

Increasing Connectedness and Consumer Payments: An Overview

Michael L. Katz

INTRODUCTION AND OVERVIEW

This paper presents a view of the future of consumer payments. Specifically, I opine on two questions. First, will the broad trends of consumers' increasingly being connected via mobile access devices and engaging in social networking be likely to revolutionize consumer payments? Second, if so, what roles will be played by the various payment participants (e.g., consumers, merchants, banks, mobile network operators, and nonbank intermediaries)?

This is a rather daunting task. Fortunately (for me, at least) confidently making sweeping predictions that fail to materialize is something of a mobile payments industry tradition. In that spirit, I will use the occasion to make my own sweeping and, possibly, far-fetched predictions.

In short, I believe that, in the United States and other advanced economies, the ubiquity of always-connected individuals with access to computing power, coupled with the near-total loss of privacy due to social and technological factors, will lead to evolutionary developments in core payment services but revolutionary changes in services that are built on the information collected through payment services.¹ Moreover, I think that core payment services will become only one component of broader constellations of services that: (a) provide consumers an integrated user experience when dealing with merchants, and (b) provide merchants with customer relationship management and marketing services, in addition to payment services.

The evolutionary changes in payments will come in the form of additional payment options that largely are extensions of existing payment options (e.g., the extension of credit card networks to mobile-commerce transactions, and the use

of smartphones as smarter smart cards through the use of near field communication (NFC)). In the short term, we may see new mobile payment products that are complementary to, and offered separately from, existing payment products. In the long term, I predict that successful payment products will provide consumers the convenience of one-stop shopping. That is, these payment mechanisms will be useful for mobile commerce, e-commerce, and traditional bricks-and-mortar commerce, and they will be so whether the consumer is buying virtual or tangible goods and services. Widely useable payment services will also have the advantage of allowing the service providers to collect more comprehensive information about any given consumer.

I believe this latter advantage will be an important one because the revolutionary services building on mobile, connected computing and social networking will be those services that allow merchants to target their customers based on the information collected through payment and social networks. Both of the trends identified in the opening of this essay will help incite revolution. First, connected individuals can be identified and tracked so that detailed information about their environment and actions can be collected, analyzed, and used to generate personalized, context-specific communication that can be delivered in real time. Second, social networks can allow the identification of an individual's revealed preferences, demographic characteristics, sources of influence, and influencer value. The ability to predict consumer behavior, know the consumer's context, and send personalized messages can give merchants very powerful marketing tools, worth tens of billions of dollars annually.²

Technological and social trends will lead to the convergence of three sectors around payment systems: telecommunications, banking, and web services. The communications sector will provide fixed and mobile Internet access services that will serve as bases on which innovative services will be built. Entities in the banking sector will extend credit and provide trusted brands. Lastly, a wide range of firms from the web-service sector may be involved, with particularly important roles played by social-networking, search, and online-advertising providers.

Any given mobile payment service requires the tacit or explicit cooperation of a wide range of parties to succeed, including mobile operating system (OS) providers, app developers, mobile access device original equipment manufacturers (OEMs), wireless telecommunications carriers, financial institutions (e.g., credit-issuing banks and merchant-acquiring banks), payment network operators, and possibly others. All of these parties are also potential rivals seeking to appropriate profits for themselves. Hence, although these parties must cooperate with one another to create value, they compete to capture that value. Similar forces arise with respect to the customer-relationship-management and targeted-marketing services that are based on the data collected through payment services and social networks.

The battles to capture value will occur on several fronts. First, there may be standards wars and compatibility battles. I believe that merchant demand for

standardization of point-of-sale (POS) transaction-capture devices will lead to the standardization of those devices, but that these devices will be flexible enough to interact with consumer devices in a variety of ways. Second, there will be struggles to control the customer relationship. However, I do not expect there to be one firm or one type of firm that controls “the” customer relationship in this area. Rather, a given consumer may have business relationships with several members of the relevant value net simultaneously.

The most important battles for control will be over information ownership. Revolutionary services will be based on the unprecedented amounts of information collected about consumers, and this information will be extremely valuable. Many firms will adopt business models predicated on monetizing the information that they collect about their users. Consequently, there will be struggles among social networks, other app providers, payment network operators, mobile network operators, and even mobile access device OEMs (at least in the case of Apple Inc.) over the ownership and control of this information. In the United States, regulatory and political pressures will have significant influences on industry evolution and who captures value. The convergence of three different sectors is going to lead to complex regulatory convergence as well. The interplay of economywide competition policy and privacy regulation with the sector-specific regulatory regimes for banking and telecommunications is going to be problematical for the industry. Given the importance of information and the complexity of the issues involved in regulating the collection and handling of it, public-policy concerns regarding privacy will loom large for years to come.

An examination of the broad forces affecting the industry gives rise to several specific predictions about the roles likely to be played by various industry participants:

- *The roles of firms in the telecommunications sector will change little.* With the possible exception of Apple, I do not see wireless telecommunications carriers and mobile access device OEMs playing significant roles in mobile payments beyond offering generic infrastructure on which payments services offered by other providers ride.
- *The roles of banks will change little.* Banks will continue to be an important part of the payment ecosystem as providers of credit, for which they possess unique expertise based on extensive experience. In addition, in the light of consumer concerns about privacy and security, banks may play an important role in reassuring consumers of the integrity of mobile payment systems.
- *Current payment card networks will play a central role if they can successfully innovate.* Traditional payment card networks, such as American Express, MasterCard, Visa, and—to a lesser extent—Discover have powerful competitive advantages in form of trusted brands and large networks of consumers and merchant users. A critical question is whether they possess the organizational capabilities to innovate to take advantage of the new possibilities created by pervasive consumer connectedness.

- *Web services firms will play significant roles as information collectors and processors.* Web services firms, such as Amazon, Facebook, and Google, are largely information collection-and-processing companies. To varying degrees, these companies have valuable competitive assets that include massive amounts of consumer data and the ability efficiently to collect, store, and analyze those data to model consumer behavior. Given these assets, I expect a few of these firms to be very successful in this area.

The remainder of this paper is organized as follows. Section I examines whether consumers and merchants are likely to derive significant new benefits from the types of payment services and features enabled by increasing consumer connectedness. The presence or absence of such benefits will have a significant impact on the likelihood that mobile payments and social-network-based payment services are likely to be widely adopted. Section II discusses the potential uses of the consumer information that would be collected by these payment services. It also discusses the likely struggle for control of that information. Section III then discusses some of the possible reasons why these payment services have not been widely adopted to date, and it identifies some of the strategies that may overcome these barriers to adoption. These first three substantive sections set the stage for Section IV to offer a predictive analysis of the likely winners and losers among the various types of firms that will be involved in providing new payment services. A very brief summary section closes the paper.

I. DOES ANYONE WANT MOBILE PAYMENTS (OTHER THAN MOBILE PAYMENT PROVIDERS)?

“Mobile” payment services already are offered by cash, checks, and various payment cards. These payment instruments are lightweight, compact, widely accepted, and easy to use. Rightly or wrongly, American consumers are also very comfortable with these payment instruments with respect to privacy and security. Moreover, most consumers already have established relationships with payment service providers, and merchants have made significant investments in POS transaction-capture devices (e.g., card readers and cash registers), employee training, and supporting information technology systems to utilize these payment instruments. These facts raise the question: do merchants and consumers want new payment options based on mobile access devices and/or social networks? The answer to this question is important because, if merchants and consumers do not see value in a new payment service, then that service is very unlikely to succeed. Cool technology alone is not enough.

What Do Users Want from Payment Products?

New payment services will be successful only if they offer merchants and consumers additional value sufficient to induce them to change payment methods or service providers. What are the sources of value to these users?

Merchants' Desiderata

Logically, the ideal payment service from a merchant's perspective is one that imposes low costs on the merchant and is used by a large number of consumers to make purchases in high volumes. And, indeed, in their empirical examination of merchant behavior with respect to mobile payment services, Mallat and Tuunainen (2008) found "that the main adoption drivers are related to the means of increasing sales or reducing the costs of payment processing."³

Merchants care about the complete set of costs that they incur to utilize a payment service. These costs include: (a) the fees, if any, charged by the payment service provider (e.g., the merchant discounts charged by a credit card network); (b) expenditures on activities that must be undertaken by the merchant to utilize the payment service (e.g., employee training and the wages and real-estate costs associated with using the payment service at checkout); (c) payments to third-parties for activities related to using the payment service; and (d) costs incurred to detect and prevent fraud by consumers, the merchant's employees, or other members of the relevant payment service value net.

Most merchants feel the need to accept payment services that consumers would like to use. Hence, merchant demand for payment services is derived in large part from consumer demand. Indirectly at least, merchants want what consumers want. In general, a merchant will be especially interested in a payment instrument that allows the merchant to attract customers who would not patronize the merchant absent the ability to utilize that payment service. Indeed, a rational merchant will accept a high-cost payment service if doing so allows the merchant to attract customers who would otherwise not patronize it.

Consumers' Desiderata

Because merchant demands are largely derived from consumer demands, it is particularly important to understand what consumers want from a payment service and whether they are likely to adopt mobile payment solutions.⁴ The research literature has identified several factors that influence consumer demand for mobile payments. In their survey of American consumers, Dewan and Chen (2005) interpreted the results as suggesting "that consumers realize the potential benefits (e.g. improved transaction speed and convenience) of mPayment, but at the same time, consumers are expressing grave security and privacy concerns."⁵ Based on their survey of New Zealanders, Viehland and Leong (2007) found that convenience was a key reason for consumers to choose mobile payments, while being less convenient than cash, and concerns about security—particularly confidentiality—were prominent barriers to adoption.⁶ In addition, the authors found that an aversion to paying service fees was the single reason most often stated for not using mobile payments.⁷ In a more recent study, Andreev et al. (2011) found "empirical evidence that trust, willingness to transact, and perceived ease of use are key factors in explaining [a] consumer's willingness to make an m-payment, with trust having the largest explanatory power."⁸

It is useful to examine several different dimensions of consumer preferences in turn.

Convenience and ease of use. It seems to be intuitively clear that consumers want mobile payments to be quick, easy, and not require a lot of knowledge specific to a particular payment service. However, Andreev et al. (2011, p. 122) found that while causation exists between perceived ease of use and willingness to make an m-payment, the association is relatively weak. This illustrates that perceived ease of use of the technology is not a key determinant of consumers' willingness to make an m-payment using a smartphone.

Similarly, Schierz et al. (2010) found that perceived ease of use was much less important for intention to use than was "perceived compatibility," where perceived compatibility was measured by the answers to questions regarding whether the respondent agreed that mobile payment services fit well with his or her lifestyle and the way in which he or she likes to purchase products and services.⁹

Ubiquity. Consumers generally want a payment instrument that they can use to make payments at their preferred merchants. Hence, all else equal, the greater the number and variety of merchants accepting a given payment service, the more attractive one would expect that service to be to consumers. Although he is careful not to assert that he has established causation, in his empirical study of credit card usage, Marc Rysman (2007) found that a consumer's choice of card network as his or her favorite is positively correlated with the degree of local merchant acceptance of that network, which suggests a positive feedback loop between merchant card acceptance and consumer card usage.¹⁰

Security and privacy. As noted above, studies have found that consumers are reluctant to use payment services that they do not trust. Similarly, Mallat (2007) found that consumers were more willing to transact with trustworthy parties.¹¹ Security and privacy are two critical elements of trust.¹²

Credit. At the start of 2012, American consumers had approximately \$800 billion of revolving-credit debt.¹³ Manifestly, many American consumers desire the provision of credit by some—although by no means all—payment services.

Rewards. Many consumers are more willing to use a payment service if they are paid to do so.¹⁴ Indeed, regulators in several nations (most notably, Australia) have expressed concern that credit-card rewards programs have led to consumers' using credit cards to a greater extent than is efficient. The use of rewards programs to motivate consumer use of mobile payment services may be a particularly important factor if it turns out that these services do not offer significant additional value for consumers but do generate significant benefits for merchants or for payment service providers in some other way (e.g., the monetization of the information they collect about consumer behavior).

Account management tools: Clearly, consumers desire the ability to monitor their accounts to at least some degree in order to check their balances, review the transactions charged against their accounts, and keep tabs on the finance charges levied on them.

Will Increasing Connectedness Enable Payment Services that Better Satisfy User Desires?

What difference does it make for payment services that consumers are increasingly connected through mobile access devices and social networks? Consider first the effects of pervasive social networking. I, at least, lack the imagination to see social networking having a huge influence on payment services narrowly defined. One could imagine embedding a payment service within a social network to facilitate online shopping or to transfer money among friends, but this strikes me as being a modest extension of the scope of existing services rather than a breakthrough new service.

Turning to connectedness through mobile access devices, the widespread adoption of smartphones and wireless tablets gives rise to several capabilities, including:¹⁵

- Consumers almost always have the ability to establish two-way communication links with merchants and/or payment networks.
- Consumers almost always have memory and processing power easily accessible to them.
- Consumers almost always have sensors with them, which may detect and report information such as location and temperature, or capture video images.¹⁶

In order to predict whether these capabilities will enable successful new payment services, one must examine if and how these capabilities enhance the ability of payment services to offer value to consumers and merchants.

Merchant Perspective

As discussed above, merchants will value payment services that make use of increasing consumer connectedness if those services either lower merchants' costs of completing existing transactions or attract additional consumer patronage.

