. In Uganda, MTN partners with Stanbic Bank to hold its MobileMoney accounts.

Cote D'Ivoire – MobileMoney (MTN)

In a service very similar to Uganda, MTN launched its Mobile Payments service "MobileMoney" in Cote d'Ivoire in 2009. Societe Generale and Ecobank are the banking partners. They currently have nearly a half million subscribers.

Regional Perspective – Asia, Excluding Japan

There are ongoing mobile money implementations in many parts of Asia. Some of these mobile applications have become successful by meeting a specific need such as salary payment in Afghanistan (by Roshan M-Paisa) or the government-sponsored poverty alleviation program in the Philippines (Globe Telecom). We provide examples of the most prominent launches and pilots below.

Philippines

Smart is one of the most successful wallets in the world with over 8.5 million registered mobile wallet users. In 2003, Smart launched their mobile money services, Smart Money, in conjunction with Banco de Oro (BDO). Due to this partnership, Smart Money accounts are handled in exactly the same way as BDO accounts which alleviated Central Bank concerns. Smart Money also issues a physical MasterCard debit cards to be used anywhere and partners with TRAVELEX for international transfers. Their success can also be attributed to their agent network, which consists of over 700,000 retailers.

47

Globe Telecom's GCash entered the mobile money service market in 2004 and now has one million subscribers. GCash enables clients to top up airtime, manage bank accounts and perform domestic money transfers and merchant payments. It is a standalone platform and is not directly associated with a bank. One of the key drivers of GCash enrolling 1 million consumers are government-sponsored poverty alleviation programs.

Thailand

True Money was launched in 2005 by Thailand's third largest MNO, True Move. It currently boasts over 6 million subscribers. True Money offers airtime top-ups, bill pay and domestic money transfers. However, their strategy focuses on bill payments rather than money transfers (e.g. M-PESA). This is due to existing competition and saturation in the country's money transfer industry. True Money's success can be attributed to True's ability to cater to a country's specific market conditions, customer needs, and operator assets.

Afghanistan

Roshan, in partnership with Vodafone, introduced M-Paisa to the market in 2008 as Afghanistan's first mobile money product. M-Paisa allows users to perform airtime top up, bill payment, domestic money transfer, MFI loan disbursement and salary disbursement. Since nearly 70% of the population is illiterate, M-Paisa facilitates the transfer of fund through Short Message Services (SMS) and an Interactive Voice Response (IVR) system. Although fewer than 5% of Afghans have bank accounts, more than 63% are mobile phone subscribers. M-Paisa is seen as a "catalyst for development" in Afghanistan. It currently has over 115,000 subscribers. In February 2012, Roshan announced an agreement with Western Union that will allow its users to receive international remittances directly onto their mobile phones.

Malaysia

Malaysia was host to the world's first multi-function NFC-based payments service in 2009. Nokia, telecom operator Maxis and financial institution Maybank partnered with Visa on a program that allowed users to pay for transit, tolls, parking and goods at over 3,000 locations nationwide.

India

India has over 880 million mobile subscribers, and therefore a huge market potential for Mobile Payments. However, Mobile Payment in India must overcome several challenges. Country regulation stipulates that Mobile Payment initiatives need to be either bank-led or bank-supported, since the Know-Your Client (KYC) and account maintenance responsibility rests with banks. However, many Indians do not have a form of legitimate national identification that would allow them to register for a bank account. To help with this, the Indian Government created, Aadhaar, one of the world's largest social unique ID project and has already enrolled 133 million people to the program - paving the way for easier KYC / AML compliance. In order to address the need for a bank's support in mobile payment initiatives, there has been a great deal of bank-MNO partnerships. In 2009, Citi partnered with Vodafone, VIVOtech and MasterCard to launch and NFC-based Mobile Payments trial in Bangalore. In late 2011, HDFC Bank (India's second largest private Bank) and Vodafone have launched "M-Paisa" as a mobile banking product offering for rural coverage. In 2012, Visa and Monitise launched a joint-venture, "Movida", with HDFC on Indian mobile money transactions over USSD for bill payments and airtime top-ups. Airtel, the largest mobile network operator in India, introduced "Airtel Money" across India in February 2012, after a successful pilot.

