

The Digital Revolution in Banking

Gail Kelly

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About the Author

Gail Kelly began her banking career in 1980, and by 2001 she had held various senior management roles in a broad range of areas, including retail and commercial banking, strategy, marketing, and human resources. Gail has spent the last 12 years as CEO of two Australian banks, St. George Bank from 2002 to 2007, and Westpac from 2008 to date.

Gail has presided over a period of enormous change and challenge for the Westpac Group. In 2008, she led Westpac through its merger with St. George, the largest merger in Australian financial services history. Gail also led Westpac as it successfully navigated through the turbulence and risk of the global financial crisis and the consequent and continuing structural shifts in world banking and financial markets.

Westpac has grown to become one of the 15 largest banks in the world by market capitalization. Under Gail's leadership, Westpac Group today serves 12 million customers, employs 36,000 people, and has over 1,500 branches.

On 13 November 2014, Gail announced her retirement as CEO of Westpac effective from 1 February 2015.

Gail holds a Bachelor of Arts degree and Higher Diploma of Education from Cape Town University and an MBA with Distinction from the University of Witwatersrand. She is Chairman of the Australian Bankers' Association, and a non-executive director of the Business Council of Australia and the Financial Markets Foundation for Children. She sits on the Global Board of Advisers at the U.S. Council on Foreign Relations, and is a member of the Group of Thirty. Gail is also CARE Australia's Ambassador for Women's Empowerment.

Gail and her husband Allan have four children.

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Introduction

The Financial Services industry has always sought to be at the forefront of technological innovation. Success has depended on it. The sector led the early commercial adoption of mainframes in the 1960s, the rollout of large-scale credit card and ATM networks in the 1970s, electronic trading in the 1980s, and the early move into online banking in the 1990s.

The financial services sector is now confronted by a new challenge, as a range of very different digital technologies—mobile devices, social media, cloud computing, data analytics, and process digitization—all mature together. Combined, they have the power to transform markets for customers and to disrupt established players.

The impact of digital technologies on financial services will be large and pervasive. The result is likely to be a very different financial services landscape. Traditional players will fundamentally reconfigure their operations. Complex collaborations among players in financial services and other sectors will be established. New entrants, some with very different business models, will emerge.

This shifting landscape will hold new challenges for policy makers, in a period when both renewed economic growth and financial stability are needed. New sources of competition, increased innovation, and greater productivity are essential ingredients for economic growth, especially in mature economies. At the same time, policy makers will need to ensure that what is likely to be a very different environment remains safe, robust, and orderly, and operates in a way that both facilitates economic growth and protects the community.

Further, if a sound and stable financial system is to be maintained in the face of a rapidly changing environment, policy cannot afford to lag too far behind commercial reality. Early identification and consideration of the issues that matter may make an important difference.

This paper outlines the march of digital technologies into financial services and describes the emerging policy questions. It argues that these issues are worth further consideration and suggests a path forward for their elaboration and discussion.

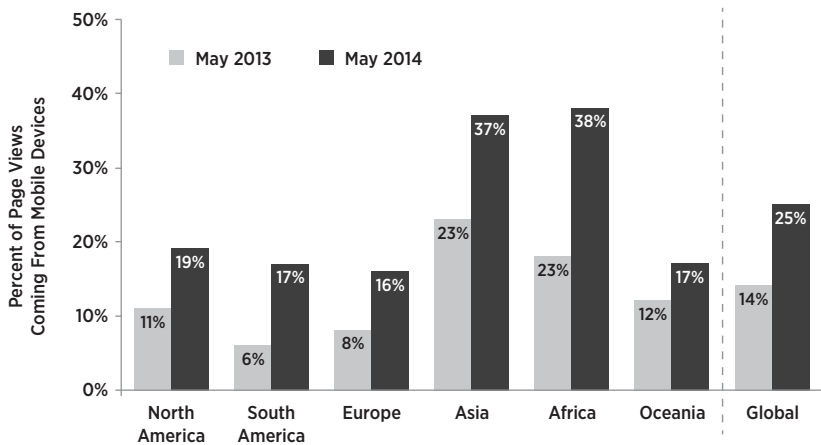
The March of Digitization

The digital economy is distinctive for the speed at which it has developed.

The Shift to Mobile

Mobile devices are now the source of 25 percent of web usage globally, compared to 14 percent a year ago. In Asia and Africa, mobile devices account for nearly 40 percent of internet page views (figure 1).

