Digital Payment Platforms

Rahul Gupta
Hak Kwok
Lili Li
Zhuangzhuang Niu
Lu Tian
Duo Zhou
Executive Summary

Digital Payments Platforms aren’t new – from the SABRE system in the 1960s to credit cards to the modern day PayPal and Google Wallet, digital platforms have continued to dominate the payments ecosystem built around customers and merchants. This paper analyzes digital payments platforms through the ecosystem lens and principles that have been introduced in the EIS class by Professor Ron Adner.

We commence the discussion by talking about the failure of First Virtual, which was one of the pioneers in the digital payments platforms space and develop an appreciation for the crucial co-innovation and adoption risks that were not addressed by First Virtual that ultimately led to its demise.

We then do a deep dive on PayPal, which is deemed as a modern day success in digital payments, to understand how PayPal pivoted and learnt from the mistakes of its predecessors. Instead of rushing to be the first to market, PayPal understood the limited nature of first mover advantage in this space and instead patiently focused on strategically reconfiguring the ecosystem to work to its advantage. Using a minimum viable footprint approach, PayPal first built a loyal, premium brand P2P payment service
to solve end consumers’ pain points before assimilating merchants and going mainstream against other platforms.

Finally, we analyze the impact of emerging mobile technologies that have been making headlines to understand whether mobile payments are disruptive to the likes of PayPal. Our findings suggest that while mobile payments may change certain requirements, ultimately they preserve the balance of power in the contemporary digital payments ecosystem and represent a greater opportunity than a threat to PayPal.
# Table of Contents

EXECUTIVE SUMMARY ............................................................................................................. 1

TABLE OF CONTENTS .................................................................................................................. 3

1. OVERVIEW OF DIGITAL PAYMENTS .................................................................................. 4
   1.1 HISTORY .......................................................................................................................... 4
   1.2 ECOSYSTEM ..................................................................................................................... 5

2. AN EARLY PIONEER - FIRST VIRTUAL .............................................................................. 6
   2.1 FAILURE ........................................................................................................................ 6
   2.2 VALUE BLUEPRINT ......................................................................................................... 8

3. ENTER PAYPAL ...................................................................................................................... 10
   3.1 INTRODUCTION .............................................................................................................. 10
   3.2 THE PAYPAL ECOSYSTEM .......................................................................................... 13
   3.3 A MINIMUM VIABLE FOOTPRINT APPROACH TO SUCCESS .................................... 14
   3.4 KEY SUCCESS FACTORS OF PAYPAL’S ONLINE PAYMENT BUSINESS .................. 17

4. MOBILE PAYMENTS AND THE ROAD AHEAD FOR PAYPAL ........................................ 23
   4.1 EXPLOSION IN MOBILE PAYMENTS ........................................................................... 23
   4.2 EMERGING TECHNOLOGIES & PLAYERS ................................................................... 24
   4.3 PAYPAL’S ADOPTION TO MOBILE PAYMENT ............................................................. 26
   4.4 IMPACT OF MOBILE PAYMENTS ON THE ECOSYSTEM ........................................... 27
   4.5 PAYPAL AND DIGITAL PAYMENT PLATFORMS IN THE MOBILE WORLD ............... 30

APPENDIX A: FIRST VIRTUAL DETAILED OPERATION .............................................................. 32

APPENDIX B: INTRODUCTION OF PAYPAL’S EARLY DEVELOPMENT ............................... 35
1. Overview of Digital Payments

1.1 History

Digital payment is a payment method used to fulfill transactions electronically, typically over channels such as the Internet. The roots of digital payments can be traced back to the 1960s, when Western Union invented the Electronic Fund Transfer (EFT). At that time, IBM and American Airlines co-invented the concept of Semi-Automatic Business Research Environment (SABRE), which morphed into a real-time transaction process system four years later, designed to act as an airline reservation system. These were the predecessors of contemporary digital payment systems and represented the first time in history that reservations could be made and paid for over the telephone on credit.