China

China's mobile industry is dominated by three state-owned mobile network operators: China Mobile, China Unicom and China Telecom. In China, MNOs must follow the standards set for financial institutions when launching mobile money initiatives. This constraint has led MNOs to move directly to mobile banking solutions. In March 2010, China Mobile (China's largest MNO with over 600 million subscribers), bought a 20% stake in Shanghai Pudong Development Bank in order to expand its mobile payment business. China Unicom has a strategic partnership with Telefonica in order to leverage procurement agreements and mobile service platforms. NFC is also gaining momentum as both China Mobile and China Unicom have agreed to move forward with the standard. In September 2011, HTC launched its first NFC-based phone in China in conjunction with China Unionpay. Independent research by ABI claims that NFC-based mobile China could top \$8 billion by 2014.

Regional Perspective – Central / Latin America

The one-line Mobile Payments takeaway for Central and Latin America is "Behind but Catching Up".

Latin America appears to be behind the developed markets and Asia in the deployment of Mobile Payments. However, the region seems to be well positioned to potentially outpace other markets. Factors supporting this statement include low banking penetration, rising mobile smartphone usage and limited fixed-line ownership. Commitments from large, well funded telecom operators could also help the cause. So far, the GSMA counts over 17 live deployments in the region.

Millicom

Millicom, in our view, is farthest along in Latin America, in developing mobile payment services, as part of its Solutions portfolio. The company is essentially developing a full range of financial services internally, but is partnering with local banks and other global financial services firms where appropriate. The end goal is to make it easier and cheaper for customers to get access to financial services.

Since these are nascent services, Millicom has taken a step-by-step approach to their development. It started with basic lending services (first allowing customers to lend each other airtime, but then with Millicom lending it to customers) before recently moving onto more sophisticated remittance programs, including the announcement of a global partnership with Western Union in February 2012. In the mid-term, the company hopes to roll out insurance and bill payment services across all its markets, as shown below.

Figure 32. Evolution of Millicom's Mobile Payments Product Portfolio

Developed Services	
SMS/Voice Gift & Collect	User A sends SMS to a user B and user A pays for the reply.
Give-me Balance	Allows friends to lend airtime to other users
Tigo Lends You	Millicom lend airtime to customers for a small fee
New Products	
Local & International Remittances	Initially in-country, expanding internationally
P2P Transfers	M-PESA style product
Bill Payments	Utilities and other payments
Micro-insurance	Typically short-term life insurance
Source: Company Reports and CIRA Estir	nates

We would like to thank James Rivett for his help and contribution to this section.

The take-up and the financial success of these early stage products is encouraging. The Tigo Lends You service has a penetration of around 40% of the customer base, with bad debt below 1.2%, as shown below.



Figure 33. Development of Tigo Lends You Across Millicom s LatAm Markets

The area of remittances is the next sector that the company is developing. It started in Paraguay in 2Q10 offering competitively priced local, in-country remittances under the brand name "Giros Tigo". A potential use of this service would include a son working in the Asuncion who sends money back to his mother living in rural Paraguay. According to Millicom, over 17% of the customer base was using this service as of July 2011. In February 2012, the company announced a global partnership with Western Union to offer international remittance services. The service, which is first being rolled out in Paraguay, allows Millicom subscribers to receive international remittances directly to their mobile phones via Western Union's network of more than 450,000 agents globally.

There are three regional tweaks to the global list of success factors we provided earlier.