Mobile payment services might lower merchants' costs by charging lower fees than current services. In theory, lower fees could arise because: (a) mobile infrastructure is less costly than existing infrastructure, which seems unlikely in practice; (b) other features of mobile payments facilitate new entry, which leads to increased competition in the provision of payment services; or (c) mobile payments services have other revenue streams (e.g., the sale of consumer information), which create incentives to charge lower prices to merchants and consumers in order to generate additional use. Mobile payment services might also lower merchants' costs in other ways, such as reducing the length of time it takes a consumer to check out

of a store or restaurant.¹⁷ For example, Starbucks offers a mobile app to its customers that draws funds from Starbucks prepaid loyalty-card accounts and generates two-dimensional barcodes that customers can use to pay for purchases by having the codes scanned at the point of sale. The president of Starbucks' U.S. operations stated that a primary benefit of the application is the ability to speed up the checkout process.¹⁸

In terms of attracting additional customers, mobile payment services clearly are valuable to merchants that rely on online shopping channels; many consumers do online commerce via smartphones and, especially, tablets. Mobile payment services will also be valuable to merchants if there are other reasons that consumers value using mobile payment services even when not engaging in online shopping.

Consumer Perspective

So why would a consumer want to use a mobile phone or other wireless access device to pay for something? Consider how the new capabilities identified above affect the ability to satisfy the consumer wants identified above:

Ubiquity. At least initially, mobile payment services might serve as complements to traditional payment services by extending the reach of their merchant acceptance networks. E-commerce transactions require Internet access. Many people's first choice for an Internet connection is their phone or tablet. This is especially likely to be true for consumers purchasing apps or content for their phones or who are traveling, but it is also true for many consumers ordering tangible goods online from home, such as when watching television in their living rooms.

Convenience and Ease of Use. Eventually, people may stop carrying wallets to hold cash and various identification cards, such as drivers' licenses and insurance cards. If all of this information were stored in a smartphone, then storing payment-service information there, too, would be a benefit. But in the short run, people will continue to carry traditional wallets. This fact raises the questions: How hard is it to swipe a traditional credit or debit card, and why is it better to swipe a smartphone than swipe a traditional wallet with a contactless smart card in it?

The only advantage I can see is the following. If you are one of those annoying people who talks on your mobile phone when you should be handing your credit card to the cashier, now the cashier can simply grab your phone, swipe it, and send you on your way. In other words, I don't see much of a benefit from swiping a phone instead of swiping a card. But then again, I am the sort of person who would rather talk to my dinner companion than spend my time in the restaurant checking in on Facebook to tell people I am having dinner.

There are services that go beyond being a smarter smart card and eliminate the need for even contactless swiping. For example, Square has a service that does not require the consumer to touch his or her phone or a payment card in order to be billed.¹⁹ Such services are manifestly more convenient, but they raise issues

of consumer trust. One can imagine it taking a long time for consumers to adopt this payment method anywhere other than merchants at which they shop regularly (e.g., to get their morning coffee or quick-service lunch).

Security and Privacy. Consumers might be induced to use a mobile payment service if they thought it were more secure and/or offered greater privacy protections than other payment options. Existing studies, however, indicate that many consumers hold the opposite view. For example, Dewan and Chen (2005) found that over half of the consumers responding to their survey felt that mobile payment systems were either “not secure” or “not secure at all,” while just under half felt these systems posed either a “high risk” or “very high risk” to privacy.²⁰ The biggest concerns regarding security were whether the transactions would be properly authenticated and whether the data exchanged during the transactions would be available to unintended users.²¹ In terms of privacy concerns, Dewan and Chen (2005) found that almost half of the consumers responding to their survey expressed concern about mobile payment companies’ collecting too much personal information; over a quarter of respondents were concerned that personal information in the companies’ databases would be used for purposes consumers had not authorized; and over a quarter of respondents were concerned that their personal information in the companies’ databases was not protected.²² The consumers surveyed expressed much less concern about errors in the information contained in the databases.²³ More recently, a consumer survey conducted in late 2011 found that the vast majority of consumers considered their personal computers to be more secure means of online shopping than their mobile phones or tablets.²⁴

Will technological developments make mobile payments more secure? Some observers credit mobile payment services with having authentication based on devices (i.e., mobile phones) that are identified with particular individuals. But existing payment cards already possess this property. One might argue that mobile access devices are superior to payment cards as authentication tokens because the former can provide biometric authentication capabilities. However, those capabilities could more reliably be delivered by merchant-controlled POS devices that could check a consumer’s claimed identity against a network database of biometric information.²⁵

Although personal devices and biometrics do not distinguish mobile payment systems, consumers’ having the ability to establish two-way communication links with merchants and/or payment networks does. Specifically, an always-connected buyer can direct payment to a merchant via communication with a payment network, without relying on the merchant’s facilities.²⁶ This means that a consumer could communicate solely with a trusted partner when dealing with potentially untrustworthy merchants. This makes the system much safer in terms of certain types of merchant fraud, such as card skimming. In addition, an always-connected consumer can be provided real-time fraud alerts and as well as the ability to engage in real-time tracking of transactions. For example, with Pay with Square, a consumer gets a notification on his or her mobile device confirming the payment.²⁷

Mobile systems also have vulnerabilities. Overall, the use of wireless might well be expected to weaken security because there are more points of vulnerability (e.g., the radio network) at which to hack a smartphone-based system than a smart-card-based one. Moreover, through the use of malicious code downloaded through apps or web browsing, a smartphone can be compromised without the attacker having to attain physical proximity.

New payment services, mobile or otherwise, may have to make tradeoffs between ease of use and privacy. For example, in a message to merchants, Square states:²⁸

After a customer elects to receive a receipt via email or text message, our system links the entered email address or phone number to their payment card. This way, the next time they pay with Square their information automatically populates, making the process much faster.

Because of this feature, if you happen to enter your own information for your customers' receipts, you'll receive their receipts any time they pay another Square user with the same card.

Although this process may be convenient, one cannot say that it provides state-of-the-art privacy.

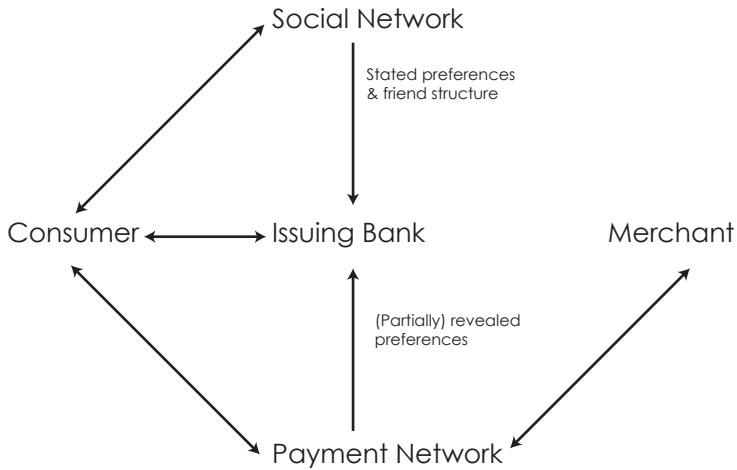
This example brings up a broader point. American consumers have a history of saying that they care deeply about privacy and security (especially with respect to new technologies) but then acting as if they care little. To the extent that mobile payments services are less trustworthy, consumers ultimately may not be troubled. And there may turn out to be limited demand for the additional security features that mobile payments systems can provide. For example, an e-commerce solution in which people handle payment transactions on a web page that is not accessed through the merchant's web page would be easy to create, yet to my knowledge consumers typically get to services such as those offered by PayPal by being redirected by the merchant's web site, and many customers are very comfortable with the security of those services.

Credit. Mobile payment services and social networks generate information on a consumer's context and transaction histories. Figure 1 presents a schematic view of important potential information flows.²⁹ As illustrated by the figure, this information could serve as additional input into credit scoring models (for example, if other members of your social network have poor credit histories, then you might receive a lower credit score than otherwise).

Rewards: As also illustrated by Figure 1, the information collected by mobile payment networks and social networks could be used to improve payment-service rewards programs, such as airline mileage points offered for credit card use. Although card issuers collect considerable information about consumer transactions, to my knowledge no issuer today offers real-time, context-sensitive rewards.

Figure 1

Using Additional Information to Improve Credit Offers and Rewards Offerings



Consumer connectedness could change that. Sophisticated, real-time, context-sensitive payment-service rewards programs are enabled by the presence of consumer mobile access devices with form factors that allow the display of graphics. I will say more on this point when discussing the broader uses of consumer information in Section II below.

Account management and customer service: One drawback (at least from the consumer's perspective) of many if not most stored-value cards in use today is that they are not readily auditable by the user. In principle, a smartphone-based stored value card could also store a transaction history that was easily reviewable by the consumer. In addition, such a card could take advantage of consumer connectiveness to allow remote recharging. More broadly, real-time communication with relevant financial institutions enables the provision of more sophisticated and up-to-date account management services, such as checking a credit account balance while in a store considering a purchase.

In summary, the analysis of this section suggests that the changes in pure payment services due to pervasive mobile connectivity and social networking will be evolutionary, not revolutionary. Pervasive mobile connectivity and social networking will facilitate payment service features that offer additional value to consumers and merchants. In many respects, however, mobile payments primarily will be an extension of various existing e-commerce payment options to a new set of Internet access devices. I also think that consumers will want the extension to be linked closely to existing systems. I suspect that many consumers do not want to have to

use one payment instrument for online purchases made using a traditional personal computer and another payment instrument for online purchases made using a smartphone or tablet computer.³⁰

II. IT'S ALL ABOUT THE BENJAMINS, AND THE BENJAMINS ARE ALL ABOUT THE INFORMATION

If pervasive mobile connectivity and social networking are not going to revolutionize payment services, then why are so many people so excited about mobile payments? I believe some are excited because they are mistaken. But others are properly excited by the potential of mobile payment services (and social networks) to generate vast amounts of information about consumer behavior, which can then be sold for tens of billions of dollars annually. Indeed, it may turn out to be a profitable business model for a payment network to pay consumers and merchants to use its service so that the network can collect information that it then sells to advertisers and other businesses.

I Saw What You Did, I Know Who You Are

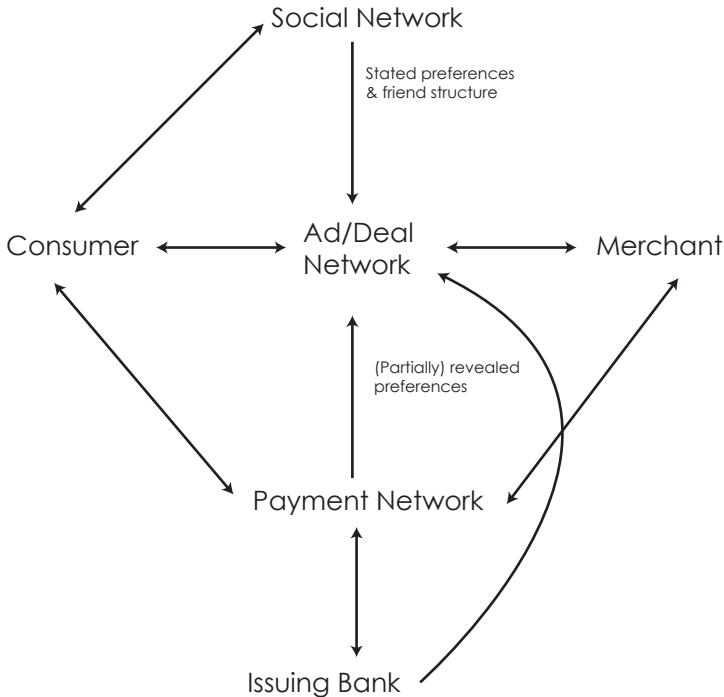
Connected individuals can be identified and tracked. Mobile payment transactions generate valuable information regarding current context and transaction histories.³¹ As others have observed, context can include a wide variety of information, including “the location of the user, surrounding weather, user’s current yearn, social relations with nearby users, bandwidth of the user’s mobile device, screen size of the mobile device.”³² Transaction histories may themselves include the contexts in which payment transactions were made and, potentially, even information about situations in which consumers shopped but did not complete purchases. In addition, consumers’ participation in social networks can allow the identification of an individual’s revealed preferences (e.g., what commercial postings he or she clicks on), stated preferences (e.g., what approval or “like” buttons he or she clicks on and what recommendations he or she makes to others), demographic characteristics, sources of influence, and influencer value.

It is important to note that Figure 2 identifies different conceptually distinct functional roles. In practice, a single enterprise might serve as the social network, ad/deal network, and payment network.

The information collected through mobile payments and social-network based payments could be valuable in multiple uses. As discussed above, some uses are directly rated to payment services, particularly the offering of consumer credit. But the far greater value will come from uses outside of the traditional payments sector. Once connected individuals have been identified and tracked, and their behavior analyzed, they can be sent personalized, context-specific communications from merchants as part of broader relationship-management strategies.

The context on which the communications are customized can include elements of the consumer’s current status (e.g., whether he or she is near a

Figure 2
The Art of the Deal



particular coffee retailer, the time of day, and evidence whether he or she has recently purchased coffee) and also certain aspects of the merchant's current status (e.g., whether the restaurant is crowded or empty, or whether the retailer has an excess stock of certain products). In terms of relationship management, sales histories can play a large role and can allow a merchant to reward its "loyal" customers with special deals.³³ A merchant could even offer social loyalty programs, whereby the deals offered to a set of consumers are related to the consumers' collective actions.³⁴

Consumers' current contexts and transaction histories could, in theory, be used to: (a) support programs of personalized pricing and customized offers or deals; (b) improve the targeting of advertising (including direct mail, robo-calls, and various forms of online ads); and (c) improve the quality of Internet search. For example, Facebook allows advertisers to target their audience with reference to users' location, language, education, work, age, sex, birthday, relationship status, likes and interests, whether they are fans of the advertiser's Facebook page, and whether they are friends of fans of the advertiser's Facebook page.³⁵ Moreover, if it could be aggregated, the information from social networks combined with that from payment networks could create powerful measures of a consumer's influence on other consumers, and many

businesses are willing to pay to identify major influencers.