Since the early days of EFT and SABRE, we have come a long way. With advances in high speed Internet, e-commerce and form factors in devices, the adoption and proliferation of digital payments has exploded the world over. Some typical categories of modern digital payments include credit/debit card based transactions, digital money, electronic checks etc. Still newer are upcoming payment products such as Paypal, Amazon Payments, Zong, Google Wallet, Square, etc. which seem to hold tremendous promise for the future.
1.2 Ecosystem

At its core, a digital payment system includes the buyer (payer), the seller (payee) and their respective banks containing respective accounts that transact electronically. Over time, we have witnessed the emergence and evolution of digital payment platforms such as credit cards, mobile wallets, Paypal etc. which act as intermediaries between the buyers and sellers. These platforms connect networks of buyers and sellers through a standardized set of transaction rules, interfaces and governance that reduce transaction costs and enforcement costs through economies of scale. In addition, there are network effects in play, which makes these platforms increasingly valuable as more and more buyers and sellers adopt the platform. For instance, the greater the number of customers (buyers) subscribing to a particular credit card service, the more valuable is the service to merchants (sellers) who are in turn incentivized to adopt the credit card ‘platform’. Conversely, greater the adoption of a particular credit card by the merchant population, stronger is the likelihood for customers will sign up for the credit card (esp. when combined with incentives such as cash back rewards, fraud security) thus completing the positive feedback loop which often results in these platforms dominating the digital payments space.

In this paper, we examine one such platform in depth by the name of Paypal, which has grown to operate 232 million accounts globally with a Total Payment Volume (TPV) of $35 billion¹ globally and supporting exchanges in 25 currencies.

2. An Early Pioneer - First Virtual

Before we dive into the Paypal success story, it is important to realize that Paypal wasn’t mankind’s first attempt at creating a sustainable digital payments platform. Similarly, not all digital payments platforms have been successful in the marketplace because of supposedly inherent network effects, economies of scale and positive feedback. Before we can fully appreciate the success story of Paypal, we begin by telling the story of First Virtual Holdings, which was regarded as one of the most promising and revolutionary platforms of Internet-based digital payment technologies at its time.

2.1 Failure

First Virtual (FV) Holdings was one of the pioneers of Internet-based payment technologies in early 1994. Its primary goal was to facilitate e-commerce through a “seamless” payments product offering that was made available to the public in October of 1994. In the First Virtual system, a buyer and seller could use any procedure or protocol to meet and decide to transact business.

The FV payment system was unique in several ways. Fundamentally, it did not rely on encryption or any other form of cryptography to ensure the safety of its commercial transactions. The philosophy behind First Virtual’s payment system was that certain information such as credit card numbers should not travel over the Internet because it was an unsecured medium. Instead of entering credit card numbers online for each transaction, a Virtual PIN was used which referenced the buyer's First Virtual account.
These PIN numbers could be sent over the Internet because even if they were intercepted, in theory they could not be used to charge purchases to the buyer's account. Also, a person's account would in principle never be debited without an explicit email confirmation from them accepting the charge.

FV's payment system was based on existing Internet protocols, with the backbone of the system designed around Internet email and the MIME (Multipurpose Internet Mail Extensions) standard. FV used email to communicate with a buyer to confirm charges against their account. Sellers used email, Telnet, or automated programs that make use of FV's Simple MIME Exchange Protocol (SMXP) to verify accounts and initiate payment transactions.

Slightly less than two years after its formation, FV had over 900 merchants and 58,000 buyers. With a $12.5M venture backing from First Data, First USA and GE Capital, the company had a successful IPO in 1996. However, by 2001, the company had morphed into a CRM service technology company, completely exiting the digital payments space and was ultimately forced into a distress sale to DoubleClick at $0.16 per share in the dotcom crash era.

It is important to know that conceptually, FV provided most features of Paypal before Paypal even existed. So what doomed the promise of this upcoming star in the field of digital payments?

Source: “Peril and Pitfalls of Practical CyberCommerce”, Lessons of First Virtual’s First Year
2.2 Value blueprint

In order to diagnose what truly happened to FV, we need to first understand the key players in the digital payments ecosystem at the end of the 20th century. In this section, we consider the co-innovation and adoption risks faced by FV.

Adoption chain risk

### Exhibit 1 – FV Adoption Chain Risks

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Relative Benefits</th>
<th>Total Cost</th>
<th>Surplus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumers</td>
<td>• Convenience of purchasing goods online</td>
<td>• Security issue: weak/no encryption along the communication lines.</td>
<td>Negative</td>
</tr>
<tr>
<td></td>
<td>• Easy to use, built on existing technologies such as email</td>
<td>• Merchants available to transact with were typically small e-tailers without much brand name, credibility or reliable infrastructure further eroding consumer trust</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Limited consumer purchase protection available. Legal recourse difficult/unclear.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Offline (physical) multi-step account set up process</td>
<td></td>
</tr>
<tr>
<td>Intermediary</td>
<td>• Potentially more revenues (through processing fees)</td>
<td>• First Virtual opaque security process posed significant risk if bank info got compromised</td>
<td>Neutral / Positive</td>
</tr>
<tr>
<td>Banks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visa/ Master</td>
<td>• Potentially more revenues (through fixed transaction + variable fees)</td>
<td>• First Virtual opaque security process posed significant risk if credit cards got compromised</td>
<td>Neutral / Positive</td>
</tr>
<tr>
<td>Network</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Merchant</td>
<td>• Easy to become a merchant or seller – no tedious screening process</td>
<td>• Long waiting period (91 days!) between when a sale is made and when payment is deposited in the merchant's account</td>
<td>Negative</td>
</tr>
<tr>
<td></td>
<td>• Relatively lower processing fees compared to other Internet payment methods.</td>
<td>• Security issue esp. with email spoofing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• No buyer screening – easy to make hoax requests or validate buyer credit-worthiness</td>
<td></td>
</tr>
</tbody>
</table>
Co-innovation risk