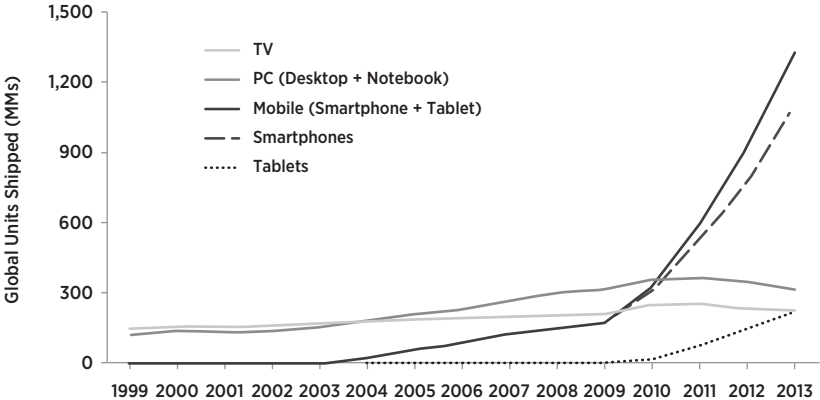
FIGURE 1. MOBILE USAGE AS PERCENT OF WEB USAGE BY REGION



Source: Meeker, based on 2014 data from StatCounter.

Globally, smartphone and tablet usage rates are growing at 20 percent and 50 percent per year, respectively. However, even with these levels of growth, smartphones still represent only 30 percent of mobile phones globally, and tablets have only a 6 percent population penetration rate (Meeker 2014) (figure 2). In all likelihood, it will be only a few years before mobile devices (and the technologies and business models that operate on them) become pervasive.

FIGURE 2. GLOBAL TV vs. PC (DESKTOP + NOTEBOOK) vs. MOBILE (SMARTPHONE + TABLET) SHIPMENTS, 1999–2013



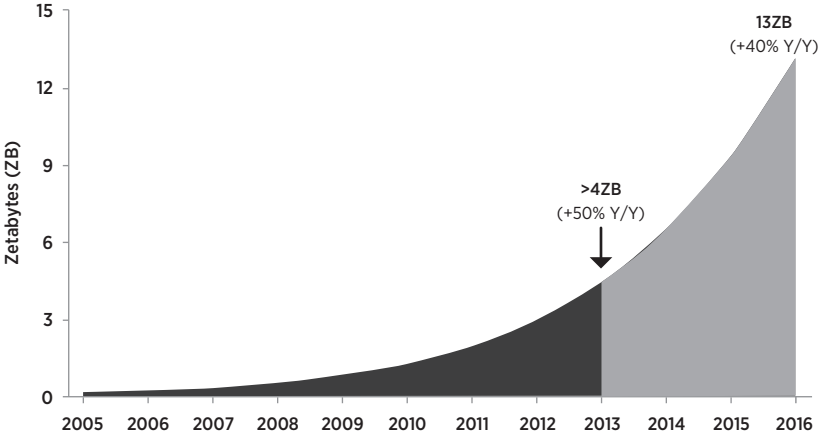
Source: Meeker, based on data from DisplaySearch (2004–2013 data), Philips (1999–2003 data), and Morgan Stanley (2014).

The Data Explosion

As smartphone (and tablet) penetration increases, levels and rates of connectivity and interaction (particularly using social media) are rising rapidly. These levels of activity, combined with the increasing addition of sensors to smartphones, means that an astonishing amount of data, much highly individual, is now being collected about customers, places, events, and businesses.

It is estimated that today there are around six zettabytes of data stored digitally (figure 3). A zettabyte is an almost unimaginably large 1 million million gigabytes. The amount of digitized data is currently doubling every two to three years.

FIGURE 3. GLOBAL GROWTH OF DIGITIZED DATA



Source: Meeker (2014).

Very rapid data growth is supported by a rapid decline in the costs of transmitting, storing, and analyzing data. These costs, as shown in figures 4a., 4b., and 4c., have been falling exponentially. Perhaps not surprisingly, IBM estimates that by 2017, 70 percent of corporations globally will use cloud computing technologies to help manage their rapidly burgeoning data holdings.