- Regulation In most markets, mobile money services are not currently regulated given their early stage nature. According to the recent GSMA report¹, in Paraguay, the banking regulator BCP is actively observing the mobile money market without officially regulating it. In Peru the regulator is looking at specific legislation to cover e-money, while in Colombia officials are looking to widen existing banking regulation to cover these services.
- Reliable Agents Banking models rely on trust: The Tigo model effectively relies on agents (typically owners of small stores called bodegas) to have sufficient cash available to give to the recipient of the transfer. This requires Millicom to thoroughly screen (and properly educate) its network of agents.
- Reliable Customers In emerging markets, customers typically operate on prepaid (pay in advance) models for mobile phone services. While not applicable to

¹ See "Mobile Money for the Unbanked – Mobile Money in Paraguay", by Camilo Tellez and M. Yasmina McCarty for further details.

the remittances products, it does mean that operators have limited knowledge on a customer's ability or likelihood of repaying a loan. Operators have to ensure that they have sufficient credit checks in place.

America Movil

America Movil is Latin America's largest telecom provider, with about 300 million customers, including 240 million that are wireless users.

In October 2011, America Movil and Citi announced a joint venture to provide mobile banking services in Mexico, South America and the Caribbean. Using the brand "Tran\$fer", the venture aims to start service in 2012 targeting people that have a mobile device but no a bank account.

"Tran\$fer" plans to allow customers to send money, obtain cash at an ATM without a debit card, make purchases (in-store and online), transfer money, pay bills and buy mobile phone airtime.

Other Initiatives that Have Garnered Attention

Under the terms of the joint venture established by MasterCard and Telefonica, Movistar® mobile subscribers in Latin America will be able to use their mobile phones for person-to-person money transfers, bill payment, mobile airtime reload and retail purchases, among other services.

"T-Cash" in Haiti: "T-Cash" from Voila Comcel and Unibank was recently awarded by the Bill and Melinda Gates Foundation and USAID for reaching 300,000 registered users and having conducted over 3 million transactions. Voila today has over 1,500 agents performing cash-in/ cash-out for these users.

"Daviplata" in Colombia: In 2011, Banco Davivienda, one of Colombia's leading banks, launched a cross-operator wallet called "Daviplata". So far, the service has registered half a million users and completed 3 million transactions. Clients can perform person to person transfers, pay bills, load airtime and cash out at ATMs

Corporate Perspective – Major Telecoms

Practically every telecom company has a Mobile Payments strategy. It is difficult to list every single initiative here and that is not the intent of this "State of the Union" section anyway.

We have cited a few telecoms in the regional examples described in prior sections. The table below lists the largest telecom companies in the world based on subscriber count. We can see they all have major Mobile Payments initiatives under way.

Figure 34. List of Major Mobile Payment Initiatives from Major Telecom Providers Globally

Company	Main Markets	Subscribers (mil)	Main Mobile Payment Initiatives
China Mobile	China	650	Plans to support SIM card-based NFC technology.
Vodafone	Europe	440	Involved in Safaricom's M-PESA system in Kenya. In JV with Everything Everywhere and O2 in UK.
Telenor (VimpelCom)	Europe / Russia	326	Piloting NFC project with DnB NOR in Oslo. VimpelCom and Amiq piloting NFC ticketing in St. Petersburg. Also partnering with Alfa-Bank and Beeline on RuRu payment system.
America Movil	Latin America	236	JV called Tran\$fer with Citigroup announced in late 2011.
Telefonica (O2)	Europe / Latin America	232	Has done extensive piloting with NFC-based mobile wallets in Europe. Plan rollout out NFC wallet in 1H12.
Airtel	India / Africa	227	Plan to launch NFC services in 15 countries in Africa.
Orange	EMEA	217	Held extensive NFC pilot in Nice, France, in 2011. Plans to roll it out across in Europe in future.
Beeline	Russia	199	Partnering with Alfa-Bank and VimpelCom and RuRu mobile payment system.
China Unicom	China	170	Plans to support SIM card-based NFC technology.
Axiata Group	SE Asia	160	Has pledged NFC support via GSMA.
TeliaSonera	Europe	160	Has launched NFC-based pilots for payments and hotel keys in Northern Europe.
SingTel	SE Asia	146	Is part of Singapore consortium to provide mobile payments/ticketing via NFC.
Reliance	India	145	N/A
Saudi Telecom	Middle East	139	Launching mobile payments system in Kuwait. Has pledged NFC support via GSMA.
MTN Group	Africa	137	Partnered with Visa for launch of prepaid mobile wallet in Nigeria and Uganda.
Etisalat	Africa / Middle East	135	Plans on rolling out NFC-based payment / ticketing system in UAE.
T-Mobile	Europe / U.S.	106	Part of ISIS JV in U.S. and Europe. Pilots slated for launch in 2012.
Verizon Wireless	U.S.	106	Part of ISIS JV in U.S. Pilots slated for launch in 2012.
AT&T	U.S.	106	Part of ISIS JV in U.S. Pilots slated for launch in 2012.
MTS	Russia	103	Launched NFC-based pilot with OTI in late 2011. Initial retail partner is LUKOIL.
Source: Company Bo	aarta		