In addition to adoption chain risks faced by different players in the payments ecosystem, there were other factors at play from a co-innovation perspective that were problematic:

- **Lack of security standards and regulation**: While consumer Internet was itself in its early development stage, security protocols and standards that would ensure safe transmission of sensitive information over the Internet were practically non-existent at the time. Moreover, there was a consumer perception issue around that time as well where users were hesitant to enter sensitive information online, particularly in the absence of clear regulation governing Internet fraud.

- **Limited e-commerce activities and infrastructure**: With e-commerce virtually non-existent in 1994 and most purchases still occurring offline in physical retail stores, there was no significant incentive or benefit for merchants and customers to adopt FV. Thus, an active e-commerce ecosystem was a crucial complement to the development of digital payments, in the absence of which the impetus to adopt FV never truly materialized.

**Conclusion**

Examining the underlying value blueprint reveals that FV failed to address key adoption risks faced by customers and merchants, which combined with lack of co-innovations in security standards, regulations and e-commerce spelt certain death.
3. Enter PayPal

3.1 Introduction

Timeline of PayPal’s early development

Exhibit 2 – PayPal timeline

Success Through eBay

As of July 2000, there were a total approximately 2 million eBay listings accepted PayPal payments, five times more than BillPoint Inc., eBay’s own payment service. By October, PayPal was being used to pay for 25% of all eBay transactions, $6 million every day.

By summer 2001, PayPal’s customer accounts had swelled to over 9 million, with 0.5 million outside the US. The company took the first international expansion, reaching about $10 billion by 2005. Online auctions continued to account for a large percentage
of the firm's annual revenues, over 60 percent. PayPal was also establishing a strong Internet presence among users of adult sites and online gambling. ³

And over its short history, PayPal had vanquished many online payment rivals, including services from Yahoo!, Citibank, and eBay Billpoint.

Going Public and Gaining New Parentage

On September 28, 2001, PayPal announced the initial public offering. From an opening price of $13, PayPal shares rose to $21.61. Investors were apparently convinced of the company's potential to become the Internet payment network of the future, one that might even challenge the big credit card companies.

In July 2002, PayPal was acquired by eBay for $1.5 billion in eBay stock. At the time, 70% of eBay transactions were processed by PayPal, 30% by Billpoint.

After 2002 Acquisition Situation and Strategy

PayPal became a vital component of eBay's growth strategy, generating 23% of eBay's 2005 revenue. And PayPal's success was closely tied to that of eBay's marketplaces: 61% of PayPal's 2002 revenue came from the auction site, up to 70% in 2005. 78% of marketplace transactions were completed using PayPal.

International expansion remained a priority for PayPal, which offered local services in 14 countries and supported seven currencies. In 2005, PayPal earned 36% of its revenue outside the U.S., compared to 48% for eBay’s marketplaces.4

PayPal was also aggressively pursuing the 87% of U.S. e-commerce conducted off the eBay platform in 2005. Back in late 2003, PayPal created Merchant Services to target “off-eBay” opportunities, launched new products, forges strategic partnerships and recruited large accounts such as Dell, Sharper Image, and United Way.

4 Source: Adapted from Thomas Eisenmann and Lauren Barley, “PayPal Merchant Services”, Harvard Business School Case 9-806-188, Rev: March 13, 2007
3.2 The PayPal ecosystem

Senders can elect to transfer funds via their PayPal accounts. The PayPal account was debited and the receiver’s account was credited with the amount. This happens instantly and at no charge, either for the sender or the receiver.\(^5\) (red route)

PayPal also provides users whose accounts are linked to a checking account (vs. linked to a credit or debit card) the option of using bank payment mode. PayPal batches up multiple transactions and sends them to the ACH\(^6\) network, instructing the ACH to pull funds from PayPal account holders’ checking accounts and to push to PayPal. The ACH