FIGURE 4a. GLOBAL COMPUTE COST TRENDS

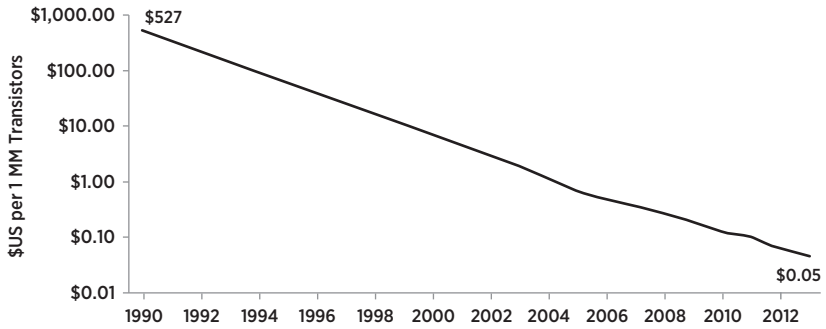


FIGURE 4b. GLOBAL STORAGE COST TRENDS

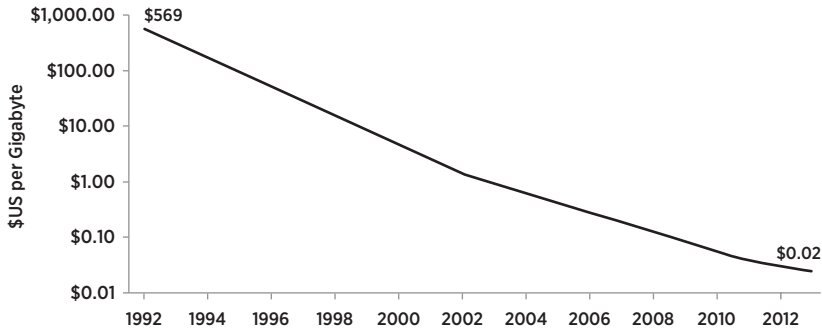
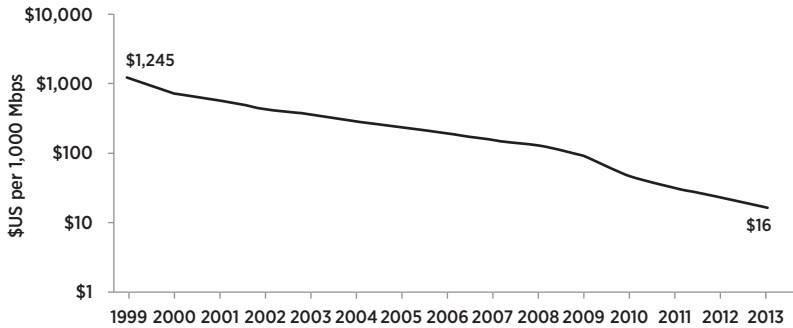


FIGURE 4c. GLOBAL BANDWIDTH COST TRENDS



Note: Y-axis on graph is logarithmic scale.

Source: Deloitte Center for the Edge.

The Rise of Social Technology

These extraordinary shifts in data collection, mobility, and storage have led to a rapid rise in social technology. Globally, around 2 billion users will be registered on social networks by 2015.

Almost 70 percent of internet users use social networking sites. Ninety-two percent of business owners see social technology as important for their business. An estimated 77 percent of Fortune 500 companies are on Twitter. Social networks will take in an estimated US\$12 billion in marketing revenue in 2014.

A Digital World

As a result, an extraordinary amount of human activity is becoming mobile-based, including a great deal of commerce and banking.

Customers now expect to be able to undertake almost any social or commercial activity from any place, at any time, quickly and flexibly. The combination of smartphones, social media, the downloadable “apps” architecture, and cloud computing puts immense power and flexibility into customers’ hands to choose providers, compare pricing and features, review recommendations, and complete purchases. This includes understanding their financial position, making payments, and the sale and purchase of financial products.

In response, the financial services sector is transforming rapidly. As data analytics, sensing and data collection capabilities, and payment technologies continue to develop, this transformation will continue.

In economies where more traditional financial services infrastructure is underdeveloped, the transition to mobile is even more accentuated.

The Transforming Bank

When Westpac launched the first smartphone mobile banking app in Australia in 2008, it took less than 30 months and little marketing effort for 1 million customers to adopt the new technology.

Since then, customer adoption rates have soared. Currently, over half of all customer transactions at Westpac are conducted using mobile devices, more than eight times the volumes conducted in branches.

By contrast, when Westpac launched internet banking in 1996, it took 80 months of consistent marketing effort to move the first 1 million customers online.

Customer-led Change

Previous shifts in banking technology were largely bank-driven; digitization is customer-led. Today, customer demand for mobile financial services, and their appetite for new mobile innovations, is well ahead of the capabilities of most banks.

As a result, we are seeing a pace of change in banking that is probably unprecedented and a level of innovation that is likely to dwarf anything in recent experience, all in time frames no longer in the sole control of established players.

This revolution in financial services is, of course, a major strategic focus for commercial banks. Nearly all banks have large programs underway to reposition their systems infrastructure to support these

new technologies, to use them to develop new solutions for customers, and to transition to operations of much lower cost.

It is already clear that creating a successful bank for the digital era will require a major reworking, and in some cases, reinvention, of today's banking operations.

Not all banks will be able to move at the pace required by the market. Banks are already heavily committed to the implementation of significant regulatory reform, including in the areas of compliance and conduct. As a result, we may well see larger gaps emerging between those banks that have the capacity to deliver large-scale regulatory change and that undertake a digital transformation (in the space of a relatively few years), and those that fall behind.

For those banks that fully embrace the digital revolution, few areas of their operations will remain untouched.

Innovative Customer Solutions

The products and solutions offered to customers will change in fundamental ways.

In particular, we are likely to see products that cross traditional industry boundaries. For example, new products targeting the retired segment are likely to combine travel and accommodation bookings, insurance, multicurrency payments, and foreign exchange. Similarly, new products for homebuyers are likely to combine real estate brokerage, valuation, financing, and insurance into a single offering. These new sorts of product combinations are likely to be much more than a simple bundling together of existing products.

This will occur across all customer segments. While, in some industries, digitization is seen as a largely consumer phenomenon, it will also encourage new products and services to be developed across the full range of business, corporate, and institutional customers.