Searching Near or Far for a Value Proposition

As were several earlier years, 2012 is supposed to be the year general-purpose payment products based on NFC take off. I am doubtful.³⁶ This doubtfulness springs from the fact that other wireless technologies, such as Wi-Fi and traditional cellular networks, offer a broader range of possibilities and greater potential for value creation.

NFC can provide some incremental benefits in the form of added convenience and functionality at checkout. For example, some consumers would very likely prefer to waive their phones in the air rather than swipe their payment cards in a traditional reader, and NFC could support additional promotional activity at checkout, similar to existing instant coupons generated at checkout. Hence, NFC may make sense for the established payment networks, such as MasterCard and Visa, because it provides their users one more option and may be a particularly useful alternative for merchants with high volumes of low-value transactions.

The really exciting possibilities, however, come from communication between the consumer and merchant *before* the consumer gets to the checkout line.³⁷ The widespread adoption of smartphones and other mobile devices with increasing capabilities is making possible new services and products that will revolutionize the interactions between consumers and merchants.

The potential for mobile communications between a merchant and a consumer not next to the POS transaction-capture device (what might be termed “far field communication”) has long been recognized. One example is a service known as SmartRestaurant, which was tested over eight years ago. This service allowed a customer to use his or her mobile access device to view a menu, place an order, pay for the order, and set a pick-up time.³⁸ In comparison with in-establishment ordering, the consumer benefited from being able to order and pay from a convenient location and then go through a much quicker pick-up process. The merchant benefited from having additional time to plan and adjust food preparation.³⁹

One aspect of the service that was critical to enabling these consumer and merchant benefits was that the service made use of communication *before* the consumer reached the checkout counter. Indeed, the consumer and merchant communicated with one another before the consumer was even at the merchant’s site. Of course, people have been faxing lunch orders for many years. And now, people can submit orders using a fixed-line Internet or mobile connection. In that respect, these are evolutionary changes.

With the rise of location-aware devices, the possibilities for communication between merchants and nearby consumers become far greater and the nature of the communication can fundamentally change. For instance, several vendors are making use of geo-fencing technologies, whereby a potential customer is sent promotional messages if he or she comes in proximity to a designated retail outlet.⁴⁰

In October 2010, for example, Starbucks teamed with the wireless network operator O2 to offer a geo-fencing program promoting Starbucks' Via instant coffee. When a participating consumer was sufficiently near a Starbucks store or a grocery store that sold Via, a discount coupon was issued via SMS.⁴¹ More generally, the message sent to a consumer as part of a geo-fencing program can contain: special pricing; information about the retail location's address, contact information, and operating hours; and information about the availability of specific products.⁴²

The Pay with Square service described above also relies on geo-fencing, in this case 100-meter geo-fences based on Wi-Fi.⁴³ The geo-fencing allows the consumer to "set up Square to automatically open your tab when you walk in the door" of a merchant.⁴⁴ According to Square, there is no need for the consumer to touch his or her phone or wallet.⁴⁵

One could easily imagine other micro-fencing applications along these lines. For instance, a consumer might visit a bricks-and-mortar retailer, pick up the desired items, and then simply walk out of the store. RFID tags on the items, coupled with identification of the consumer's mobile access device, could be used to generate an automatic charge to the relevant payment account. Clearly many other opportunities for innovative new services exist.

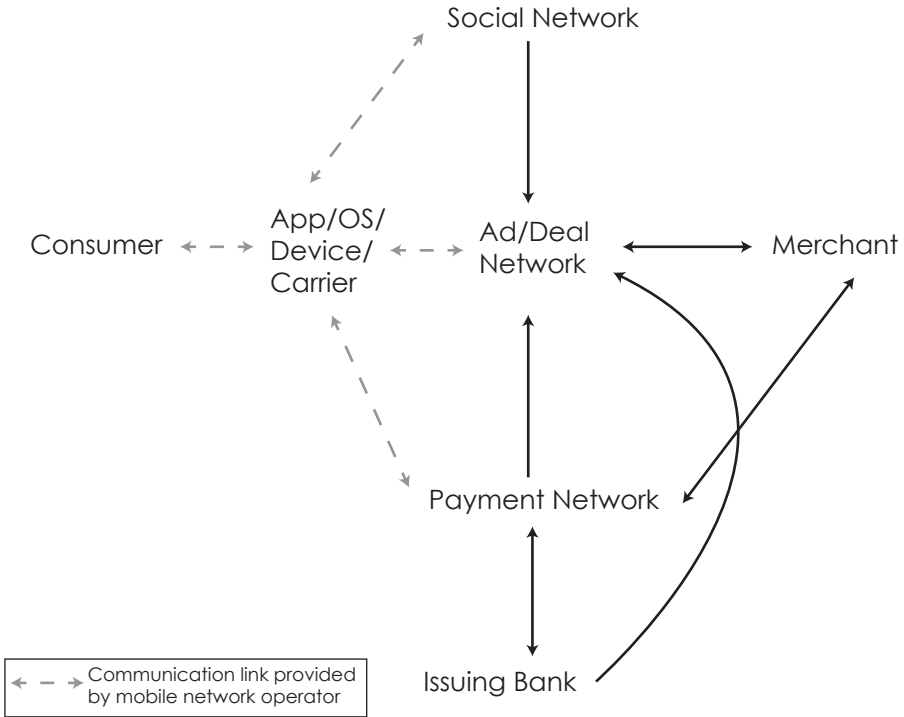
Who will Control Consumer Information?

If information is where all the money will be, then intense battles to own and control access to that information can be expected. Figure 3 illustrates the information channels that may be wireless, and it provides a finer breakdown than does Figure 2. As Figure 3 illustrates, potentially one or more of the following groups might control important pieces of consumer information: wireless carriers, mobile access device manufacturers, mobile OS developers, app developers, consumer banks, and payment networks. Consequently, there may be struggles for control that cut across the telecommunications, financial services, and web services sectors. There may also be struggles within each sector. For example, app developers, mobile access device OEMS, mobile OS providers, and wireless carriers all may lay claim to consumer information related to mobile payments.

Within the financial sector, MasterCard and Visa may have disagreements with card-issuing banks with respect to who has the rights to use transaction information. At least for now, both Visa and its issuing banks appear to be able to use the information:⁴⁶

Gap and Visa began a pilot of a real-time text message system in November [2010]. Customers enrolled via a secure website and were sent Gap offers when they used their Visa cards to complete transactions that met certain criteria—for example, they may have had to buy something at a store in a specified ZIP code, or shop during a certain time period. Once the offers appeared on their phones, the customers took advantage of

**Figure 3
Who Will Control Consumer Information?**



them by showing the text messages to Gap sales clerks.

This pilot is notable because it is my understanding that this relationship between Visa, Gap, and consumers was not mediated by either a card-issuing bank or a merchant-acquiring one.⁴⁷

One could even imagine consumers controlling their own information. For example, a consumer might have a low-cost app that allowed him or her to control who had access to his or her personal information, with the possibility of demanding compensation for the right to use this information. Here, pervasive social network poses some interesting difficulties. Would your friends be allowed to sell or give away what they know about you even if you refused to provide the information yourself? In any event, I believe that it is implausible that American consumers will go to the trouble of managing their information to this degree unless it is made very easy to do so.

“Ownership” of “the” customer relationship is often seen as critical point of strategic control in economic ecosystems and might be seen as a way to control

access to consumer information. However, there may be multiple customer relationships that come into play simultaneously in the area of mobile payments. A consumer may perceive herself as having one relationship with a mobile carrier, another with a mobile access device OEM, and a third relationship with a financial institution. Moreover, depending on public policy and private contracts, a firm might have access to a consumer's information even if that consumer does not perceive herself as having a meaningful commercial relationship.

Regulation, Regulation, Regulation

Legal and regulatory decisions regarding privacy and antitrust will very likely be critical determinants of who controls consumer information. For instance, as discussed below, the only way that I can see mobile network operators' being able to capture a large part of the value created by mobile payments services is if they could successfully limit the set of access devices operating on their mobile networks and the applications that run on those devices (i.e., if wireless carriers could control who offered mobile payment services over their networks). Hence, telecommunications-specific and economywide antitrust regulation will play important roles in shaping industry evolution.

The public-policy treatment of privacy and information ownership are likely to play very significant roles in the *creation*, as well as capture, of value from new services based on payment products enable by pervasive connectedness.⁴⁸ For example, a study of European privacy regulation found that it substantially reduced the effectiveness of targeted advertising.⁴⁹

The convergence of three economic sectors is also going to involve the convergence (or collision) of three or more regulatory regimes. For example, telecommunications carriers and financial institutions are subject to distinct, sector-specific privacy regulation and antitrust enforcement regimes. And web services companies have been drawing attention from the FTC. Thus, the use of information about a consumer's mobile payment transactions could be subject to oversight from three or more different agencies.

In addition to creating the potential for regulatory conflict, the presence of multiple regimes may lead to consumer confusion. Consider, for example, direct carrier billing, which allows a consumer to make a purchase (e.g., buy a smart-phone app) and have the charges posted on his or her wireless service billing account. According to ConsumerReports.org,⁵⁰

Federal law currently offers protection to consumers in the event that their credit card or debit card is lost, stolen or misused... If mobile payment transactions are linked to credit cards or debit cards, then consumers are entitled to the same guaranteed federal protections that apply when a credit card or debit card is used directly in a transaction.

Mobile charges linked to other forms of payment don't enjoy any of these legal protections. If the mobile payment charge appears on

the customer's cell phone bill, the product might escape consumer protections entirely unless the contract provides them.

Given how few consumers read contracts, it would seem unlikely that consumers know the extent of their protections with direct carrier billing.

Although industry members often are adverse to regulation, it should be noted that certain forms of regulation may make an important contribution to the success of mobile payments. In their recent study of consumers, Andreev et al. (2011, p. 123) found

conclusive evidence of the association between trust and consumer's willingness to make an m-payment using a smartphone. By exploring trust in detail, our analysis illustrates that consumer's (sic) perceptions of legal frameworks and the regulation of these frameworks are integral parts of trust.

In addition to refusing to adopt mobile payments, consumers may engage in self-help to deal with privacy concerns by providing only limited or false information about themselves.⁵¹ From the industry's perspective, regulation may be preferable to any of these outcomes.

III. GETTING FROM HERE TO THERE

It sometimes seems that each year begins with the prediction that it will be the year mobile payment services take off (with or without NFC) and ends with the prediction that the next year will be the one in which the takeoff will occur. If mobile payments services are so great, what is holding them back? One possibility is that, even when one accounts for the value of the information generated by mobile payment services, the benefits are always going to be less than the costs. I think the more likely answer is that, although the benefits outweigh the costs in the long term, there are difficult start-up issues that must be overcome to realize the potential benefits.⁵²

On the merchant side, Mallat and Tuunainen (2008, p. 24) found that "the barriers to adoption include complexity of the systems, unfavorable revenue sharing models, lack of critical mass, and lack of standardization." On the consumer side, Mallat (2007, § 5.6) found that the lack of widespread adoption by merchants was a deterrent to adoption by consumers. And, as discussed in Section II above, Dewan and Chen (2005), Viehland and Leong (2007), and Andreev et al. (2011), among others, found that consumer concerns about security and privacy were significant obstacles.

Consumer Trust

Consumers' security and privacy concerns have been identified as barriers to the adoption of mobile payments. However, as noted above, American consumers have a history of saying that they care more deeply about privacy and security than

their actual behavior suggests. I believe that people will continue to express concern about security and privacy but in the long run they will act as if they are unconcerned. In the short run, however, the lack of trust in mobile payment systems can be an impediment to adoption.

One solution is to have mobile payments offered by established firms that have already have good reputations and are trusted by consumers. In their survey of consumers, Andreev et al. (2011, p. 117) found “that respondents considered using a secure and trusted third-party payment company as the preferred method of making an m-payment for products/services.” Similarly, Mallat (2007, p. 424) concluded that focus group participants were “more willing to conduct payments with trustworthy transaction parties and regarded established banks, credit card companies, and telecom operators as reliable mobile payment service providers. Banks were slightly preferred to other providers.”

Network Effects and the Chicken-and-Egg Problem

Network effects arise when, the greater the number of users on a system, the more valuable the system is to an individual user.⁵³ Network effects are prevalent in payment services. An increase in the number of consumers making use of a given payment service will—if the costs are not too high relative to the benefits—make acceptance of that payment service more attractive to merchants. And, all else equal, a consumer will more highly value a payment service the more extensive is the merchant acceptance network for that payment instrument. These positive relationships between the number of one type of payment-service user and the other are examples of what economists refer to as cross-platform network effects because they involve two different groups of platform users each of which values the presence of members of the other group.⁵⁴ Although the most obvious network effects are those associated with merchants and consumers, there are also cross-platform network effects in the supply of complementary products, such as smartphones and merchant POS devices that can communicate with one another.⁵⁵

An important implication of network effects is that a payment network can suffer from a “chicken-and-egg problem.” In short, a chicken-and-egg problem arises when no one wants to belong to a network unless lots of other parties belong to the network first. Specifically, a merchant will not want to bear the expenses of changing its checkout process to accommodate a new payment service if there are few consumers who would potentially use that service. Similarly, a consumer will not want to sign up for the payment service if there are few merchants who accept it. Of course, if everyone waits for lots of other parties to join the service, then the service will never get off of the ground.

