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Disruption or distraction? How digitisation is changing New Zealand banks and core banking systems



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Consumers now expect the same seamless digital services from banks as they receive from other industries. Hence, the banking industry is being ‘digitally disrupted’ as banks and technology firms race to meet this expectation. This article explores whether the digital disruption of banking is a ‘disruption’ or more of a ‘distraction’ and aims to understand the concept of digital disruption of banking, what is driving it, what are the impacts on banks, and what are the impacts on financial system stability. It finds that the disruption is occurring in all areas of banking but particularly in retail customer interactions. The introduction of new ‘digital’ competitors is driving banks to respond with digital strategies including the modernisation of their core banking systems. Digital disruption may impact financial stability both positively and negatively, and the Reserve Bank continues to monitor it closely.

1 Introduction

The banking industry has been confronted with ‘digital disruption’, ‘digitisation’ and ‘digital banking’. These are all terms referring to the change in the banking system (and wider financial sector) as customers demand a more digital banking experience and firms outside of the banking sector, including technology firms, respond to these demands. However, it is not clear how deep this disruption of the banking industry is and how it might affect the stability of the financial system.

The Reserve Bank has a mandate to “promote the maintenance of a sound and efficient financial system” according to section 1A of the Reserve Bank of New Zealand Act 1989. In addition, part 5 of this Act mandates the Reserve Bank to regulate and supervise banks. Therefore, the Reserve Bank is interested in any disruption (digital or otherwise) to the banking system.

The article finds that digital disruption is currently focused on ‘customer-facing’ banking services, but it also could result in more fundamental

¹ The author would like to thank Greg Perrott, Chris Miller, Stuart Irvine, and Andrew Rodgers for their contribution to this article.

changes to the banking system.² Banks are motivated to respond to the digital disruption in order to remain competitive, but a key challenge for banks is the current state of their core banking systems. While these core systems are effective at providing current banking services they limit banks' ability to provide new and seamless digital experiences for customers.

Digital disruption has not so far affected the stability of the financial system. There is potential for digital disruption to bring beneficial and detrimental impacts to financial stability. The Reserve Bank has not proposed any new regulations in response to the digital disruption of the banking industry, but will continue to monitor new developments and assess whether and when a regulatory response is required to maintain financial system soundness.

Section 2 describes the digital disruption of banking and its drivers, and section 3 outlines the banking services that are affected by digitisation. Section 4 describes the potential effects of digitisation on banks and section 5 discusses the strategies being adopted by banks in response to these impacts, including how banks are developing their core systems. Finally, section 6 assesses the potential effects of digital disruption on financial system stability.

2 Defining digital disruption

Banks using new technologies to improve their services is not a new phenomenon. Over the late 1980s to 1990s automated teller machines (ATMs), electronic debit and credit cards, and telephone banking started replacing paper-based payments. Then, through 2000 to 2010, basic banking products became digitally available through the introduction of remote access to bank accounts via mobile banking and internet banking.³ However, these earlier digital trends were predominantly driven by the supply side (i.e. by banks themselves) to improve the cost efficiency of supplying banking services, and therefore improve profitability.

This current wave of digitisation is different to earlier periods of innovation in the banking industry in that it is primarily driven by consumers rather than banks. Consumers now expect more accessible, convenient and smarter transactions (using internet and mobile devices) when accessing and managing their finances, as they have experienced this convenience in other activities such as shopping and transportation. Advances in new technologies and the changing customer expectations have enabled non-bank firms, such as large technology companies (for example Amazon, Facebook and Google) and start-ups (for example PushPay, Moven and Harmony), to provide innovative bank-like services and take a share of the banking industry profits. These firms can be referred to as 'disruptors'. Figure 1 provides a simplified overview of the digital disruption in retail banking.

2 A glossary is provided at the end of this article to provide an explanation of the many technical terms and 'jargon' associated with this subject area.