\(^6\) Automated Clearing House (ACH) Network - an electronic network for financial transactions in the United States. ACH processes large volumes of credit and debit transactions in batches. Using ACH payments can help reduce errors, speed things up, and save resources.
switch operator sends funds to PayPal, who then passes them to the online merchant’s bank account. PayPal essentially bypasses the traditional card networks, such as Visa, Master, or American Express. (grey route)

Senders can also make payments through credit cards. For Visa/Master credit card networks, PayPal is technically considered a merchant as PayPal stands in as the merchant of record for the e-commerce retailers that accept PayPal as a payment method. PayPal charges its merchant customers a blended, per-transaction discount rate. (green route)

PayPal’s funding costs differ depending on user funding methods. Checking account-linked accounts that use ACH for settlement are the lowest cost and most profitable for PayPal, while credit and debit card-funded accounts are more costly as they require PayPal to pay interchange on these transactions.

3.3 A Minimum Viable Footprint approach to Success

PayPal followed a staged expansion by starting small, getting early market traction and feedback and pivoting where necessary and finally expanding strategically in a phase manner to become the payment platform mammoth it is today.


8 Ibid

9 Ibid
Stage-1: Person-to-Person payments

PayPal originally positioned itself as a person-to-person (P2P) payment service built on the existing credit-card system. It is considered that PayPal viewed P2P as an easy and quick way to acquire a large user base by providing convenience and safety to users. Users went through a simple registration process to create a PayPal account and money could be transferred to anyone who had an email address, even those who did not have to have a PayPal account. However, recipients did have to open a PayPal account in order to claim their money\(^{10}\). The P2P payment service anchored its establishment.

Stage-2: Adding money-market accounts

Beyond P2P, PayPal also offered free money-market accounts into which new funds can be automatically swept each night. This offering was intended to encourage users to leave funds with PayPal rather than withdraw the funds for delivery. Earning float interest on these funds was PayPal’s initial revenue stream.\(^{11}\) Aside from revenue benefit, PayPal also had the opportunity to get to know more about its users, because users must surrender their social security number in order to take advantage of the interest-bearing account\(^{12}\).

Stage -3: Adding ACH bank-account debits

---


\(^{12}\) Ibid
As acceptance grew, PayPal expanded funding instrument to ACH bank-account debits. This move offered users more flexibility which further drew users and also significantly lowered PayPal’s cost to fund accounts. Instead of a credit-card processing cost of $0.18 plus 1.9%, PayPal incurs a flat ACH debit processing cost of $0.03 per transaction.\(^\text{13}\)

**Step-4: User segmentation and value creation**

Later in June 2000, PayPal built on its original person-to-person service model and tiered its user structure by offering personal, premier, and business accounts. Casual users were given personal accounts, while a new tier of professional users was given access to business accounts that came with added features but carried associated fees. High-volume users were forced to upgrade to the revenue-generating accounts for PayPal. This offering and the features created new market dynamics.\(^\text{14}\) PayPal now provides a cost-effective mechanism for small businesses to handle affiliate commissions, pay-to-surf rewards, and survey participation incentives.

One year after the business account became available, 20% of the users upgraded from personal to business accounts. These business accounts, many of which are eBay power sellers, drive 90% of transactions in the system.\(^\text{15}\) Business account holders pay $0.30 per transaction plus 2.9% of the payment amount, and PayPal now earns $1.23 in fees,


on average, on a $50 value transaction. Because these fees are significantly less than many smaller stores pay to handle credit card sales, PayPal started to see a growing merchant base and marched into the small-business e-commerce markets.

**Step-5: Online auction**

After building a broader merchant user base, PayPal entered the online auction space when more and more eBay listings started to accept PayPal payments. One year after the initial entry to the online auction space, PayPal was being used to pay for 25% of all eBay transactions and online auction accounts for about 55% of the firm’s annual revenue.

![Exhibit 4 Breakdown of E-mail payment market](image)

**3.4 Key Success Factors of PayPal’s online payment business**

PayPal’s success was not built on a single technology, solution or strategy; rather, it required an iterative, phased approach to systematically reduce various ecosystem risks.


PayPal allied with strategic partners and took the right time to roll out products and services, both helped PayPal create a compelling value proposition for the customer and resulted in tremendous growth.

**Lower co-innovation risk**

Compared with First Virtual, PayPal was born at the right time when co-innovation risks were lower. E-commerce was far more prevalent and pervasive. Consumers were beginning to embrace the Internet and created “pull” for alternative payment methods that would alleviate the pain points associated with checks and money orders (original payments adopted by eBay customers).