Developing and, equally importantly, rapidly deploying, new customer solutions will require new skills in banks, new suppliers and partners, and potentially new types of acquisitions. As a result, there are likely to be many more collaborative undertakings between banks and nonbank players.

Reconfigured Distribution

Distribution will become much less reliant on physical distribution, particularly as cash needs decline, video-based advice becomes more common, and a wide array of new tools for customers are made available.

Social networks are already a key promotional and sales channel for building customer engagement, as well as a steadily growing channel for service escalation. Customers increasingly prefer mobile devices as their “branch.” While the “death of the branch” has been falsely forecast many times since the late 1980s, it seems likely that what will occur in branches will significantly change as a result of digitization, and that a substantial reduction in physical presence is now likely.

Process Digitization

Digitization is not just a distribution and retailing phenomenon.

Digital technologies, solutions, and thinking will have a substantial impact across the full range of banking activities. For example, in banking operations, process digitization will lead to the automation of most back-office processes. In risk management, the combination of advanced analytics with massive amounts of digitally generated data will cause the redesign of risk management policies and processes. In technology functions, systems architectures will need to be reconfigured and new systems development tools and processes introduced.

Fundamental Workforce Change

Across financial services there has been a long-term trend to fewer, more flexible, and more highly skilled jobs. The digital revolution will accelerate this trend, even though estimates differ on the final impact these technologies will have on the banking workforce. They are likely, in addition, to require the building of new technical skill and knowledge sets, the incorporation of artificial intelligence capabilities, and much greater management flexibility.

These changes will affect executives as much as the general workforce.

Management of change processes, undertaking end-to-end process redesign, and product and service innovation, will all require significant changes in management approach and thinking.

Summary

In total, digital technologies can, and ultimately will, be deployed in nearly all areas of banking. Moreover, given their potentially disruptive impact, banks will need to deploy them relatively quickly, or face ceding increasing parts of the banking value chain to new entrants.

We should not underestimate the nature or the scale of the change agenda facing individual banks. Many already face considerable operational and financial pressures as part of their longer-term recovery and repositioning after the global financial crisis and in order to implement the important regulatory reform programs now largely agreed.

The new competitive pressures that digitization brings are to be welcomed as a revitalizing and positive step, and it is in the community's broad interests to see the established banking industry adapting quickly and well. The community needs both a modern and well-functioning banking system, with institutions that can ensure safe and trusted services across the economy. It is highly desirable that boards and management teams of banks direct appropriate resources, skills, and energy to enable this transition.

The Implications for Policy

The digital revolution clearly contains major challenges for commercial banks.

It also throws up questions for the financial system as a whole—questions that should engage thought leaders, policy makers, and regulators.

The impact of the digital revolution is still in its early stages. Moreover, broader questions about the general regulation of the internet are still in flux, with individual countries already adopting very different approaches to access to internet-based services.

However, this should not encourage a “wait and see” mentality. The digital world is already beyond the stage where it can be dismissed because of its small size or marginal nature. Nor should policy makers adopt too restricted or narrow a view of the questions before them.

There is already an emerging view that the digital revolution may bring economic and societal changes to parallel those of the industrial revolution. If it does, it holds the potential for great improvement in social and economic conditions but also for great disruption.

While our understanding of the digital revolution will continue to emerge and evolve, the early impacts on the financial system as a whole are beginning to become clearer.

From a policy perspective, four important questions, discussed below, already stand out:

1. How will digitization change the industry boundaries of financial services? Who should we now think of as participants in the financial services sector? Who should be subject to regulatory oversight and how?

2. How will confidence, trust, and privacy be maintained and protected in a digital world?
3. How does currency work in a global, digital world? Should cryptocurrencies proceed unfettered?
4. Does the digitization of financial services change the profile of risks in the financial system? Does it reduce or exacerbate existing risks or introduce any new areas for concern?

1. The New Boundaries

The boundaries of banking have never been static or easily articulated.

When activities that are difficult to define and regulate operate only at the margins of the financial system and have little impact on it, risk and regulatory questions pose relatively few challenges. However, when apparently marginal activities grow rapidly, they can have a profound, and potentially unforeseen, systemic impact.

The global financial crisis brought the challenge of setting the perimeter for the financial system into sharp relief, in large part because of poorly understood innovation in the shadow banking sector. As a result, regulators increasingly speak of the need to regulate activities rather than entities.

The digital revolution will continue this challenge: What should be inside the perimeter of regulation and what can safely operate outside it? How dynamic does supervision and regulation need to be? As a wider and wider range of entities are involved in banking activities, how broadly should policy makers and regulators set their gaze?

In digital financial services there are already examples of astonishing growth outside the traditional bounds of the sector.