There are several potential solutions to the chicken-and-egg problem. One is to begin with smaller groups that have strong cross-platform network effects among themselves. One of the most successful examples of mobile payments to date is the mobile app version of Starbucks prepaid store cards. The CEO of the developer of the Starbucks application attributed this success to “factors like Star-

bucks' complete control over the point of sale, the use of a closed-loop system, and smartphone-toting customers who are loyal and often make daily visits to the brand."⁵⁶ In addition, approximately 20-percent of Starbucks customers' in-store purchases were made using Starbucks' loyalty card before the app was launched.⁵⁷

Another approach is to adopt pricing strategies that make joining a service attractive even if, at present, it offers relatively few benefits. One such strategy is penetration pricing, whereby prices are initially set at low (possibly below-cost) levels in order to attract users to the service. As the service becomes established, prices can be increased. A variant of across-the-board penetration pricing is to offer special deals solely to key early adopters. Specific parties may be particularly important early adopters for at least three reasons. Early adopters can: create valuable positive network effects (e.g., a popular merchant will attract buyers to the payment service); help the network achieve an efficient scale of operation; and, in some cases, add credibility.

A payment service could also offer users subsidies to cover fixed costs of participation. For example, a merchant typically has to incur fixed costs (e.g., the costs of modifying online shopping cart software) to participate in a payment service. If the merchant later determines that it is undesirable to participate in the service, then these costs will be lost. Hence, these costs represent a risk of participating and create an incentive to wait until other parties have joined a new service and shown it to be viable. Development subsidies are one way to reduce the risks of membership and thus lessen the chicken-and-egg problem. Offering free applications to consumers has a similar effect.

In market with strong network effects, the degree to which different services are interoperable, or compatible, can also affect adoption decisions, as well as industry performance generally. Compatibility can reduce costs by allowing different service providers to share some elements of infrastructure (e.g., POS transaction-capture devices). Users may also be more likely to adopt new payment services because there is less threat of lock-in or stranding when a given piece of user equipment (e.g., a smartphone) can operate with multiple services. Hence, the chicken-and-egg problem is less severe.

But compatibility can also reduce or eliminate network size as a source of competitive advantage. Consequently, firms that have large installed bases—or firms that users generally *expect* to be particularly successful under incompatibility—may oppose compatibility.⁵⁸ Moreover, particular standards may favor some service providers over others. Hence, it is not a foregone conclusion that widespread standards will be adopted and compatibility achieved simply because network effects are present.

That said, I believe there will be standardization of merchants' POS transaction-capture devices. Merchants will likely exhibit very strong preferences for compatible POS transaction-capture devices, as we have today with different credit, charge, and

debit card readers. Most merchants have limited space at checkout, and what space they do have could better be used to display products rather than house multiple payment terminals.⁵⁹ Because the demand for compatibility among POS transaction-capture devices will be so strong, I expect that the most widely adopted devices will work with multiple payment services and will drive consumer mobile access devices to have similarly standardized interfaces. Although these devices will be standardized, there will still be significant opportunities for the payment services making use of these devices to differentiate themselves from one another.⁶⁰

In addition to issues regarding standardization across competing mobile payment services, there are also issues regarding standardization across mobile payment services and existing payment services. Compatibility with existing services can reduce the chicken-and-egg problem for new services. These considerations arise with respect to NFC. Here, the desires of at least some parties to maintain compatibility are evident:⁶¹

Visa has played a leadership role in establishing global standards for mobile payments, making sure that they are aligned with existing technology and security standards for chip payment cards and can easily be integrated into the existing payments ecosystem. For example: Visa pay-Wave on mobile devices is compatible with existing contactless (NFC) payment terminals already installed at retail outlets worldwide, enabling Visa account holders to simply wave their enabled phone in front of a payment terminal in order to pay.

Compatibility with existing systems is also valuable because, even if most consumers rely on their mobile phones to serve as smart cards, merchants will still have to deal with non-phone-enabled consumers for a significant period of time. Thus, compatibility will allow merchants avoid the costs of having to operate two systems simultaneously.

The chicken-and-egg problem faced by payment services is not limited to consumers and merchants. These effects also apply to financial institutions and other potential complementors, such as mobile access device OEMs which must choose whether to install special features such as NFC chips on their devices. One solution to the complementor version of the chicken-and-egg problem is for the payment service either to subsidize the production of the complements or to purchase them on behalf of users.

Several years ago, Wells Fargo tested a service that allowed users to make payments using a phone rather than a bankcard. Wells Fargo chose not to offer the service to its customers, in part because there was only one handset that could be used to offer the service.⁶² Even today, most smartphones do not have built-in capabilities to communicate with merchant POS devices. Recently, however, Wells and other potential payment providers have experimented with microSD cards that can add these capabilities to existing phones,⁶³ and DeviceFidelity and Spring Card

Systems announced a microSD card that can be inserted into an Android phone and used to make payments over MasterCard's PayPass NFC system.⁶⁴ These developments highlight the need for complementary investments at various points in the value net. They also illustrate how some parties may be able to internalize complementary effects by offering the complementary products to their customers rather than waiting for independent suppliers to offer them directly to users.

IV. WHO WILL DO WHAT?

Having discussed many of the forces that will shape competition, I next examine what roles will be played by the various payments industry participants, including banks, wireless telecommunications service providers, financial institutions, traditional card payment networks, and web services companies.

Don't Get Carried Away with Carriers

Wireless carriers will unquestionably provide important communication links that will enable both mobile payment services and mobile advertising-and-deal services. Figure 3 above illustrates the fact that wireless carriers will provide communication links between consumers and payment networks, deal-and-advertising networks, social networks, and—directly or indirectly—merchants. Despite the importance of these links, it does not follow that wireless carriers will be successful in capturing the value created by these services.

Indeed, there is a wide variety of opinions regarding whether wireless network operators are likely to succeed in capturing value, ranging from extreme optimism:⁶⁵

There is a game-changing opportunity here for the operators to effectively displace credit cards and banks.

to strong pessimism:⁶⁶

Operators will continue to attempt to insinuate themselves into the process at a premium rather than simply accepting their long-term fate of being minimum-margin bit pipes for the masses.

Other commentators fall in the middle, seeing mobile network operators as playing critical roles but doing so by partnering with financial institutions rather than displacing them.⁶⁷

In my opinion, the pessimistic view is very likely the correct one: telecommunications providers will neither significantly shape the evolution of general purpose payments in the United States nor will they capture significant value. Instead, they will provide essential but undifferentiated infrastructure.⁶⁸ The term “undifferentiated” is critical here. It will prevent almost all access device OEMs and telecommunications carriers from having powerful positions within the mobile payments value net (the one exception may be Apple). There is little or no need to have wireless network operators involved in planning payment services, and there is relatively little benefit to other parties from forming alliances with mobile

network operators except in their roles as distributors of mobile access devices.⁶⁹ In addition, wireless carriers and access device manufacturers generally lack strong business relationships with merchants.

Mobile network operators do not want to be commoditized, “dumb pipes.” But to avoid this fate, network operators have to provide something that cannot better be provided at the edge (either for technological reasons or because network operators have locked out rivals).

Experience with fixed-line access to the Internet does not bode well for mobile network operators and access device OEMs. Personal computer manufacturers, operating system developers, and Internet service providers play no role in online payments today beyond providing generic infrastructure over which online payment applications run. And there is no reason to expect that situation to change. I don’t know of anyone who expects fixed-line broadband Internet service providers to dominate online payments. Why should one expect mobile broadband providers be any different?

There are a few possible reasons. For one, mobile broadband service providers in the United States have been able to keep much greater control over how their services are used than have fixed-line providers. For example, wireless carriers can limit the set of devices used to access their networks and have some degree of control over the applications that run on those devices. But blocking competing payments services would be very difficult.

It would be relatively easy to work around bottlenecks in mobile access devices that took the form of proprietary chips or capabilities. Even if there were proprietary NFC chips installed in smartphones by OEMs or carriers, there are add-on chips and software solutions that can be utilized instead. And, of course, Wi-Fi and cellular-based systems need not rely on NFC at all. In order to keep competing payment services from reaching its customers, a mobile network operator would have to rely on more actions specifically designed and targeted to block those applications. I question whether excluding mobile payment applications in that way is a feasible long-term strategy either commercially or politically.

The two earlier discussions of the Starbucks app and banks’ use of microSD cards to run an over-the-top payment application illustrate some of the difficulties that mobile network operators and access device OEMs face. There is no need for wireless carriers, wireless OS providers, or mobile access device manufacturers to provide any features or functions specifically tailored to the Starbucks app. Although banks consider microSD cards to be a transition technology,⁷⁰ these cards demonstrate the existence of a simple work-around of any device manufacturer and carrier that attempted to go a different route (as long as the devices had non-proprietary expansion slots; once again, Apple may be different than the rest of the industry).

The other way to avoid becoming “dumb pipes” is for mobile networks to provide something that is cannot—or at least is not today—better provided at the

edge. For example, network operators may be able to provide some information that, although edge devices could provide, many do not. Locaid Technologies Inc., and Placecast offer geo-fencing services that use mobile network information to determine a subscriber's location.⁷¹ Consequently, these services are available to consumers who do not have GPS-enabled phones. Although this approach may be valuable in the short run, it seems likely that, in the long run, a very high percentage of mobile access devices will be location aware, whether by using GPS, triangulation based on Wi-Fi networks, or some other means. Moreover, in the long run, those devices that are not location-aware may be feature phones that lack the ability to provide rich graphics and, hence, will rely on SMS messages that are much less powerful marketing tools than those that can be provided to smartphone and mobile tablet users. I am unaware of any other services or features relevant to payment systems that can be offered by the core of mobile networks but not edge devices.

There may be certain niches (albeit multibillion-dollar niches) in which mobile network operators play deeper roles. For example, carrier-based billing is convenient for purchasing apps, ringtones, and similar digital goods for use on mobile devices. And SMS-based and carrier-based-billing solutions might have a place for low-value, spontaneous transactions (e.g., to pay for online voting related to a television broadcast). For mainstream mobile payments, however, mobile network operators' roles are likely to be limited.

Similar considerations arise with respect to mobile operating system providers and access device OEMs. Although, in at least some instances, these parties may be more differentiated along other dimensions, they still will serve as relatively undifferentiated infrastructure for over-the-top payment services unless they are able actively to lock out such competitors. With the possible exception of Apple, such a strategy seems infeasible for access device manufacturers given the high degree of competition they face. And such a strategy seems unlikely for Microsoft and RIM given their weak market positions, and Android given its open strategy.

Give Banks Credit

My analysis suggests that the roles of financial institutions play in payment systems will not change very much as the result of increasing consumer connectedness. There are two dimensions to this prediction: (a) banks will not branch out to play significant new roles; and (b) other types of institutions will not displace banks as sources of credit and stores of wealth.

My basis for prediction (a) is twofold. First, with the exception of the bank controlled by American Express, few if any banks have a broad enough customer bases to attract merchants to a proprietary network based on a single bank's consumer customers. Second, I expect banks to be able successfully and profitably to extend their traditional roles of providing credit and serving as stores of wealth to mobile payments by partnering with other parties that are better positioned to

develop merchant networks and the other aspects of new payment systems.

Given the existence of various regulatory constraints, prediction (b) might almost be true by definition: enterprises taking over banks' roles will have to become banks themselves. The more interesting version of this prediction is that mobile payments will not allow significant entry of new firms as suppliers of credit, at least in the short run.

This prediction is based on the fact that issuing credit is hard work. Just ask AT&T or American Express. AT&T believed that the core competence needed to issue credit cards was the ability to process large numbers of transactions efficiently and reliably. Given its experience in large-scale, highly complex telephone billing, AT&T thought it had this competence. AT&T entered the card-issuing business and amassed a large portfolio. However, the credit card industry evolved so that a critical—or, perhaps, the critical—skill is the ability to process information to predict what card offers will appeal to consumers and which consumers will be profitable. AT&T lacked this skill and exited the industry by selling its credit card portfolio to Citibank.

American Express also serves as an instructive example of the difficulties of issuing credit cards without experience or an existing customer base. American Express initially had significant difficulties when it first issued a credit (as opposed to charge card). When it began offering its Optima credit card in 1987, American Express dramatically misjudged the market and the risks that it faced.⁷² Consequently, American Express ended up suffering loan losses of hundreds of millions of dollars per year between 1988 and 1994, despite being an experienced charge card issuer and having account histories for millions of charge card holders.⁷³ Since becoming an experienced credit card issuer, American Express has become more successful.

Banks have another competitive advantage in addition to their experience issuing credit. As discussed in Section III above, some researchers have found that consumers place greater trust in established payment companies and banks. This factor speaks well to a continuing, central role for banks and the existing bankcard payment networks.

Lastly, it should be observed that there is a further connection between parts (a) and (b) of this prediction: because banks have an important and profitable role to play as a complementary piece, they do not have large incentives to try to create proprietary systems of their own.

Wither Incumbent Payment Card Networks?

Many people see the developments discussed in this paper as very significant threats to incumbent payment card networks. It is important to recognize that many of these developments also represent opportunities for incumbent networks. These developments extend the reach and increase the utility of the services

offered by these networks. Incumbent payment card networks may be able to take advantage of these opportunities directly. These networks have several competitive advantages including: reputations with consumers for trustworthiness; large merchant acceptance networks; and lots of data, including data generated by nonmobile transactions. For incumbent payment card networks, the biggest question is whether they have the organizational capabilities to innovate successfully to build on their current strengths.

Even if incumbent networks do not take advantage of the opportunities created by pervasive consumer connectedness directly, many of the services offered by companies such as PayPal and Square are built on top of the services of incumbent card networks. That said, there is a risk that some of these complementary service providers may evolve into competitors.