The development of e-commerce nourished the application of PayPal. With an established online auction platform like eBay, PayPal quickly grew in the market. Similarly, the IETF (Internet Engineering Task Force) had developed robust and widely commercially acceptable standards for securely handling data transmission, which were non-existent when FV came aboard.

**Systematic reduction of adoption chain risk**

As we saw with First Virtual, the first set of adoption risks stemmed directly from the customer base. In PayPal’s early launch period, the concept of digital payment via email was still new to most buyers and sellers. PayPal therefore took several creative approaches to address this risk by promoting itself as a reliable and secure payments method, while strategically investing in marketing programs to leverage network effects.
• **Improve security of accounts:** Compared to First Virtual which barely invested in encryption or other forms of secure transmission protocols, PayPal took security seriously. It used encrypted database and communication with Secure Sockets Layer protocol (SSL) among the systems components to ensure a safe and reliable quality of service for users. It also uses Securing IPN (Instant Payment Notification), which allows the users to check payment status.

Furthermore PayPal invested in creating a security system that could detect accounts with suspicious transactions. For instance, the system could verify the existence of bank accounts where PayPal would send small amounts of money to applicants and analyzed buying and selling patterns among PayPal accounts. If an irregular transaction was identified (e.g. significantly different transaction amount), all the funds in the account will be frozen. This system successfully decreased fraud rate to 0.85% for PayPal, compared to an Internet average of 2.64%. But more importantly, the security system ensured that key stakeholders – the consumers and merchants to trust PayPal and widely use it in online transactions. Over the years, PayPal continued to roll out new layers of security measures and even offered up to $100,000 account insurance to protect users. PayPal’s investment in creating a secure payments platform was a key step in mitigating end customer adoption risk.

• **Strategic Marketing to harness network effects:** PayPal provided structured incentives to attract users. Each new user was offered a $10 bonus for opening a

---

18 Source: The system is sometimes considered as “too sensitive” that buyers and sellers were sometimes too frequently denied access to the money in their PayPal accounts for normal transactions.

PayPal account and another $10 for referring another user. This program immediately helped PayPal gain tens of thousands of new users. PayPal later lowered the bonus to “$5 and $5” bonus, having no impact on users’ adoption. Such marketing campaign was extremely successful, in that PayPal’s users surged from 12,000 to 2.7 million in record period of time.

“First” mover at the right time

Though First Virtual entered the digital payments market before PayPal, it is widely accepted that PayPal was the first mover in this market.

Using the first mover matrix (Exhibit 4), we can see that PayPal recognized the importance of addressing the challenges faced by its complementors and co-innovators as a prerequisite of acquiring any real first mover advantage. For online digital payments, innovators face various execution challenges, such as establishing a solid security system, acquiring a sufficiently large customer base, and setting up a reliable server. Therefore it falls in the lower part in the matrix.

However, due to different entry times, PayPal and First Virtual faced different co-innovation challenges. At the time (1994) when First Virtual was launched, there were not many applications for online transaction service, nor many internet surfers that could be converted into customers. Software development was in a relatively early stage where advanced security encryption was not widely available. Therefore, First Virtual faced a higher co-innovation challenge and as a result, could not establish a solid winner position.
On the other hand, PayPal didn’t face a very significant co-innovation challenge as First Virtual. With online shopping websites like eBay, Buy.com, and Amazon attracting customers, the soil for online digital payment to grow was ready when PayPal launched. In addition, after 4-5 years’ development, the Secure Sockets Layer (SSL) technology had got more and more mature as a dependable way to protect internet users from malicious software. So at this time, the co-innovation challenge has greatly reduced to a much lower level (left of the matrix).

As a result, PayPal took the advantage and moved in quickly into the digital payment space with a good security platform, a structured incentive program, at a right time. PayPal quickly build up the customer base and strengthened the leadership position, took the majority of online payment market.

**Exhibit 5 – First Mover Matrix**

<table>
<thead>
<tr>
<th>Complementor Co-innovation Challenge</th>
<th>Lower</th>
<th>Higher</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Innovator Execution Challenge</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower</td>
<td>First gets the win</td>
<td>Hurry up and Wait</td>
</tr>
<tr>
<td>Higher</td>
<td>Winner takes more PayPal</td>
<td>It Depends</td>
</tr>
</tbody>
</table>

**Strategic acquisition by eBay**

The acquisition by eBay was a win-win strategy for both companies. It gave eBay full control over a significant portion of its payments stream and increased the amount it
took from each transaction from 7 to 10 percent. It also made it possible for eBay to shutter the unprofitable Billpoint operation, which it did as soon as the PayPal acquisition was finalized. For PayPal, the merger signaled the end of a period of uncertainty about steps eBay might take to cut it out of its auction market. While the company remained an independent entity under its former management team, its service was integrated directly into eBay's online software, enabling sellers to offer it more easily and prominently.