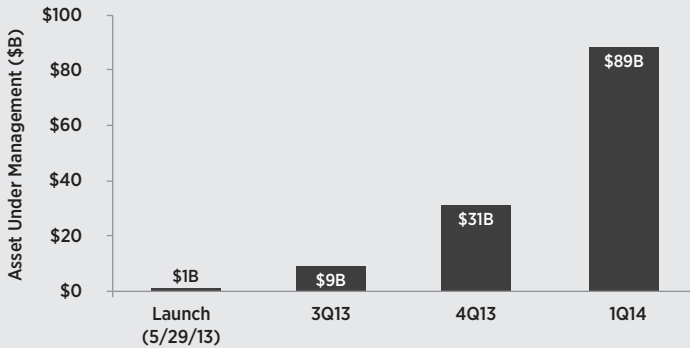
YU'E BAO, A NEW MONEY MARKET FUND

In China, Alibaba's launch of Yu'e Bao, an online money market fund, raised US\$89 billion within 10 months of launch (figure 5), making it the third-largest money market fund globally within a year of inception. Yu'e Bao, an entirely online creation, is built on top of Alipay, Alibaba's very successful online payments system, and now has over 160 million accounts.

That the world's third-largest money market fund could be built online by a company with no financial services history within a year of launch is not something any of us would have foreseen. Moreover, its success is clearly linked both to its online nature and its connection to a large e-market provider.

In response, earlier this year, the China Banking Regulatory Commission granted a banking license to the Alibaba Group, as part of an internet banking pilot program. A similar license was granted to Tencent.

FIGURE 5. ALIBABA'S ENTRY INTO FUNDS MANAGEMENT
Alipay Yu-E Bao Assets Under Management



Source: Meeker, based on 2014 data from Alipay, Liang Wu, Hillhouse Capital.

TENCENT, COMBINING SHOPPING AND BANKING

In a not dissimilar manner to Yu'e Bao, Tencent, one of China's leading internet companies, with over 400 million customers, uses their popular WeChat messaging application for other functions. Through the WeChat service accounts, customers of the China Merchant Bank are able to view their accounts, send money, and ask questions electronically. Other services offered through WeChat include shopping suggestions and food delivery.

M-PESA, MOBILE BANKING SERVICE FOR THE UNBANKED

In Africa, Safaricom, a mobile telephony company, has built M-pesa, an entirely mobile banking service. It has an entirely telephony, rather than banking, base.

Between 2008 and 2011, M-pesa grew at nearly 90 percent per year, is now used by 18 million Kenyans, and has an estimated 85 percent penetration rate among Kenyan families

In an economy where remittances from city workers to rural families are common, users report that M-pesa saves them around three hours and US\$3 compared to alternatives for moving money (often physically carrying the cash themselves to the intended recipient). The Economist Intelligence Unit estimates that the flows through M-pesa equal about 60 percent of Kenyan gross domestic product. As of 2012, there were 18 million users in Kenya alone who were transferring an estimated US\$1.6 billion per month. The service grew 88 percent in 2012.

Vodafone, an owner of Safaricom, is now expanding the M-pesa system to other geographies. The M-pesa service is currently available in the Democratic Republic of the Congo, Egypt, Fiji, India, Kenya, Lesotho, Mozambique, Romania, South Africa, and Tanzania.

**AMAZON CAPITAL SERVICES, INTEGRATED
LENDING AND PAYMENTS**

In the United States, Amazon is now building two financial services businesses around its global online retailing and logistics business. Amazon Capital Services provides loans to companies that retail through Amazon, based on the detailed understanding of their sales and economics generated through its retailing systems, and Payoneer provides simple global payments solutions to individuals and some companies.

THE BLURRING OF BOUNDARIES

Each of these examples involves the combination of some aspect of financial services, digital technology, and another industry. Each has grown at an astonishing rate. There is much more to come; we are only at the beginning of a new phase of reinvention. With new start-up businesses emerging every day, backed by a large venture capital flow, this trend will expand into a wide range of commerce activities.

Were this trend to be little more than the embedding of existing payments solutions within online commerce activities, it might be fairly readily accommodated within existing policy and thinking.

However, these examples go well beyond that. Their success arises from the combining of aspects of different sectors and industry types, using the power of digital technologies. They are likely to be early examples of a new class of participant in financial services, which combine:

- Innovative thinking and practice around data combination, customer needs recognition, and credit decision making
- A combination of different industries, with different regulation and different conventions
- Low-cost mobile distribution, with an inherently large and readily scalable reach.

Further, given the nature of the technology and distribution methods used, some of these businesses will be naturally global in nature and will not limit their ambitions to a single, domestic market.

In response, traditional players are likely to seek much higher levels of collaboration with new players outside financial services and with new entrants. We may well see a wide range of “collaborative enterprises,” as established players seek to marry their traditional strengths in banking with the agility and technological capabilities of others. These collaborations are likely to extend much further than traditional sourcing and outsourcing arrangements.