Web-Services Companies

The rise of Internet payments has brought web-services companies such as eBay, Google, and Facebook into the payment arena. Many of these companies are essentially information collection-and-processing companies, with valuable competitive assets that include: massive amounts of consumer data; experience efficiently collecting, storing, and processing that data at scale; high degrees of skill at processing the data to model consumer behavior (e.g., determining for what consumers are looking when submitting Internet search queries).

The role of web-services companies will depend on how a variety of political and regulatory issues shake out (e.g., whether privacy regulations limit their business models), but I expect a few of these firms to be very successful in this area. Companies that sell advertising based on Internet search and social networks can be expected to make effective use of their ability to help merchants target their advertising in ways that pervasive consumer connectedness will enable. I also believe that web-services providers will extend their success to the business of facilitating targeted offers and customized, context-specific pricing.

Will web-services companies be able to use their information as well as their information-collection-and-analysis skills to compete with banks by customizing credit products and conducting superior credit analyses? One issue is whether these companies would be better off selling the information to existing credit card issuers. Another issue is that there is more to life (and success in the payments marketplace) than information processing. As discussed at several points above, at least in the short run trust is a big issue. In my view, at present consumers can be expected to trust several of the largest web-services companies less than they trust their banks and traditional payment card networks.

What about Apple?

At several points in the discussion above, Apple has been singled out as a possible exception to statements made about broad groups of firms. The future role

of Apple is a big question mark for at least two reasons. First, Apple is uniquely positioned in the mobile economic ecosystem. It has by far the most powerful consumer brand, and it is the most vertically integrated of any company. Today, Apple is the most successful mobile access device OEM, one of the two most successful mobile OS developers, a web-services company, one of the most innovative and successful bricks-and-mortar retailers, and an online payment company (albeit one that generally rides on top of existing credit and charge card networks).⁷⁴ And, in 2006, Apple even filed a patent application for a system under which Apple would be a mobile virtual network operator.⁷⁵ Second, Apple has a history of operating closed systems that offer high levels of user convenience coupled with high levels of Apple control.

Apple has been conducting research on various wireless payments solutions and has implemented some of them in its retail outlets (e.g., Apple EasyPay, which allows a consumer to use his or her iPhone's camera to scan an item's barcode and then pay using the credit card associated with the user's iTunes account).⁷⁶ Will Apple be able to use its powerful brand and vertical integration to create a payment system that it dominates? Or will Apple be driven to be more open in this arena because even Apple will need to work with other enterprises (merchants, if no one else), and these enterprises can see how big a share Apple has taken for digital goods to date?

CONCLUSION

I believe that consumers' increasing connectedness via mobile access devices and social networks will lead to evolutionary developments in core payment services but revolutionary changes in services that are built on the information collected through mobile payment services and social networks. I also believe that firms in the telecommunications sector will play a smaller role in payment services than they would like, while traditional payments services providers will play a larger role than many expect. The role of web-services companies will depend on how a variety of political and regulatory issues shake out, but I expect a few of these firms to be very successful in this area. For incumbent payment card networks, the biggest question is whether they have the organizational capabilities to innovate successfully to build on their current strengths of trusted brands and large networks of consumers and merchants. Only time will tell.

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ENDNOTES

¹Throughout, when talking about either fixed or mobile access devices, I will be agnostic as to whether the computing power lies in the access device itself or the cloud.

²As discussed below, the increased understanding of consumer behavior may also have benefits for payment products themselves in terms of improved customization of credit terms and more-effective fraud detection and control.

³Niina Mallat and Virpi Kristiina Tuunainen (2008). “Exploring Merchant Adoption of Mobile Payment Systems: An Empirical Study,” *e-Service Journal* 6(2): 24-57 (hereinafter, Mallat and Tuunainen (2008)) at 24.

⁴For purposes of this paper, it is sufficient to examine the drivers of consumer adoption at a broad level. In practice, consumer payment decisions are typically made at the transaction level, and the choice of payment instrument can vary with consumer characteristics, transaction characteristics, and payment-service characteristics.

⁵Sunil Dewan and Lei-da Chen (2005). “Mobile Payment Adoption in the US: A Cross-Industry, Cross-Platform Solution,” *Journal of Information Privacy and Security*, 1(2): 4-28, available at http://www.sunildewan.com/uploads/mpayment_Journal_of_Information_Privacy_and_Security.pdf; site visited April 23, 2012 (hereinafter, Dewan and Chen (2005)), at 23. Page cites made to this document correspond to the version available at URL above.

⁶Dennis Viehland and Roslyn Siu Yoong Leong (2007). “Acceptance and Use of Mobile Payments,” ACIS 2007 Proceedings, Paper 16, Tables 4 and 5.

⁷*Id.*, Table 5.

⁸Pavel Andreev, Aidan Duane, Philip O’Reilly (2011). “Conceptualizing Consumer Perceptions of Making M-Payments Using Smartphones in Ireland,” in *Researching the Future in Information Systems*, Chiasson, Henfridsson, Karsten, and DeGross (ed.s). Springer: Boston (hereinafter Andreev et al. (2011)) at 122.

⁹The correlation between perceived compatibility and perceived ease of use was only 0.25. (Paul Gerhardt Schierz, Oliver Schilke, and Bernd W. Wirtz (2010). “Understanding consumer acceptance of mobile payment services: An empirical analysis,” *Electronic Commerce Research and Applications*, 9(3): 209-216 at 215. Other authors have also examined the effects of compatibility on adoption. Because of its somewhat amorphous nature, I do not discuss it further in the present paper, except to note two points. First, because consumers’ notions of compatibility can vary by transaction type (e.g., quick service restaurant purchases versus major appliance purchases), these notions can have important effects on the types of transactions for which consumers will use mobile payments. Second, I fully expect the population of users obsessed with their iPhones to find any Apple mobile payment service to be compatible with their lifestyles.

¹⁰Marc Rysman (2007). “An Empirical Analysis of Payment Card Usage,” *The Journal of Industrial Economics*, 55(1): 1-36.

¹¹Niina Mallat (2007). “Exploring consumer adoption of mobile payments – A qualitative study,” *Journal of Strategic Information Systems*, 16: 413–432 (hereinafter, Mallat (2007) at 424.

¹²For example, Andreev et al. (2011, p. 123) found that “that consumer’s [sic] perceptions of the privacy controls employed by smart phone service providers is [sic] a critical element of trust.”

¹³Federal Reserve Bank, Consumer Credit—G.19, released April 6, 2012, available at <http://www.federalreserve.gov/releases/g19/current/default.htm>, site visited April 27, 2012.

¹⁴See Andrew Ching and Fumiko Hayashi (2010). “Payment card rewards programs and consumer payment choice,” *Journal of Banking & Finance*, 34(8): 1773-1787, and the references cited therein for empirical estimates of the sensitivity of consumers’ choices of payment instruments to the presence of reward programs.

¹⁵Although tablets are generally more capable than smartphones, consumers are less likely to have tablets with them and readily accessible at all times. Hence, tablets may be the preferred means of engaging in e-commerce transactions at home but smartphones will be used while at bricks-and-mortar retailers.

¹⁶I will not discuss them further, but it is worth noting in passing that there are also new features and services enabled by the form factors of mobile access devices compared to traditional payment cards. Even the smartest smart card cannot change its look and logo in real time. But a smartphone or tablet can. This fact opens new possibilities for co-branding. For example, a mobile payment account might be co-branded with a petroleum company when used to buy gas and a department store when used to purchase clothing.

¹⁷There might be potential cost savings for very small merchants from using smartphones or tablets as their primary POS, transaction-capture devices (one of Square’s principal services offers these benefits, among others).

¹⁸Kate Fitzgerald, “Starbucks in National Push for Mobile Payments,” *American Banker*, Dec. 3, 2010, available at http://www.americanbanker.com/issues/175_232/starbucks-mobile-payments-1029437-1.html, site visited March 12, 2012.

¹⁹<https://squareup.com/pay-with-square>, site visited April 20, 2012.

²⁰Dewan and Chen (2005) at 14.

²¹*Id.* at 15 and 16.

²²*Id.* at 17 and 18.

²³*Id.*

²⁴Ann Carrns, “Consumers Leery of Online Shopping with Tablets and Phones,” *The New York Times*, Jan. 27, 2012, available at <http://bucks.blogs.nytimes.com/2012/01/27/consumers-leery-of-online-shopping-with-tablets-and-phones/>, site visited April 30, 2012.

²⁵The identity claim might be made by a consumer orally, by swiping his or her payment card, or by a message sent by his or her mobile phone to the merchant.

²⁶With an NFC-based service, the consumer’s mobile access device would still communicate with a POS terminal controlled by the merchant. But in other cases, such as the use of Wi-Fi or traditional cellular services, the consumer’s mobile access device could communicate with the payment network “directly.” The Pay with Square service allows this to be done. (<https://squareup.com/pay-with-square>, site visited April 20, 2012.) In contrast, Square’s innovative mobile card reader reportedly can easily be used to skim credit card information. Square’s defense is that all credit cards can be skimmed. (“Square answers VeriFone’s accusations on security of mobile credit card reader,” *Los Angeles Times*, March 10, 2011, available at <http://latimesblogs.latimes.com/technology/2011/03/square-answers-verifones-accusations-on-security-of-mobile-credit-card-reader.html>, site visited April 20, 2012.)

²⁷<https://help.squareup.com/customer/portal/articles/108037-pay-with-square-where-can-i-find-my-receipts-and-payment-history->, site visited April 20, 2012.

²⁸<https://help.squareup.com/customer/portal/articles/197741>, site visited April 12, 2012.

²⁹There could also be flows in addition to those illustrated in this simplified diagram. For example, some merchants might interact with the issuing bank directly, and merchants and social networks might also exchange information.

³⁰There may be limits to consumers’ desire for one-stop shopping. For example, one interpretation of PayPal’s success is that consumers want to have a limited account when transacting with merchants in whom consumers have less trust (this is my interpretation of PayPal’s apparent appeal from hiding a consumer’s credit card information from a merchant while potentially exposing the user’s PayPal password. Of course, such preferences could be accomplished by a single payment mechanism that had different transaction and liability limits for different classes of merchants.

³¹As discussed below, consumers may also be connected through the facilities of the payment network itself.

³²Janne Lukkari, Jani Korhonen, and Timo Ojala (2004). “SmartRestaurant: mobile payments in context-aware environment,” ICEC ‘04 Proceedings of the

6th International Conference on Electronic Commerce, Janssen, Sol, and Wagenaar (ed.s), 575-582 (hereinafter Lukkari et al. (2004)), at 576.

³³I place the word loyal within quotation marks because one might argue that truly loyal customers do not require special deals to be induced to patronize the merchant.

³⁴By way of comparison, Groupon currently facilitates offers that are sensitive only to the merchant's context (and not in real time) and that are very crude in terms of relationship management. Although in at least some cases intended to serve as introductory offers that begin longer-term relationships, the big discounts associated with Groupon deals may encourage an adversarial attitude of consumers toward merchants. Groupon has what some observers label a "social" element, but it is among strangers and is not—in my view—properly viewed as a loyalty program.

³⁵See <http://www.facebook.com/business/ads>, site visited April 20, 2012.

³⁶I believe that NFC is more likely ultimately to be remembered as "never fulfilled claims." Those readers with telecommunications backgrounds will recognize this prediction as a tribute to the person who first observed that ISDN stood for "it still does nothing," rather than "integrated services digital network."

³⁷Like a dog taught to walk on two legs, NFC could do other things. NFC swiping stations could be set up in the store aisles or showrooms so that consumers could seek information on the products and available deals.

³⁸Lukkari et al. (2004) at 576.

³⁹*Id.*

⁴⁰See, for example, Chantal Tode, "Will wide-scale adoption of geofencing happen this year?" *Mobile Commerce Daily*, April 16, 2012, available at <http://www.mobilecommercedaily.com/2012/04/16/geofencing-strategies-on-the-rise-but-challenges-remain>, site visited April 20, 2012.

⁴¹Placecast, "O2 Case Study," available at http://placecast.net/research/case_study_o2.pdf, site visited April 20, 2012, at 01.

⁴²For a description of one such service, see <http://placecast.net/shopalerts/operators.html>, site visited April 20, 2012.

⁴³<https://help.squareup.com/customer/portal/articles/223248-new-how-do-i-set-up-auto-open-in-card-case->, site visited April 20, 2012.

⁴⁴<https://squareup.com/pay-with-square>, site visited April 20, 2012.

⁴⁵*Id.*

⁴⁶Matt Hamblen, “Visa, Gap use text messages to mobile phones for promotions,” *Computerworld*, April 21, 2011, available at http://www.computerworld.com/slarticle/9216060/Visa_Gap_use_text_messages_to_mobile_phones_for_promotions, site visited April 28, 2012. See also, Sarah Perez, “Visa Launches Real-Time, Location-Based Discounts for Gap Customers,” ReadWriteWeb, April 21, 2011, available at http://www.readwriteweb.com/archives/Visa_launches_real_time_location_based_discounts_for_gap_customers.php, site visited April 28, 2012.

⁴⁷It is also notable in that it uses Visa’s network to provide the location service and uses wireless networks solely for SMS messages, so that smartphones are not required and wireless carriers play a very limited role in providing the service.

⁴⁸To the extent that privacy regulation distinguishes uses of information within an enterprise from uses that cross enterprise boundaries, regulation could affect enterprise’s choices of their boundaries. For instance, public policies that are more lenient toward within-enterprise transactions are likely to promote greater enterprise scope. Similar issues can arise with respect to antitrust policy when two divisions of a given enterprise are permitted to engage in practices (e.g., exclusive contracting) that might be found to be antitrust violations if practiced by two separate enterprises.