The sale had some disadvantages for PayPal as well. PayPal began, as one analyst told the New York Times, as "a unique payment platform on the Internet and is ending up a company whose focus is a niche market"—namely the eBay auction market. PayPal has become a pure subsidiary of eBay, and lost the independence.
4. Mobile Payments and the Road Ahead for PayPal

4.1 Explosion in Mobile Payments

The last decade saw the fastest growth in mobile device usage in developed countries, and in recent years the developing countries also showed strong momentum to embrace this trend. Mobile phone shipments are expected to grow from 1.5bn in 2011 to 2.0bn in 2015. The number of mobile phones has already exceeded that of bank accounts and could potentially exceed that of card accounts.

Supported by strong growth in the mobile device market, the mobile payment also shows very promising opportunities. Mobile payments are expected to grow at a 54% CAGR from $49B in 2010 to $426B by 2015 according to Gartner. Juniper Research is more aggressive and expects the mobile payment market comprised of digital and physical goods, money transfers and NFC transactions to exceed $670B by 2015. Although, Asia/pacific and EMEA command a higher share of the mobile payments, Gartner’s forecast suggests faster adoption in the developed economies of North America and Western Europe. Security and convenience are major drivers for adoption of mobile payments in developing markets. Also, mobile payments, especially those
based on SMS or mobile POS, can help flatten the adoption curve and overcome infrastructural challenges of retail POS deployments and consumer adoption.\(^\text{20}\)

### 4.2 Emerging Technologies & Players

A number of companies have invested in exploring opportunities in the mobile payment market, with different technologies.

**MasterCard Mobile Payment**

MasterCard’s mobile strategy centers on mobile wallet access through MasterCard payPass contactless technology. MasterCard has developed a mobile payments gateway that enables financial institutions and mobile network operators to deliver end-to-end mobile payment solutions through the MasterCard Worldwide Network. The service will enable consumers to use their phones as mobile wallets and link their existing credit, debit or prepaid MasterCard or Maestro card accounts to fund mobile-initiated payments.

---

Google Wallet

Google unveiled the Google Wallet with much fanfare in May 2011 and announced the commercial launch in September 2011. Google collaborated with MasterCard, Sprint, First Data (who serves as the Trusted Service Manager (TSM) for card provisioning), and Citigroup, and it signed 16 retailers including American Eagle Outfitters, Bloomingdale’s, Duane Reade, Foot Locker, Macy’s, Radio Shack, Subway, Toys “R” Us, Walgreens, Peet’s Coffee and Jamba Juice to accept mobile payments.

Isis

Isis is a mobile payment joint venture of the top three US mobile operators (AT&T, Verizon, and T-Mobile). In the original announcement, Barclays was Isis’ issuing bank and Discover the payment network. Subsequently, Isis signed agreements with Visa, MasterCard, and American Express. Isis plans to target the 200M mobile subscribers of AT&T, Verizon, and T-Mobile which has gotten payment issuers excited and partnering with Isis.

Apple

Apple’s potential entry into NFC-based mobile payments could be a major boost for mobile payments. Apple’s user-centric approach could potentially improve and standardize the mobile payment process, and will provide huge captive Apple iTunes
customer-base of over 225M iTunes accounts. Apple has produced over 275M mobile devices including 149M iPhone, iPod touch, and iPad.21

4.3 Paypal’s Adoption to Mobile Payment

In 2011, PayPal doubled its forecast for mobile payments for 2011 from $1.5B to $3B in June, and then increased it to $3.5B in October. In the same year, eBay mobile commerce generated $5 billion in retail volume, and PayPal mobile processed 80% of that. eBay’s mobile apps have been downloaded more than 70M times. In 2012, eBay expects to do $8B in mobile commerce retail volume, and PayPal expects to process 87.5% of that number. PayPal has substantial clout with 8M mobile users and processes over $10M worth of transfers a day.

The PayPal approach to mobile payments has focused more on mobile commerce and multi-channel shopping experience rather than NFC based mobile payments at retail POS. However, in September 2011, PayPal unveiled its mobile payment strategy which includes use of PayPal at retail POS. PayPal is working on multiple alternatives for retail acceptance and also plans to integrate location-based merchant offers through mobile alerts.