A NEW FOCUS FOR POLICY

As traditional sectoral and geographic boundaries blur, policy makers may need to rethink aspects of regulation. How will the combination of aspects of traditionally separate industries affect the stability of the financial system and the profile of systemic risk? If banking is to be increasingly regulated on an activity basis, how widely will financial regulatory supervision need to extend? Do any activities need to be insulated from others? At a time when regulation is becoming more domestically focused, in order to make it more manageable, and complex cross-border arrangements are being simplified, how far should new models be allowed to run before attracting scrutiny?

As digital technologies stimulate wide-ranging innovation in customer value propositions, business models, and product distribution, the financial system may evolve in some unforeseen directions. Changes may occur quickly.

Moreover, some new entrants start with an intention to operate outside any regulation that might slow their progress. This will almost certainly give rise to nonbanks that seek to play as if they are banks but do not wish to follow the banking rules.

The digital revolution is likely to engender an intensive period of innovation that largely ignores well-established rules and boundaries. Regulating banking activities in a digital world may require regulating thousands of market participants. Hope that tighter regulation and supervision of the key established players at, say, selected points in the payments chain will provide sufficient protection for the system as a whole may well prove misplaced. Moreover, confidence that whatever

genies arise can readily be returned to their respective bottles may prove optimistic, as the wider policy debate about the internet shows.

Policy makers will need to ensure that their gaze remains focused outside the walls as well as in, to stay close to the implications of new offerings for stability and regulation and to give careful thought to policy responses. For policy makers who have been able, for many years, to focus their efforts on a relatively small number of well understood market participants in order to protect the financial system as a whole, this may prove a challenging shift in focus.

2. Maintaining Confidence in the System and Protecting Privacy

Confidence and trust in others is at the heart of the financial system. Community confidence that the players in a financial system can securely store a customer's money and repay it on demand, make approved payments accurately and on time, and protect a customer's private personal and financial information anchor the banking system.

CONFIDENCE IN THE SYSTEM

In the predigital world, community and customers rely on largely well-established players, licensed and subject to prudential regulation and supervision. Moreover, most of the players in the system have a good understanding of each other's capabilities and have established methods of measuring and limiting their counterparty exposures.

Digital technologies are leading to a rapid growth in the number of players participating in the payment process. Some of these offer an alternative to traditional systems (such as Ripple.com, an alternative to correspondent banking), and many offer an additional layer, or layers, in the process. Some offer internal netting¹ on customer accounts and private currency-like mechanisms to make internal payments. Many of these ultimately use established payments systems, such as the cards system, but a number are seeking an increasing role for themselves.

1 Internal netting allows the exchange of value between customer accounts within a digital business, without recourse to the banking or payments system.

Given that payments-related data are highly valued by internet-based businesses, a continued push into payment activities is likely, both in domestic and cross-border markets.

Where internet payment offerings remain a simple layer on top of the existing payments system, as occurs in many online retailing businesses, the risks in the payments system are unlikely to be much affected. However, as more sophisticated offerings emerge and customer usage begins to change, new risks will emerge and some existing risks will begin to shift to new players.

To ensure community confidence is maintained in the payments system (and, thus, the financial system), policy makers will need to closely track new payment options and practices and the players that offer them.

THE PRIVACY OF CUSTOMER DATA

It is a tenet of banking that a customer's personal and private details must be protected. Unless required by law, most banks will not disclose customer data to a third party or use it other than for the purposes provided.

By contrast, many digital business models are based on the exploitation of private data. For a digital business, a customer is defined by their data, including passively generated data of which a customer may not even be aware. Digital businesses often buy and sell very detailed customer information and use advanced analytic techniques on that information for marketing and other purposes. Some digital financial services businesses encourage consumers to divulge bank account numbers, pins, and passwords to facilitate their operations. It is often said, and increasingly true, that there is little or no privacy on the internet.

Perhaps surprisingly, customers, especially younger customers, seem to accept this. Even with some reasonably high-profile issues occurring over the last year or so, customers continue to use online services that do not protect privacy, especially where services are provided for free in exchange for relatively unlimited use of customer data.

Almost certainly, these practices will find their way into financial services, if they have not done so already. If these practices prove as financially attractive in financial services as they have in other sectors, pressures will rise on traditional banks that operate digitally to follow suit.

Most large banks will be reluctant to change their attitudes toward, and practices for, protecting customers' private data. For many of us, this will be an unequivocally good thing. However, it may also lead to a situation where practices vary considerably among players, and customer confidence in the safety of the system overall is diminished.

Setting, or resetting, the standards for data protection and usage in companies that provide financial services digitally is an important task for policy makers and regulators to address within the next few years.

TRUST IN THE SAFETY OF BANKS AND THE BANKING SYSTEM

In the predigital world, banks regularly included images of their large below-ground vaults in advertising and designed their branches to look (and, in fact, be) physically strong and secure. Tellers were required to balance their cash at the end of every working day. Safety was focused on physical attack and the protection of cash.

Cybersecurity is now the largest security issue facing the financial system. As we have seen over the last year, in particular, the rate, nature, and success of attacks on the financial system have increased significantly. Many of these attacks have targeted private customer data, not just as a means of stealing customer funds but also to create disruption and uncertainty by destroying data holdings.