⁴⁹Avi Goldfarb and Catherine Tucker (2010). “Privacy Regulation and Online Advertising,” available at <http://ssrn.com/abstract=1600259>, site visited May 1, 2012.

⁵⁰ConsumerReports.org, “T-Mobile’s “Direct Carrier Billing” Program Could Leave Consumers Vulnerable,” Aug. 8, 2011, available at <http://pressroom.consumerreports.org/pressroom/2011/08/t-mobiles-direct-carrier-billing-program-could-leave-consumers-vulnerable.html>, site visited Jan. 25, 2012.

⁵¹Peter O’Connor (2005) “Comparative Analysis of International Approaches to the Protection of Online Privacy,” in S. Krishnamurthy, ed., *Contemporary Research in E-Marketing*, Vol. 2. Hershey, Pa.: Idea Group Publishing, as summarized by Evelyne Beatrix Cleff, (2007) “Implementing the Legal Criteria of Meaningful Consent in the Concept of Mobile Advertising,” *Computer Law and Security Report*, 23(3): 262–269, at 265.

⁵²I don’t subscribe to the conspiracy theories of the sort put forth by several of the people interviewed in a recent Pew Research Center survey. (Aaron Smith, Janna Anderson, Lee Rainie, “The Future of Money: Smartphone Swiping in the Mobile Age,” Pew Research Center, April 17, 2012, available at <http://www.pewinternet.org/Reports/2012/Future-of-Money.aspx?src=prc-headline>, site visited April 28, 2012 (hereinafter, Smith et al. (2012)) at 5, 16, and 17.)

⁵³For a survey of the economics of network effects, see Michael L. Katz and Carl Shapiro (1994) “Systems Competition and Network Effects,” *Journal of Economic Perspectives*, 8 (Spring): 93-115 (hereinafter, Katz and Shapiro (1994)).

⁵⁴For survey of cross-platform network effects, also known as two-sided markets, see Roberto Roson (2005) “Two-Sided Markets: A Tentative Survey,” *Review of Network Economics*, 4(2): 142-160.

⁵⁵In addition, positive-feedback effects may arise with respect to the provision of targeted-marketing services to merchants. Specifically, the larger a payment-service’s merchant-acceptance network, the greater the depth of information that service will be able to collect about its consumer users because the payment service will likely capture a greater percentage of any given consumer’s transactions. Hence, the greater the number of merchants using a payment service, the higher the value of the targeted marketing services that platform can offer to merchants.

⁵⁶“POS Gets Smart,” *QSR*, June 24, 2011, available at <http://www.qsrmagazine.com/news/pos-gets-smart>, site visited March 11, 2012. (The quotation in the text is of the cited article’s paraphrase of what the executive said.)

⁵⁷*Id.*

⁵⁸See, for example, Katz and Shapiro (1994).

⁵⁹Note that this issue need not arise in this exact form for certain payment services based on Wi-Fi and cellular networks. However, these technologies, too, will require at least some equipment located on the merchant’s premises.

⁶⁰Economic theory suggests that widespread compatibility that allows product differentiation would very likely maximize the joint profits of competing payment-service providers. Consumers and merchants might be reluctant to adopt a monopoly service, thus exacerbating the chicken-and-egg problem, while a lack of differentiation could lead to intense payment-service competition that eroded profits. From a social welfare perspective, a structure that allows service providers to differentiate themselves can spur innovation and long-run competition.

⁶¹Rebecca Robinson, “Smartphones for Use as Visa Mobile Payment Devices,” *CardGuide*, Feb. 21, 2012, available at <http://www.card-guide-international.com/201202211911/Visa-Certifies-Smartphones-for-Use-as-Visa-Mobile-Payment-Devices.html>, site visited March 11, 2012.

⁶²Rachael King, “Wells Fargo tests smart-phone mobile payments,” *SFGate*, Jan. 5, 2011, available at <http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2011/01/04/BUBT1H3TO3.DTL>, site visited March 11, 2012.

⁶³*Id.* See also Andrew Johnson, “In Mobile Payments, Lack of Interoperability Threatens Adoption,” *American Banker*, Dec. 9, 2010, available at http://www.americanbanker.com/issues/175_235/lack-of-interoperability-1029690-1.html, site visited March 11, 2012.

⁶⁴Mat Smith, “Moneto NFC microSD to bring contactless features to any Android phone,” *engadget*, posted Jan. 11, 2012, available at <http://www.engadget>.

com/2012/01/11/moneto-nfc-microsd-contactless-payment-Android-iPhone/, site visited April 28, 2012.

⁶⁵Dan Hays of PRTM as quoted by Leila Abboud, “Telcos battle tech, bank titans for mobile payments,” *The Globe and Mail*, Feb. 14, 2011, available at <http://m.theglobeandmail.com/news/technology/mobile-technology/telcos-battle-tech-bank-titans-for-mobile-payments/article1905892/?service=mobile>, site visited April 28, 2012.

⁶⁶Rob Scott of Nokia as quoted by Smith et al. (2012) at 14.

⁶⁷See, for example, Jan Ondrus and Kalle Lyytinen (2011). “Mobile Payments Market: Towards Another Clash of the Titans?” *Proceedings of the 10th International Conference on Mobile Business*, Como, Italy.

⁶⁸Telecommunications firms may play much more significant roles in developing economies (*Id.*, §I.):

Some local success stories have been observed in developing countries... However, these systems have been well adapted for the financial markets of the developing world (e.g., high penetration of mobile phones, low bank service penetration, lack of alternative solutions, clear economic value propositions for the users). Those contexts are highly specific and far from the ones encountered in the developed world.

⁶⁹That said, several such parties apparently disagree with my assessment and have formed alliances with wireless carriers.

⁷⁰Rachael King, “Wells Fargo tests smart-phone mobile payments,” *SFGate*, Jan. 5, 2011, available at <http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2011/01/04/BUBT1H3TO3.DTL>, site visited March 11, 2012.

⁷¹<http://www.loc-aid.com/about-us>, site visited April 20, 2012; Ryan Kim, “O2 Turns on Geo-fencing for Starbucks, L’Oreal in UK,” *GigaOm*, Oct. 14, 2010, available at <http://gigaom.com/2010/10/14/o2-turns-on-geo-fencing-for-starbucks-loreal-in-uk/>, site visited April 20, 2012.

⁷²According to Bernstein Research, once American Express launched the Optima card, “Disaster followed. The list of what went wrong is almost unbearably long. The credit assumptions were flawed to begin with,...” (“The Future of the Credit Card Industry: Part II—Company Outlook,” Bernstein Research, January 1996, at 30.)

⁷³*Id.*, Exhibit 18 and accompanying text.

⁷⁴See <http://support.apple.com/kb/HT2001>, site visited April 23, 2012.

⁷⁵AppleInsider Staff, “Filing: Apple conceptualized smart MVNO system ahead of iPhone,” *AppleInsider*, April 10, 2008, available at http://www.appleinsider.com/articles/08/04/10/filing_apple_conceptualized_smart_mvno_system_ahead_of_iphone.html, site visited May 1, 2012.

⁷⁶See, for example, “Apple Gearing Up for the Coming NFC- iPhone Revolution,” *Patently Apple*, April 8, 2010, available at <http://www.patentlyapple.com/patently-apple/2010/04/apple-gearing-up-for-the-coming-nfc--iphone-revolution.html>, and Lance Whitney, Apple Store’s new self-checkout: Nice, but not flawless,” CNET, Nov. 14, 2011, available at http://news.cnet.com/8301-13579_3-57324198-37/apple-stores-new-self-checkout-nice-but-not-flawless/, sites visited Jan.18, 2012.

Increasing Connectedness and Consumer Payments: An Overview Commentary

Don Kingsborough

Good morning. It seems that I am always standing in front of an audience and telling them I think it is *not* going to be an evolution, but instead, that we are at the beginning of a revolution. So I am here today to say that.

This has happened to me three times now. In the 1970s, I was president of a company called Atari. I got up in front of an audience with a game called Pong and said it was going to lead us to a brand new entertainment network.

In the 1980s, I invented a new talking toy called Teddy Ruxpin that changed the way kids got electronic toys. In 2000, I got an idea that paper could be changed to plastic and we could put branded gift cards in other retail stores and create a new way for people to get products.

I am here today to tell you I think we are at the beginning of a revolution. During Dr. Katz's remarks, he suggested that when the bank is in the center of an ecosystem, the ecosystem will not change very much and the change that does occur will be evolutionary in nature. If this stays the same, we agree with him. But we think there is a small, but significant difference.

This view of the future is limited only by the status quo and incumbents trying to maintain their position in market share. We believe the balance of power is shifting and the technology is the facilitator of the shift. In our view, the consumer is at the core of the ecosystem. Consumers are the ones who are going to drive this change. We think the revolution has already started.

In just the few short years since the iPhone was invented, multichannel shopping accounts for almost 50 percent of all retail sales. It is the consumer who says they want to buy anytime, anyplace, and in anyway. It is this type of shopping and buying that will drive this revolution. Consumers will determine the new payment types, as they encounter new options for how and when to pay.

In his paper, Dr. Katz talks about multichannel shopping. Let me bring it to life for you by showing a brief video of how PayPal is helping to make that happen. Millions of people can now live, shop, and buy anytime, anywhere, anyway, because they have PayPal. It is innovation you can use and share with friends today, no matter where you are. Innovation that finds exactly what you are looking for. It's putting advantages at your fingertips. It's your money moving with you, listening to you, following your lead. It's all on you—the power of information. Rewarding you in a meaningful way and saving you time when it really counts. It's meeting the need for a whole new kind of convenience. And it's letting you decide how to pay...long after you've checked out. So if you have PayPal, you have it good.

Dr. Katz says revolutionary changes can come from services. On this we agree. It is a consumer-driven revolution. It is no longer about location, location, location. The new commerce is about access to the consumer and you get access when you bring value. You can save them time, you can save them money, or you can provide critical information. It is about consumers who get value and trade information for that value. And it is based on their needs and their choices.

The digitization and virtualization of currency and payments have shifted control from financial institutions. Instead of an existing channel today to the consumer, the digital wallet is a channel for the consumer. Consumers now choose information to pull and information to share. The proliferation of apps enables consumers to build relationships when they benefit and to disengage when there is no more value. This is not a revolution about tapping or swiping. New commerce is about frictionless payments. It is about adding value. These are the things that are going to determine how the consumer decides to pay.

Consumers will share this information only when it benefits them. The ecosystem and the technology that knit this together will be shaped by new players and who are able to do this when they bring value to the consumer. It is about an opt-in world, where consumers are connected to the cloud at will—to do their shopping, to do their buying, when and wherever they want to.

We think these changes are a continuum of technology and consumer needs. In Dr. Katz's paper, he says he does not think there will be any real winners. And we think a lot of the players today will still be the players of tomorrow, but we think the batting order may change. And, for sure, we think the market share will change.

It is who satisfies the needs of the consumer and gets them to connect that wins. There will not be one device for all people; it will be 50 billion devices connected to the cloud with many different payment systems. But it will have to work with the existing infrastructure.

It will not be just your iPhone that you touch and pay; it will be the screen that is closest to you when you decide to buy. We believe the change will occur when you move the consumer to the center of the ecosystem.

Increasing Connectedness and Consumer Payments: An Overview Commentary

Hal R. Varian

I have a series of more or less unrelated comments about Dr. Katz's paper. Since I am from Silicon Valley, I think Dr. Katz is a little too conservative. He is from that conservative part of the country—the East Bay. In Silicon Valley, we think of ourselves as much more forward-looking than those conservative people in Berkeley.

Let's start out by looking in our pockets: What is in your pocket? You have your wallet and what does your wallet have in it? Well it has some measures of persistent identity—like your driver's license, maybe your AAA card, maybe a faculty ID, an auto insurance card, a medical insurance card. These verify persistent identity. They say that I am a member of some group of people licensed to drive or to use certain facilities.

My wallet also has temporary identities. I might have a boarding pass or a ticket to a play stuck in my wallet and that shows that I have a right or access to certain facilities.

Of course, there are general purpose payment mechanisms such as credit and debit cards.

Then there are a lot of specific payment mechanisms. I have a card for the Bay Area Rapid Transit system and receipts that show what I paid for lunch in the airport.

Finally, there are those personal things—your photos, your notes, your reminders, and so on. But then you also have keys, not in your wallet but in your pocket, that are also a form of identity verification and access control—permanent keys for your car and your home and temporary keys for your hotel room and rental car. Airbnb, is a company that allows people to rent out in-law units or apartments to

temporary visitors. They have a system where you can just go up to the door of the apartment, punch a number in your smartphone, and the door will unlock. You can use your smartphone as a key. That is a very attractive mechanism.

Of course, all of these payment systems, identity systems, access systems and so on can be replaced by a phone. That is, replacing these capabilities with a phone is *technologically* feasible. Dr. Katz is absolutely right that there are a lot of institutional and inertia reasons why they may not be replaced in the near-term future. But the fact you can do all those things from one device is something that is potentially quite exciting.

Also, one thing that has not been mentioned very much in the discussion is the idea of payments within a social system. It amazes me that Zynga generates about 12 percent of Facebook revenues—12 percent. Remember this is the hot company in Silicon Valley these days. The Zynga revenue comes from virtual currencies, which are used to buy animals in FarmVille and other types of virtual goods in online games. It is remarkable to me that you have this whole virtual currency system generating such a large part of Facebook's revenue.