What is even more amazing is PayPal’s growth in average annual mobile payment per active user. As is shown in the chart below, the average annual mobile payment per user

has grown from $1.56 in 2009 to $7.98 in 2010 to $37.63 in 2011. This is a rise of 371% over 2010, and an increase of 2304% over 2009 average mobile payments.\textsuperscript{22}

\textbf{Exhibit 8 – Paypal Average Estimated Mobile Payment Per Active User}

\begin{figure}
\centering
\includegraphics[width=\textwidth]{paypal-average-estimated-mobile-payment-per-active-user}
\end{figure}

\subsection*{4.4 Impact of Mobile Payments on the Ecosystem}

Mobile payments strengthen the value proposition offered by the incumbent digital payments platforms for almost all the players in the ecosystem:

- **Consumers:** Mobile payment systems extend the convenience of e-commerce that consumers are familiar with on the desktop to mobile devices. Not only does this enable consumers to shop on-the-go, but development of complementary services such as daily deals (GroupOn) and price check (Amazon) have empowered

\textsuperscript{22} The Astonishing Growth of PayPal’s Average Mobile Payment per User, Mary Monahan, January 20, 2012, https://www.javelinstrategy.com/blog/2012/01/20/the-astonishing-growth-of-paypals-average-mobile-payment-per-user/
consumers with greater real-time information about their purchase choices. Mobile systems can also open up the electronic world and internet shopping to those who do not have traditional computer access.

- **Merchants:** Mobile payments strengthen the position of e-merchants and small business owners. For e-merchants, mobile payment provides an alternate channel from which revenues may be derived and can potentially boost revenue stream. For small business owners who were traditionally limited (say in geography) can now accept payments and provide services globally through mobile payments and complementary services (for instance, Amazon’s fulfillment capabilities). That said, mobile e-commerce has the potential to hurt traditional in-store merchants. ‘Showrooming’ is emerging as a popular trend where consumers shopping in big-box stores can compare prices in real-time using mobile apps with e-tailers (who typically have a cost advantage) and then order goods online instead.

- **Intermediary Banks:** NFC technology, mobile card reader or mobile apps, no matter how the different technologies play out, people still need bank account and/or cards to process payment. So they are neutral to mobile payments.

- **Payment Networks (Credit cards, ACH):** Though there are players such as PayPal trying to build their own competing “closed loop” services and replace traditional payment networks, in the foreseeable future there will still be a distinct need for payment networks (such as credit cards and ACH) to exist. In fact, mobile technologies (such as those from Square and PayPal) are built on top of the credit card, thus cementing credit card network’s position in this ecosystem. Without
doubt, the adoption of mobile payments will generate more revenues in transaction/processing fees for these networks.

- **Hardware companies:** The companies include smart phone producer, NFC technology provider and mobile POS manufacturer. More mobile payment transaction creates increasing demand for these companies.

- **Software companies:** Retail apps (e.g. that of Amazon or iTunes) and mobile wallet companies (Google Wallet) are benefitting from the surge in mobile transactions and have the chance to grab a piece of the growing payments pie.

- **Wireless Carriers:** Traditional carriers are neutral to this opportunity, although growth of m-commerce drives up Internet data usage on mobile devices, which is in the interest of the wireless carriers. That said, AT&T, Verizon, and T-Mobile are actively trying to participate in this space through the joint venture Isis, which is yet to gain credible market traction.

### Exhibit 10 – Summary of Impact of Mobile Payments to the Digital Payments Ecosystem

<table>
<thead>
<tr>
<th>Players</th>
<th>Benefits</th>
<th>Drawbacks</th>
<th>Surplus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumers</td>
<td>• Convenience</td>
<td></td>
<td>Positive</td>
</tr>
<tr>
<td></td>
<td>• Access</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Discount</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Merchants</td>
<td>• More revenue</td>
<td>• Showrooming for big box merchants</td>
<td>Neutral/Positive</td>
</tr>
<tr>
<td></td>
<td>• Targeting</td>
<td>• Infrastructure installation costs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Location</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intermediary</td>
<td>• Potentially more transactions</td>
<td></td>
<td>Neutral</td>
</tr>
<tr>
<td>Banks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Payment</td>
<td>• More revenue</td>
<td></td>
<td>Positive</td>
</tr>
<tr>
<td>Networks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hardware</td>
<td>• More revenue</td>
<td></td>
<td>Positive</td>
</tr>
<tr>
<td>Software</td>
<td>• More revenue</td>
<td></td>
<td>Positive</td>
</tr>
<tr>
<td>Carriers</td>
<td>• More data/bandwidth</td>
<td></td>
<td>Neutral/Positive</td>
</tr>
</tbody>
</table>
4.5 PayPal and Digital Payment Platforms in the Mobile World

As seen in the previous section, the emergence of mobile payments provides an opportunity for PayPal to continue extending its dominance in the payments space to a new form factor – mobile devices.