These attacks involve a quite different set of perpetrators than banks are traditionally used to facing, including players with geopolitical as well as criminal objectives.

BANK SECURITY

For the last two decades, cybersecurity in banks has been based on two central ideas—the creation of strong perimeter defenses (firewalls and similar mechanisms) and the encryption of data in transit outside the perimeter walls. More recently, increasing effort has also gone into monitoring system traffic and activity to identify anomalous events that might indicate fraud or attack.

While these strategies have worked well thus far, they will come under increasing and considerable pressure. For example, attacks on perimeter security have become increasingly sophisticated, and there are an increasing number of recorded instances of breach.

In addition, banks will need to increase their ability to monitor the “enemy within”—a number of recent breaches of credit card data appear to have been enabled by the malicious actions of staff or contractors with privileged systems access. As perimeter security is increased, it is likely that attempts will increase to access protected data, insert malicious hardware or software, or disrupt environments from the inside.

The secure transmission of data, which is now a central feature of the financial system, has relied on cryptographic techniques using computationally intractable functions. These techniques are so “intractable” that they are widely regarded as being well beyond the capacity of even the largest assemblies of conventional computers to unscramble. This is still the assessment of experts in the field.

However, computing capabilities continue to develop rapidly. Very recently, what is claimed to be the first commercially available quantum computer was released in Canada, and Google has just made a major investment in this field. While it is still the clear assessment of experts that our current cryptographic standards remain secure, close attention to developments is important.

These three issues—increasing risk of perimeter compromise, greater “enemy within” attacks, and the risk of cryptographic defeat of data in transit—mean that the current approaches to, and standards for, bank security will need to be fundamentally reappraised over the next five to 10 years.

SECURITY BEYOND BANKS

However, security of the financial system extends beyond the security of individual banks. As banking activity increasingly extends beyond banks, so must questions of adequate security for the banking system. Businesses beginning to engage in banking-like activities as a result of the digital revolution regularly use, or depend upon, public or hybrid clouds for data storage and often deploy security measures that fall below what is regarded as appropriate in major banks.

As the digitization of banking continues, it is unclear that security arrangements in individual banks, however strong, will provide adequate security for the system as a whole. In the complex web of

businesses that provide e-commerce, failures in one part of the system may lead to a loss of confidence in the system as a whole.

While no part of the financial system would be complacent about cybersecurity, it may well be that the greatest risks to security lie outside the areas of greatest focus.

A LOSS OF CONFIDENCE

A loss of trust in a player in the financial system usually results in the rapid withdrawal of customer deposits, a rapid rise in counterparty collateral levels, and a refusal to deal.

Digital technologies potentially exacerbate the impact of a loss of trust. It is already conceivable, for example, that a “run” on a bank might originate on social media and occur on mobile phones. In a digital environment, such a “run” could occur at any time and spread with astonishing speed. With real-time settlement processes in place, enormous shifts of funds will be able to be effected in virtually no time.

Flows of cash in and out of individual institutions can already happen quickly. They will be able to happen much more rapidly in a digital environment. This is likely to encourage more precipitate behaviors by market participants seeking to manage counterparty risk and, consequently, the capacity for even more rapid intervention, when required, by market regulators.

Given the importance of community trust in the safety of the banking system, even the most technically complex of these issues should not be left for technical specialists alone to solve. Bank executives, policy makers, and regulators will all need to be satisfied that customer data are adequately protected and that commerce that relies on electronic exchange can be safely conducted. A high level of engagement and collaboration, locally and globally, is likely to be required to develop enduring solutions.

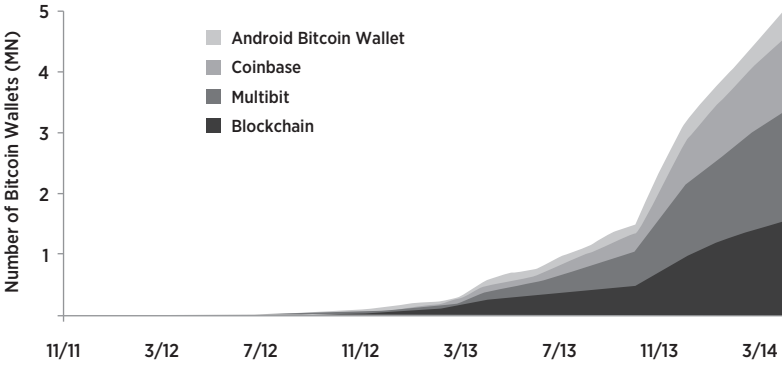
Trust is a fundamental feature of the financial system and a precondition for its successful operation. As it has developed so far, the digital world offers very different trust propositions. As the two worlds collide, we need to be very sure that the central elements of the financial system that create trust are not compromised.

3. Digital Currency

Until recently, digital currencies have largely been a novelty, and all early attempts to build them have proved deeply flawed.