Source: Company Reports

Corporate Perspective – Major Banks

The table below lists the largest banks in the world based on assets. We can see they all have major Mobile Payments initiatives under way.

Figure 35. List of Major Mobile Payment Initiatives from Major Banks Globally

Company	Home Market	Assets (\$bil)	Main Mobile Payment Initiatives
BNP Paribas	France	\$2,792	Launched mobile banking / payment services called BNP Paribas Mobile in late 2011 with partner telecom operator Orange in France.
HSBC Holdings	UK	\$2,691	Purchased mobile network operating 3UK in 1H11 and plans rollout of mobile wallet services.
Deutsche Bank	Germany	\$2,681	Announced plans in early 2009 to offer mobile payment services to its banking and corporate customers in 80 countries.
Mitsubishi UFJ	Japan	\$2,480	Offer Smartplus mobile payment service in Japan primarily targeted at the retail sector.
Barclays PLC	UK	\$2,395	Leading provider of contactless payments in the UK. Has JV with Orange to offer NFC-based mobile payments for low-value transactions.
Royal Bank of Scotland	UK	\$2,320	Signed an agreement with Monitise in late 2011 to broaden its mobile banking and payments services globally.
ICBC	China	\$2,304	Is launching a NFC-based credit product in partnership with China UnionPay and China Unicom.
Bank of America	U.S.	\$2,264	Conducted several NFC-based mobile payment pilots with Visa in 2011.
JPMorgan Chase	U.S.	\$2,247	Is aggressively marketing its mobile P2P offering called QuickPay.
Credit Agricole SA	France	\$2,237	Has partnered with Gemalto to offer NFC-based mobile banking and payment services in France.
Citigroup	U.S.	\$1,957	Was launch partner for Google Wallet in U.S. Partner with America Movil on mobile payments JV, Tran\$fer in Latin America.
Mizuho Financial	Japan	\$1,943	Participates as credit issuer in NTT DOCOMO's iD mobile payment wallet.
China Construction Bank	China	\$1,818	Is launching a NFC-based credit product in partnership with China UnionPay and China Unicom.
ING Group	Netherlands	\$1,799	Is part of JV with other banks and telecom operators to launch NFC-based payments in the Netherlands in 2012.
Source: Company Rep	orts, relbanks.com		

Corporate Perspective – Major Processors

Figure 36. List of Major Mobile Payment Initiatives from Major Payment Processors Globally