- **Change in Power**: Mobile payments largely do not impact the incumbents’ (e.g. PayPal’s) dominance in the industry, as long as they are able to quickly embrace the mobile channel and provide a ‘reach’ experience for their existing customers. By bundling payments with value-added services such as daily deals, price check, PayPal can further strengthen its appeal among consumers in the ecosystem. The one key constituent that is potentially harmed by the evolution of mobile payments is the merchant, especially those with brick and mortar operations. By investing in POS solutions that equip these retail stores with digital processing payment capabilities, PayPal can alleviate some of the pains felt by the merchants and retain its stranglehold.

- **Change in Requirements**: To the extent that PayPal has already embraced mobile as an additional form factor for which its applications as well as complementary services need to be developed, we don’t believe that the requirements for PayPal to compete in this space are tremendously different
from those that position them competitively in the pre-mobile digital payments space.

- **Change in Game:** Ultimately, we believe that mobile payments do not change the fundamental nature of the game for most of the key players in the ecosystem. Both technological and market linkages for digital payments platforms like PayPal are preserved and positions PayPal favorably to continue to win in this space.
Appendix A: First Virtual Detailed Operation

I. Before transaction, a VirtualPin and an account need to be set up.

- Provide non-sensitive application info online, such as name, email address, and telephone no.
- Provide credit card information (for buyer) by phone and bank transfer information (for seller) by Postal Mail
- Receive Virtual Pin
- Charge consumers a registration fee of $2 for each credit card account, and merchants, a one-time fee of $10

II. When a transaction occurs

1. Consumer places an order
2. Merchant requests buyer's First VirtualPIN, which is usually through a form on a WWW page. Merchant can then check whether the VirtualPIN actually belongs to a real First Virtual account that is in good standing. Merchants can verify accounts by using the following programs: Finger, Telnet, email, or the FV_API utility. Verifying the account is an optional step in the sale process.

3. The merchant then initiates a payment transaction through First Virtual. This payment transaction is initiated by sending the following information either by email, Telnet, or a SMXP enabled program to First Virtual:
   - Buyer's First VirtualPIN
   - Merchant's First VirtualPIN
   - The amount and currency of the sale (Not everything is processed in dollars!)
   - A description of the item for sale

4. First Virtual generates an email request to the buyer to confirm the sale. This email request contains the following sale information:
   - The merchant's full name
   - The amount of the sale
   - A description of the item bought

5. Buyer confirms sale by sending a YES response to back to First Virtual:
   - A buyer can also respond NO, to state that they are unsatisfied with the item and are unwilling to pay, or FRAUD, to state that they never made the purchase and someone must have stolen their VirtualPIN.
   - If a buyer does not respond in a reasonable time, their account is suspended.
6. First Virtual sends a transaction result message to the merchant, indicating whether the buyer accepted the charges. Meanwhile, FV would send the transaction payment request to the buyer's credit card service for collection and transfer to the seller's bank account.

7. After a waiting period, (91 days after buyer's credit card has been charged), the amount of the sale minus transaction fees are directly deposited into the merchant's account. The 91 day waiting period is in place to protect First Virtual from buyers who dispute the charge on their credit card and have the credit card company chargeback First Virtual for all or part of the sale.
Appendix B: Introduction of PayPal’s early development

October 1999: Led by Max Levchin and Peter Thiel, a technical startup called Confinity launched PayPal as a service to send money electronically via handheld devices. PayPal relied on existing, universally accepted institutions. After it was discovered by online auction aficionados, PayPal’s fate was linked inextricably with eBay’s.

March 2000: X.com Corporation acquired Confinity and took on PayPal as the corporate name. X.com initiated aggressively marketed the product through promotions. In 8 months, PayPal surged from 12,000 accounts to 2.7 million. The system’s convenience and low cost won over eBay shoppers. They no longer needed a credit card to buy online, and the service did not levy additional charges, but more importantly, PayPal provided a trustworthy way of dealing with anonymous sellers. Although sellers were required to pay 1.9% of the sales price, it was still cheaper than using a credit card.

June 2000: PayPal introduced business accounts, which were intended for high volume individual and commercial accounts. The fee was 30 cents plus 2.9% of each transaction, significantly less than many smaller stores paid to handle credit card sales. Business accounts had no limitation on payment amount every month, while consumer accounts were limited to $500 in credit card business every 6 months. By the end of 2001, more than one-fifth of PayPal’s 12.8 million accounts were business accounts.