However, with the advent of cryptocurrencies, consumer interest in digital currency is growing rapidly. It has been estimated that there are now 5 million bitcoin wallets, an 800 percent increase over last year (figure 6).

FIGURE 6. NUMBER OF BITCOIN WALLETS BY WALLET PROVIDER



Source: Meeker, based on 2014 data from CoinDesk.

This is despite bitcoin holders suffering losses as a result of technical issues and exchange collapses, considerable volatility in its value (it has fluctuated from well over US\$1,000 to under US\$400 over the last year, hardly an attractive feature in a currency designed for commerce), and its apparent popularity among criminal users.

Coin Market, a U.S.-based exchange for buying and selling bitcoin and other cryptocurrencies with U.S. dollars, tracks the performance of 100 cryptocurrencies. While the amount of cryptocurrency on issue is tiny, it is growing rapidly. In addition, greater clarity from taxation authorities and some central banks has allowed users more certainty about using cryptocurrencies.

Reliable currency, issued and controlled in a well-understood manner and backed by government, is a key contributor to the stability of the financial system. The uncontrolled introduction of a large number of unbacked or unsupported currencies into circulation may not be wise.

In addition, when currency was introduced, keeping track of financial transactions and money flows was not an issue. One characteristic of cash, its largely untraceable nature, was largely irrelevant. Today, in a complex and largely global financial system, it is not. Governments and regulators have legitimate and compelling reasons, including taxation, law enforcement, and national security, to better understand money flows and financial transactions. It is no surprise that early adopters of bitcoin were those with a reason, or desire, not to have their financial dealings observed by governments.

One of the defining characteristics of the digital world has been the rapid “S-curve”² rates of adoption. At times, growth rates for new technologies and new products, including for uses not foreseen, have been well ahead of what was expected. Once in place, digital currency may prove difficult to control. Policy makers should not let this product run too far without thinking through its best regulation and use in the global economy (and individual domestic economies).

4. The Changing Profile of Systemic Risk

Overall, the advent of digital financial services is likely to change the profile of risks across the financial system. Almost certainly it will raise new risks; it may also arguably make others easier to manage.

Traditional credit risk, for example, has the potential to become more accurately managed as the amount and timeliness of data available to credit providers increase considerably. Key credit functions such as property valuation may become more accurate and more objectively based. Credit decision making is likely to become more automated and more consistent as a result. Advanced analytic techniques may allow patterns in credit and market data to be observed earlier and with greater clarity, allowing swifter and more accurate response to emerging imbalances and other issues.

Some aspects of operational risk may also decline, as greater automation is introduced.

Against this, systems reliability is likely to become a more important risk consideration, as the ability to “step back” to manual systems in

² An S-curve is used to represent the adoption of innovation over time. It was proposed by Everett Rogers, a communication professor, and seeks to explain how, why, and at what rate new ideas and technology spread through cultures.

the event of failure becomes increasingly difficult. Greater redundancy and higher levels of assurance will be required, not just in major banks but in a growing number of new entrants. In addition, cybersecurity risks will certainly increase, and new approaches and techniques will be required to address and mitigate them.

These changes, together with the wider spread of financial services in the economy, more complex webs of service delivery, and high levels of innovation, are likely to shift the overall profile of systemic risk.

The net impact of all these will not be easily assessed. Policy makers will need to think deeply about systemic risk, including about the potential role of digital financial services in the creation and transmission of future financial crises.

Conclusion

Assessing the risks of a digitizing financial services environment and responding to them is a challenge for policy makers and thought leaders, as much as it is for the executive teams of commercial banks.

The challenge will be making sure they are staying up with the play, have the capabilities to understand the new environment, and are not letting new risks emerge unobserved.

There can be little doubt that digital technologies are rapidly changing financial services.

In the next few years, traditional banks will transform. New entrants will appear, some playing a potentially major role in financial services, particularly in payments and related services. Traditional boundaries will shift, and there is the potential for financial service activities to spread well beyond traditional providers and be undertaken by complex webs of entities.

Understanding industry boundaries in a digital world, ensuring that community confidence and trust are maintained, thinking through the consequences of digital currency, and recalculating the profile of systemic risk are all likely to prove weighty issues.

While much is in flux and some issues are now emerging, it is prudent to start discussion early, rather than trying to catch up later. It may also be wise to set some early boundaries, even if they are relaxed later.

Given the extraordinary disruption caused by the global financial crisis, it is not surprising that matters of capital, liquidity, resolution, and recovery have dominated debate for the last few years. It may now be timely to direct more consideration to the next large wave of change about to break across the sector.

This paper is intended to stimulate a discussion about the systemic consequences of the digital revolution for financial services. While there has been much debate about the commercial and social consequences of the digital revolution, the policy debate has received much less public attention. At a time when both economic growth and the stability of the financial system are essential concerns, finding the right balance between encouraging new growth and not allowing it to proceed in a totally unfettered manner is an important and major task for policy makers and policy.

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