Company	Home Market	Main Mobile Payment Initiatives
Visa	U.S.	Broad array of pilots. Partnering with Google Wallet and ISIS. Working on internal initiatives for Visa mobile wallet (Monitise). Uses payWave technology.
MasterCard	U.S.	Working with many partners globally. Was lead network partner on Google Wallet launch in the U.S. Leveraging existing PayPass technology.
China UnionPay	China	Is launching a NFC-based credit product in partnership with China Unicom, ICBC and China Construction Bank.
American Express	U.S.	Is working on internal product called Serve that will act as its prepaid / mobile offering. Has a partnership with ISIS. Leveraging ExpressPay technology.
Discover	U.S.	Was original launch partner with ISIS in the U.S.
JCB	Japan	Offers its QUICPay credit service in Japan, targeting at the retail sector.
PayPal	U.S.	Is rolling out several payment options (card, mobile, POS entry) at brick-and-mortar stores in the U.S. Largest P2P player in the U.S.
First Data	U.S.	Was launch partner with Google Wallet rollout in the U.S.
WorldPay	UK	Supports broad array of contactless payments in Europe. Has various mobile payment partnerships in the region.
Redecard	Brazil	In 2010, it launched Redecard Celular, which offers credit-based mobile payments. Its Redecard Movel offering turns mobile phones into POS terminals.
Cielo	Brazil	Acquired majority stake in M4U, Brazilian developer of mobile technology platforms. Has a NV with Tele Norte to develop mobile payments ecosystem.
Source: Company Reports		

The Path Ahead

The benefits to Mobile Payments are pretty clear. There is significant value add for the end consumer which leads to real opportunities for telecoms, financial institutions, governments and other new entrants. Here is how we see the ecosystem moving forward:

- 1. We predict that the most immediate benefits from mobile payments will be where a dominant telecom, financial services or mobile operating system player can launch a system with significant value to all members of the ecosystem (consumers, banks, telecoms, merchants, etc). These dominant players or coalitions of players will drive forward the one or two most valuable use-cases for the given situation. However, without an open ecosystem of partners, Mobile Payments will only grow to a certain point. We believe market altering growth is most likely with much more open systems that support and enable the ecosystem to flourish and add value in a number of ways — without exerting too much control or trying to extract too much value.
- 2. In developed markets, the mobile wallet will continue to evolve into a device that can remove the financial frictions of everyday life. Specifically, mobile wallets will likely initially flourish in use-cases of high volume, low value transactions like transit, parking and coffee shops. Additionally, by utilizing a range of data generated by mobile wallets (transactions, locations, web histories, etc.), there is an opportunity for both advertisers and retailers to capture significant value by developing tools to better predict and cater to consumers' wants and needs.
- 3. In emerging markets, the benefits of financial inclusion are much more defined. Converting transactions from cash to electronic can result in a higher quality of life for citizens and improved finances for governments (lower costs, improved tax collection). There is a longer runway likely in emerging markets – we could start with an application like domestic remittances that drives adoption but we should look for other functionality to piggyback on this growth until we eventually get a multi-function product that looks and feels like a bank account. Corporations and governments can then take advantage of this new electronic network to drive increasingly greater efficiencies as well as providing new and innovative products.

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NOW/NEXT

Key Insights Regarding the Path Ahead for Mobile Payments

SOCIAL CHANGE

With similar bank account and mobile phone penetration in developed markets, Mobile Payment functionality is more of a "nice to have" option. / The increased utilization of Mobile Payments will allow consumers to use their mobile devices to remove financial frictions of every day life. High volume, lower value transactions such as transit, parking and coffee shop purchases will initially flourish and eventually advertisers and retailers will be able to capture value by predicting and catering to consumers wants and needs.



INFRASTRUCTURE

Access to financial services is dependent on a customers physical proximity to a financial institution. / Through Mobile Payments, financial inclusion is attainable across a much greater geography. Converting transactions from cash to electronic can result in a higher quality of life for citizens and improved finances for governments through lower costs and improved tax collection.





Distinct country-level regulation exists for financial and telecom and governance is very sector-specific. / The merging of finance and telecom will require governments to create new frameworks to ensure financial inclusion for their citizens while maintaining high levels of control against illegal activity. Corporations and governments can take advantage of new electronic networks to drive increasingly greater efficiencies as well as providing new innovative products.