And you think about how social networks are evolving, they certainly intend to be part of an identity verification system. And as soon as you have identity verification, you have a good chunk of the payments mechanism problem licked, because I have some way to verify that I am who I am, some way to verify the merchant is who he is, and the rest of it is just accounting, making some transactions that move from one side of the ledger to another. That identity verification business is going to be a really key role. It is possible—I will only say it is *possible*—that social networks will play a role in that identity verification,

Clearly, the password authentication we use now is very, very primitive. There are much more secure systems easily available. Google offers, for example, two-factor authentication to everybody for free. By that I mean you have a mobile device and it will generate one-time passwords for you to use to get into different services. So there are plenty of systems available now. It is really just social acceptance and the hassle of using them that prevented people from having much more secure authentication.

Another thing that is worth mentioning, and Dr. Katz alluded to this in passing, but it would be good to say a little bit more about it, is that controlling the payments system can confer a significant competitive advantage. For example, Amazon and Amazon Prime have your credit card on file, so you have one-click shopping. It is very easy to buy things on Amazon, once you have enrolled in their payment system. Of course, that is why merchants are very eager to join the Amazon Marketplace. They view this as a really important place to be, because Amazon has basically internalized the whole payment system. They have a private payment system within Amazon that gives them a strong competitive advantage against other players.

The same thing occurs with Apple iTunes. They have 150 million credit card numbers on file; this allows consumers to buy content on iTunes very quickly and easily. This is a major reason why content providers want to put their content on iTunes. So just building a special-purpose payments system is really a huge source of competitive advantage.

Conversely, I would say, if you have a general-purpose payment system, which is as easy to use as a special-purpose payment system, then it makes it a lot easier for new entrants to start selling things.

Talking a little bit about the industry dynamics for these private payment systems would be interesting. Of course, multihoming is perfectly feasible. I can be a member of Amazon and on iTunes and other systems, but only up to some limit. I probably do not want to be the member of 15 or 16 or 20 different private payment systems. A few of them, however, can easily coexist.

With regards to ISPs and payments, Dr. Katz is a little bit too pessimistic there. There are examples where ISPs provide payment systems now. So with Comcast and On Demand, I can buy movies and pay-for-view TV shows and buy other sorts of services. And of course I can buy subscriptions to premium channels like Home Box Office through my ISP/cable provider. It is absolutely true there is no good reason why competitors cannot do this as well, so iTunes can use my ISP and collect payments from me and Netflix and so on. But the network providers do some kind of nascent payment processing system that shows up on your cable bill.

If you look at other countries, it is much more common to see the mobile carriers offering you services, adding them onto your mobile bills—as a value-added service—or processing other third-party payments. It seems strange and you see this mostly in developing countries that have a very primitive infrastructure, but also in very highly advanced countries like Sweden, Japan, Finland, and Korea where you can buy services from third parties that then show up on your mobile phone bill. We do not see much of this happening in America, but we do see some of it.

I want to say a couple words about other approaches or what I would call creative approaches to payments systems. We are going to hear later from Square. I do not want to steal their thunder here, but I will give an endorsement to the system as I think it is a very clever and innovative way to manage payments. One is this little device you can get from Square for free, plug it into your iPhone, and then handle credit card payments. In the Bay Area, if you go to the farmers markets or the art shows, it is very common to see this mechanism being used. So it lowers a barrier to entry to use credit cards. It is quite a nice idea. They also have another system, which is quite ingenious. I do not know if this will take over the world, but it shows there are lots of possibilities for creative approaches here.

What are the key issues for success of a new system? You do not want to have a new device for consumers. That is one of the setup costs. You do not want to have a new device for the merchants. You do not want to have a new communications

network. And you do not want to have a new payment system. Those are all costs; these are all barriers to entry.

What you would like to do if you are trying to get a new system that you add on top of the existing systems, which after all work pretty well, you really have to have very, very low cost for all parties provided. The Pay by Square system is a good example of this. Here is how it works. The idea is you use the phone location system to keep track of your location. Your carrier knows where you are to a block or so, because it has to know that. So, you can find a merchant using this system, if you want. The first time you visit the merchant, you click “open a tab” when you walk in the door and you only have to do that once. Now it has a connection between you and the merchant: you are in the same general area. Once I buy my latte I go to the checkout counter and say, “Just charge it to Hal.”

The nice lady at the checkout counter types “Hal” into her laptop computer and up pops a photograph of me. She looks at me; she looks at the picture, and says, “Thanks, Hal. Here is your latte.”

That is it. That is the whole system. If you want to do it privately, you can use a PIN, or some made-up name, or something like that. You get the receipt on your phone showing this charge has been made. The only thing you use to verify the transaction is your face. If you want to get fancy about it, say, use biometric identification, but after all we have had a million years of evolution to try to recognize other people. By now we are pretty good at it. If you think about it, what is the difference between having this series of numbers embossed on a card and showing that to a person or showing your face to a person? It is still a way of connecting your financial identity with your personal identity with your agreement to engage in this particular transaction. It is a clever mechanism and there are a lot of other variations on it one could imagine.

Ironically, it brings us back to the Downton Abbey days when everybody maintained a tab with the merchants and was billed every few months. That is just the global village in action.

Finally, I do want to say a word about a part of the payments system that we have not really discussed that much. Who is the biggest wireless data carrier? It is a trick question, because my answer is Wi-Fi. Wi-Fi is a technology, not an organization but, if you look at the data, it carries at least half of all wireless data. And, if you throw in laptops, it is very substantially more than half. Wi-Fi was built on junk spectrum that nobody wanted. Some technologists got together and said, “Let’s use this for local area communication.”

All of these new innovations—the iPad, the iPhone, tablets, smartphones—they could not exist without Wi-Fi. They could not exist without Wi-Fi since the cellular network couldn’t carry all that data.

Right now, there is a battle shaping up in D.C. over these spectrum auctions, where they would like to repurpose some TV spectrum to mobile device use.

But telecommunication carriers and the technology industry are very concerned that there should be some *unlicensed* spectrum available for the same kind of experimentation and innovation we have seen in Wi-Fi. It is an “iffy” thing. Because given the budget situation, people say, “Why should we set aside some piece of this for unlicensed spectrum? Why don’t we sell it all off to the highest bidder?”

Our view is you need this wireless spectrum to really encourage the same kind of innovation we have seen in Wi-Fi. It can make a very big deal for all of us in this industry in particular. It is something that is quite important to pay attention to.

General Discussion

Session 1

Mr. Katz: I just want to thank both discussants and to say a couple of things very quickly. I am going to stay away from the last thing Hal said, although I am quite happy to debate him about spectrum policy another time.

Just a couple of things. On Hal's point about controlling the payments system as a source of competitive advantage: From what I understand of the examples he brought up, I would say they are important but they are illustrating a slightly different point, which is this one that if people are doing online commerce, and they are going to log in and identify themselves, such as you do with Amazon, then the fact that Amazon can make it costless to use particular payment mechanisms once you have gotten on Amazon, it seems to me that is a big deal. But it is slightly different than saying Amazon is offering its own payment system. They are offering a particular form of one-stop shopping to people. I certainly agree with the point that that can have a powerful effect on competition.

On the ISPs, I would disagree that Comcast is a counterexample to what I have said. Comcast is charging in their role as proprietary content owner for premium channels, not in their role as provider of broadband services.

Finally, we want to throw it open to questions. On the carrier billing, I agree that in economies outside the United States it is not obvious what the difference is from the U.S. economy. Carrier billing is a big deal. (I think I said this in the paper.) Carrier billing will be a niche in the United States, although it could be a niche worth billions of dollars and that could be a big niche.

I thought about this a little bit as it relates to Japan. Americans' use of credit cards in particular, but also payment cards generally, is off-the-charts compared with most other countries. At least in the case of Japan, it is—at least until very recently and I do not know now—much more of a cash-based society. That is one

of the reasons that mobile carriers play a bigger role there. Plus their mobile carriers are more innovative than ours.

Mr. Drechny: I have a couple of observations and then a question.

First, in Dr. Katz's diagram, I thought that it was really interesting that the connection that was missing, and nobody talked about, was between merchants and social networks. That you discount the fact merchants could use social networks themselves. Seeing as merchants already own all of the data that everybody else wants to get to, you could have that infrastructure built by merchants to consumers, which would be the most efficient way for that system to be built instead of adding people in the middle.

The other observation I will make is when we talked about revolutionary, the revolutionary side already happened and it was around getting rid of offers. There is a small retailer out of Arkansas that did a pretty good job of creating a large infrastructure around getting offers out of the system and making the system more simplistic for customers to be able to complete purchases.

It is quite interesting as we talk about the idea that the system is going to allow for consumers to get more offers, I would argue consumers do not want more offers. Consumers want simplification. We have recently seen a lot of announcements by retailers who have started to realize that customers want simplification—JC Penney, being one of them. Supervalu is about out of the marketplace, talking about how they are going to back down the amount of offers they have in the marketplace as well. I thought those were all interesting insights added.

My question centers around the fact that, How can you have a revolution and have mobile phones used to pay, *if* the basis for all that payment is still the current system that is in place today? So when you look at the basis of PayPal, a majority of the way that money is getting into PayPal is based on the networks that already exist today, those that already have a stranglehold on the marketplace and control that pricing in the marketplace. That has not changed.

My question is, How do you change that? Until you change that, there is no revolution. There is just a perpetuation and a change of the face of how it looks.

Mr. Katz: I will provide the uninteresting answer first. I will defend my diagram, but I will agree with you that my description of it was wrong. One interpretation of what you are saying is the “ad deal” network could be the social network, but I think you are right. The merchant could run that as well.

Your point about simplification: I take it that little retailer has been quite successful with its approach. But I also think we will see a bifurcation of it, because there are consumers—I am not one of them—who live for their deals and feeling like they are special. One of the things we will see, though, in evolution of a lot of this is away from—this Groupon model is the wrong one in a lot of ways. But the particular way I mean is this notion that it is almost adversarial. “OK, I am going

to get this really good deal—the merchant’s screwed—I am going to take advantage of this deal and then I am off to the next one.”

The way we are going to see this stuff used is to try to build up relationships between merchants and their customers. The idea that it really is an ongoing relationship and the deals can build is much more like a rewards program and *that* is something a lot of consumers do want.

I will turn it over to Don to give a much more interesting answer about breaking the stranglehold.

Mr. Kingsborough: I think you are right. What you have to do is get other types of currency into the account where you have a lower overall cost of funds. That has to be part of the solution, relative to what retailers are doing. Retailers will be a critical part of this, because I have never been to a retailer who, in the first five minutes, is not talking about how we lower their cost of payments.

This is not simply about offers. This revolution is not about offers. What has occurred in the last 12 years is the consumer has decided they are going to be smart. They want to be a master shopper. Everyone in this room has a friend who gets a hotel room in Hawaii for \$200 a night when you are paying \$400 a night. Or they have someone they know that gets that \$199 airfare and they are paying \$500 for the airfare.

It is about information that empowers people to do things and they are not going to make these buying decisions without that information. The information is going to be moved from simply being online to being in-store where, while they are in-store, the “scan and scrambling” is going to stop and “scan and buying” is going to start when the consumer gets enough information so they then can save time at that moment in time that they are doing the scan.

So it is not simply about offers. It is about information and the transmission of that information whenever the consumer wants it and wherever they want, whether it is at a price discounter like your chain or it is at another one that is more promotionally oriented. Without information, the consumer is going to find some other place to shop.

Mr. Varian: Let me weigh in on this complexity versus offers debate. They will coexist, because it is quite clear there are people who are shoppers who want the best deal, just as you said. The offers are a way to attract that segment of the population. Then, there are other people—and of course the same people are discussed—who at different times, want to buy it, get the thing done with, and do not want to go through all this offer stuff.

There is an interesting dynamic here. Because when you think about something like coupons, the fact you are willing to take the time to clip the coupon indicates you are a price-sensitive shopper and so you get a better deal, because you signaled to the merchant that you are a price-sensitive shopper. You cannot

make clipping coupons too easy if you want this form of price discrimination to work. If 100 percent of the people clip coupons, then you might as well have the lower price to begin with. The hassle of clipping the coupons is what makes the market segmentation for you work, so a lot of these other offer deals inevitably have to have complexity. If you take the complexity away, then you have removed the whole point of the marketing effort. There is always going to be that dynamic throughout the whole system.

Mr. Tomasofsky: Thank you very much for a great panel. I see a lot of gray hairs in here. Many of us have been around the business for a few years. Every innovation, every new payment product that has come out in the last 30 years—at least from my perspective—has always had to make the trade-off between getting to mass production or whatever segment you want to penetrate, getting the right numbers, and being secure enough, especially in today's world with interconnectiveness and social media, we know that the system today is broken when it comes to security authentication. We have built the fraud number into the product, hopefully, and it has not blown up in our faces yet.

The question I have is, To what extent should security-related questions and security and fraud mitigation, etc., be focused on when we talk about new products, new innovation, and all the things many of you showed us today? How does that work into your equation and where do we go from there?

Mr. Varian: I will say a word about that. Sometimes you hear people say, “Well, my system is only designed to deal with small payments, so it is not really much of a security risk.”

But, as soon as you get computers into the equation, that defense goes away. There was a very interesting fraud committed on Medicare a few years ago, where people got hold of a doctor's account number. They would file reimbursement claims for some procedure that tried \$200, \$190, \$180, \$170 and then find out the point where the claim was not questioned. If it was below \$120, it would be approved. Then you file a million reimbursement claims for \$120. As soon as you have computers able to take advantage of any threshold you use for security purposes, you can get a lot of money out of small payments. It is always going to be a cat-and-mouse game. There is never going to be a final solution for this fraud problem.

Mr. Kingsborough: What we think is that fraud, as you said, is a part of every one of these systems. The fraudsters are generally ahead of us and you have to constantly catch up. At the beginning of these new payment technologies, you have to let enough fraud in so you can see exactly what is going on, so you can make the changes.

The other thing that is occurring, though, is as you start to see the consumer in a monolithic way, when you see them online, when you see them using a mobile phone, you see them in brick-and-mortar stores, and you use the technology that allows you to know more about them that they have invited you in and opted in to

allow you to know more about them, then it is in the combination of these things, as opposed to having isolated events. It is the combination of these things that you know who the consumer is, what they normally do, and where they are by geo location. It is these things that a secondary and tertiary authentication will start to give you a better handle on reducing fraud. It is only in that combination of letting it in at the beginning, then analyzing it, and bringing other layers of authentication into the mix that you can gain this under control, in our opinion.

Mr. Tomasofsky: That is a good point, but that information you have now collected is a really nice honey pot for a fraudster to go after to help defeat everyone the second and third authentication tertiary stuff.

Mr. Katz: Knowing nothing about this, I will just make something up. (People become rich doing that.)

One of the things, it seems to me, you would think about doing if people are really concerned about it, given the possibilities of the communication, is you could have the payment network contact you in real time every time you were paying for something. There is always the question of how you stop somebody from changing the phone number, but there are things you can do to make it extremely difficult to change the phone number. That is something people would have to do. You could have it set once, then if you want to change it you are going to be sorry. That way, it would alert you every time you were making payments. And, if you were actually making the payment, it would not make any difference to you at all. You might think it is inconvenient if I am in the middle of a conference and you ask why is my phone ringing but some consumers might be willing to put up with that for security reasons. So there are things where you could try to make use of the communications capabilities to also improve it. But I agree with you. This is going to be a big issue and I also predict it will be a big issue generationally. People my age will be much more likely to be scared off from some of this stuff because of security concerns. People my children's age just do not care.

Mr. Varian: I am going to add one more point to that. It is very important to look at the decision of where the liability ends up in the exceptional cases, because it could be with the merchant, with the intermediary, with the consumer. These different liability systems can lead to different patterns for adoption.

Given the system is so competitive at the moment, you are going to see the intermediaries taking on the liability in an effort to get their technology adopted by the other parties. That can potentially be a systemic stability problem, the kind of thing we are talking about here. Where merchants take on excessive liability, there could be a problem.

Mr. Ramamurthi: I know Google has tremendous positive information. What I wanted to ask you is, What have you seen change, because Google literally sees even what I am trying to buy sometimes? Those data are visible to Google in

real time across the world. What have you seen change in the last few years? Have you seen more mobile devices, more people accessing from mobile? If they are, is their search behavior changing to where it is more transaction oriented behavior? What is it you are seeing at Google now from your vantage point?

Mr. Varian: Well, certainly we are seeing a huge increase in mobile queries. One interesting fact is the pattern of mobile queries is not so different than the pattern of desktop queries. Obviously there are more location-aware queries. There are a few more adult queries on mobile devices, I think because they are more personal.

One interesting thing that is not sufficiently appreciated is that many mobile queries—you are supposed to hear the quotation marks on that “mobile”—are made in front of your television. So we call these the “immobile” users, because of their remarkably large number.

You have your cell phone with you when you are sitting in front of the TV because you might get a call. You see an ad on the television for a new car or a movie or something like that. Then people will follow up by just doing a query on their mobile device and getting a little more information on that particular product or that particular ad.

We’ve done a number of postings about the kind of queries people do during the Oscars and during the Super Bowl and during similar events. It is interesting to look at, because it is quite a significant part of the query stream. So the immobile users are a pretty big deal.

Ms. Benson: Michael, I have a question for you. We spent a lot of time thinking about how technology might enable changes in consumer payment behavior. You talked about ubiquity and I agree that is important. In today’s world, that pretty much means you want a card that is going to work in a lot of places. But today also I have a Starbucks app on my phone, which is automatically topped off from my bank account. Tomorrow I could have a Wal-Mart app on my phone, an IKEA app on my phone. And I could get ubiquity just because it is all on my phone, not because it is all the same card that is good in each one of those payment relationships; it might be unique to the merchant. Do you see this as a technology that could be changing consumer behavior?

Mr. Katz: Some people would disagree with the dichotomy I drew between the evolutionaries and revolutionaries. Whether or not we count the Starbucks card as being about a payment instrument versus whether you should count separately the fact there is a rewards program. It is useful to think about them separately, even though obviously consumers want to see them together.

I agree. There is clearly the possibility that you will see all these merchant-customized programs, although it is not clear to me in that sense whether you should see that as the merchant actually delivering it. For example, you could easily imagine an intermediary...I was partially joking around with somebody last

night that you could imagine bringing back store cards, but in the following way: It could be run by a bank using Visa infrastructure and it is actually one bank. The way it works is it is based on your phone and when you go into a Macy's, your Visa card shows up as a Macy's card. And it may have particular terms, either credit terms or store terms or whatever associated with it. If you were to go into Penney's, it would show up as a Penney's card, even though underlying it is the same card and same account.

There are a lot of different possibilities for how you could do this, either one card looking like many or it could be many cards all on one device. With that last one, though, it then becomes a question of at some point consumers are going to want things to narrow down to one-stop shopping, say, for the payments. So you have all these different things, but ultimately they all charge to the same credit card, I could see that happening. I do not see the notion of people having to pay 20 bills. Not that it is that hard if you do it electronically, but it does get harder to monitor them. What I guess I am saying is, technology opens up a lot of possibilities where we are going to see a lot of different things tried.

Mr. Kingsborough: We actually did some research on this specific subject. Our take was there could be a few retailers who could pull it off, but the consumer is not going to have 40 different apps in their phone to pay 40 different ways. It has to do with trust. They like retailers. There are a few they will trust, but there are many they will not trust. It is the level of trust that will determine who could do this and who could not do this. At the end of the day, consumers generally voted—I will give you the ranking—but when they ranked how they did it, retailers did not rank in the top four or five, even though they were well-thought-of retailers.

Mr. Anderson: Michael, I am slightly skeptical of the idea that you could have a multifunction store loyalty card. And the reason for this is that over the past 20 years, smartcard vendors in Europe tried that again and again and again and there were few takers. We struggled with various things, like cards that would work for electricity as well as banking.

The killer was very often marketing stuff, like whose logo goes on the front and who controls the address list. It was not whether you could get enough RAM in the card or figure out the application IDs so we would not interfere with each other. There is a real commercial reason why we have 40 different cards in our wallet and it is about branding and loyalty and stuff like that. It is not altogether clear how technology makes that go away.

Mr. Katz: At least on the branding, it *can* make it go away. That was what I was mentioning. If you think instead of a smartcard you are using a phone with a screen, I am saying you have a locational device. When you walk into Macy's, it would show up the branding and would be Macy's on the screen. And, when you are at a Starbucks the branding would be Starbucks, even if it is the same underlying, overall account.

There are some things the technology could solve. I agree with you, though, issues like who is going to control the information could be huge. But even that, you could have infrastructure service that divided that up and it would say: “You can sign up to be in our virtual store card program and you retain ownership for the information.”

Obviously, they would rather NOT do that; they would rather centralize the information. The current technologies give you a lot more flexibility to try to make an end run around some of those issues.

Mr. Williams: I like your approach, Michael, to go right back to basics to try to take a very high-level view. At the end of the day, when we are trying to make payments, we are trying to pay a person or a merchant. We are trying to transfer some sort of value. Hal made a very good point about wallets currently containing mostly things which are around identity or payment mechanisms. I would contend most credit cards are, in fact, alternative methods of authentication. We certainly use them as such when we are checking in at electronic kiosks for airlines. A couple of us are taking an approach looking at identity, like NIST (National Institute of Standards and Technology) in the United States or Identity Assurance in the U.K., to try to link identity back to attributes on our individuals. That is one of the key things. In the U.K., we have recently launched something called Pingit at Barclays Bank, which has the ability to empower a mobile phone number but using an ACH transfer. It seems to be very successful so far.

My question is, Is identity the key thing behind this for all of these transactions we have talked about, what you can say about the consumer, what you can say about the merchant, how you can set the trust between those two for prevention of fraud? So is identity key? How do we keep anonymous transactions, which we are currently doing using cash, in that environment?

Mr. Katz: I will say this about anonymous transactions. We will all agree that identity and being able to authenticate yourself is critical to all of these. It is certainly the case, even if you do not go as far as anonymous payments, there are going to be a lot of issues about how much control over your information you have and how widely it is used. So that would be one of the extremes.

It seems to me a big issue with anonymity is going to be whether you believe the people are not actually tracking this stuff. I understand there are various ways you can do digital cash and it could be anonymous. There would be a question whether people believe it actually is anonymous. I defer to the experts on this.

Mr. Varian: I guess the question is anonymous to whom? You could be anonymous with a merchant. You could be anonymous to the payments system. There are lots of different levels there that the system I described—the Square system—I said you could come in and say, “Charge it to Hal” or you could say, “Charge it to XYZ192” and use a code. Then you are anonymous in that respect. Well, I do not know. Obviously there is a demand for anonymous payments from

some segments of the economy.

The question is, Are those segments of the economy that we really want to support? You always see this debate where on the one hand anonymity might be considered a right and on the other hand it is also a possibility for abuse. So we are going to see this fought out for the near-term future.

Mr. Katz: Let me just say one thing on that, because there is always this thing about we need to make sure we have a currency for drug dealers. It is a lot more than that. You think about this thing currently going on with Facebook and employers saying they want access to employees' Facebook accounts and their passwords. It does start raising issues. There is a lot of stuff you would not want employers seeing. For example, some pharmaceuticals, people would rather remain anonymous when paying. Now a lot of people want anonymous and then they pay with credit cards and do not realize it is not anonymous. It does seem to me these questions of privacy do cut across things beyond illicit transactions.

Mr. Varian: If my insurer really knew how much butter I consume, he would be very unhappy.

Mr. Wallgren: My question is, How can I show off my black card panache and my status in the future of mobile?

Mr. Katz: Actually you will have to return to history. The first touch screen mobile phone, at least that I know of, was a Prada phone. You are just going to have more garish cases, although that is going to lead to some interesting intellectual property issues, because then people will start making wraps to put around the phones to make them look like the expensive ones. So, I think the answer is you need to hire a good IT lawyer and a fashion designer. I don't know if Don and Hal have thought about high-status accounts?

Mr. Varian: Call it PayPrince, rather than PayPal.

Mr. Kingsborough: I think we will leave it there.

Mr. Katz: One thing on this: You will not be able to show it to other people, but certainly, there are a lot of possibilities for creating tiers of service and having people who get the super high level of things. In that sense, it opens up way more possibilities for creating differential cards. You can automate it all. It is easier to have multiple levels of service. You are losing this thing about other people not saying they will be able see that. Certainly in terms of communications with the consumer and saying, "you get a package of service that nobody else gets," there are way more possibilities for that.

Mr. Kingsborough: You can put anything in the digital wallet and you can display it if you so choose to. All the things consumers want—which is loyalty, loyalty points, rewards, those kinds of things that are associated with the things that go

into the digital wallet—will still be there. You do not lose the less obvious things that are important when you move to a digital world. You do not lose it at all.

Mr. Hansen: Dr. Katz, you mentioned earlier regulation, regulation, regulation. As a lawyer who practices in this area, I would agree there are many regulations as you converge different industries—between the telecom industry with the banking industry, for instance, or interactive entertainment. But I would ask this panel, What is new that needs to be regulated? Right, I admit it is more complex. But to me the question is, Where is the gap?

Mr. Katz: I do not know enough about the details of regulation to know if there is a specific gap. My concern would be that you will see multiple regulations potentially covering the same transaction. What is going to be the need to figure out which regime is the one that governs it? That is the thing that concerns me the most. There could also be things that are new in the sense that communications networks might want to start using customer information in ways they had not before. Then there would be a question if a regulation needs to adapt to it. My guess is the problem is more so that things are covered that are not covered in the right way *rather than* there are things that are not uncovered.

Mr. Varian: I guess I was going to say the question is somewhat hypothetical, because we do not really know how the industry is going to shake out. But given the very strong network effects and the strong complementarities, it is *possible* some player would gain a position which gave them monopoly power and then there would certainly be cries from everybody else in the system that there should be regulation on the behavior of that player. I do not think that has really occurred yet. Of course, there was the American Express suit and the investigation of Visa-MasterCard about the payment mechanism. That is the kind of thing people are concerned about. There could be a player who locks in a privileged position and that is going to bring calls for regulation.

Mr. Kingsborough: At the beginning of any revolution, there has to be a period of time to let these things grow and to foster these things first. Then start to look at regulation after you start to see clearly the direction in which these new payment types, these new marketplaces are going. We always think you should hold off on regulation for awhile and then only use regulation when something is abused.

Ms. Walker: I will take the last question here. One of the questions I had was, You are all very well-connected in the space we are talking about today. It seems there is an opportunity for new incumbents, new participants in this particular activity. I am curious if any of you have seen any startup or entrepreneurial ideas you find have promise to help us move in this direction and play a growing role in that area. Michael.

Mr. Katz: I am sure PayPal and Google will. I will defer to the industry.

Mr. Varian: I have already mentioned Square. There are people who are

working on currencies in social networks and trying to do aggregation of virtual currencies—that kind of thing. There is an amount of interest there.

Mr. Kingsborough: I gave a speech the other day and I said, “This is the first time financial services were really sexy.”

I think that there are a lot of startup companies that look at the world totally differently than probably most of us in this room. They are not obligated to follow the rules. So we see companies all the time that take small niches and start to innovate on those niches. There is a tremendous amount of innovation going on. Both new companies and you will see some companies of size—like Google or like PayPal—that actually are innovating. The industry will see lots in the coming 24 months.

Ms. Walker: Thank you all for your attention. This wraps up our panel this morning. Please join me in a round of applause for Michael and our discussants.