3 Matarranz, Scopa, and Vlaar (2011)

The emergence of disruptors poses a threat to the traditional banking model and is referred to as the disruption of the banking industry. A survey by Efma and Infosys Finacle (2015) revealed that 45 percent of banks viewed global technology companies as high threat and 41 percent of banks also viewed start-up companies as high threat. Figure 1, overleaf, provides a simplified diagram of this disruption; under the current model of retail banking most services are provided by banks. However, after the digital disruption of banking, ‘front-end’ (or ‘customer-facing’) banking services such as the sales and distribution of banking products, account management and payment instructions may also be provided by disruptors. However, disruptors do not appear to be engaging in ‘back-end’ services such as holding deposits and settling payments because these activities tend to be captured by prudential regulation which makes them more expensive to provide due to additional compliance costs.

‘Millennials’ (the generation born 1981–2000) appear to be driving this ‘disruption’ of banking services. A three-year survey of views of 10,000 Millennials in the United States reported that the banking industry was the industry with the highest risk of disruption due to the Millennials’ low loyalty towards banks and expectations that technology companies could service their banking needs better.⁴ The survey found that:

- 71 percent of respondents would rather go to the dentist than hear from their bank,
- one in three respondents was open to switching banks,

- nearly half of the survey participants were counting on the change to traditional banking models to come from technology start-ups; and
- 73 percent of respondents indicated they would be more excited about a new financial product offering from Google, Amazon, Apple, PayPal or Square than from their bank.

2.1 *New Zealand’s openness to financial technology*

New Zealand is relatively open to financial technology and innovation so it is likely that the Millennial survey is indicative of the trends here. New Zealand consumers have already proven to be quick to take up new payments technology. The World Bank reported that 83 percent of New Zealand adults were using electronic payment methods (e.g. electronic cards and internet banking) making New Zealand the fourth most intensive user out of 164 countries.⁵ Payments NZ reported in 2014 that New Zealand had the lowest value of bank notes per capita in circulation of the OECD countries.⁶ A further global survey by RFintelligence (2014) ranked New Zealand the number one global pioneering payments market. This was based on three metrics: a low-value payment preference index (preference for using electronic payment opens for low-value payments), contactless openness index (willingness to use contactless forms of electronic payments) and a pace of change index (receptivity to changes in electronic payments, current payment behaviours and preferences for electronic payments).⁷

4 Scratch (2013) surveyed more than 10,000 Millennials concerning their opinions of 73 companies spanning 15 industries.

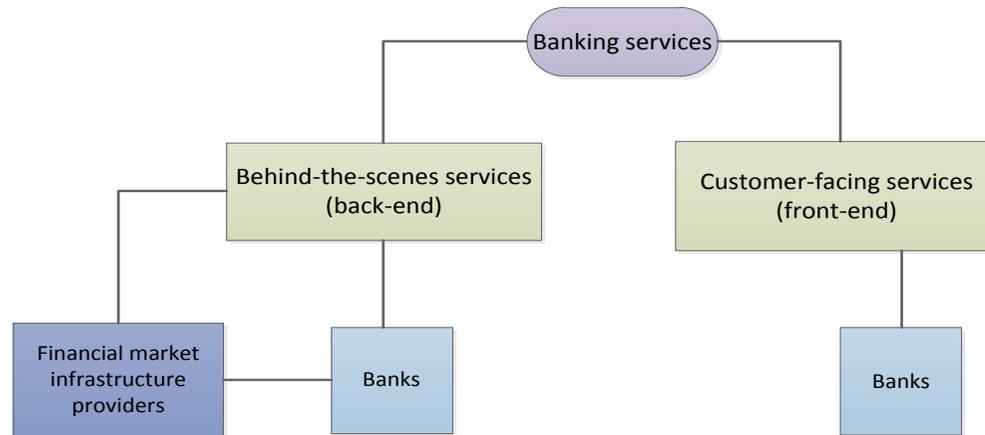
5 Worldbank (2015).

6 Payments New Zealand (2014).

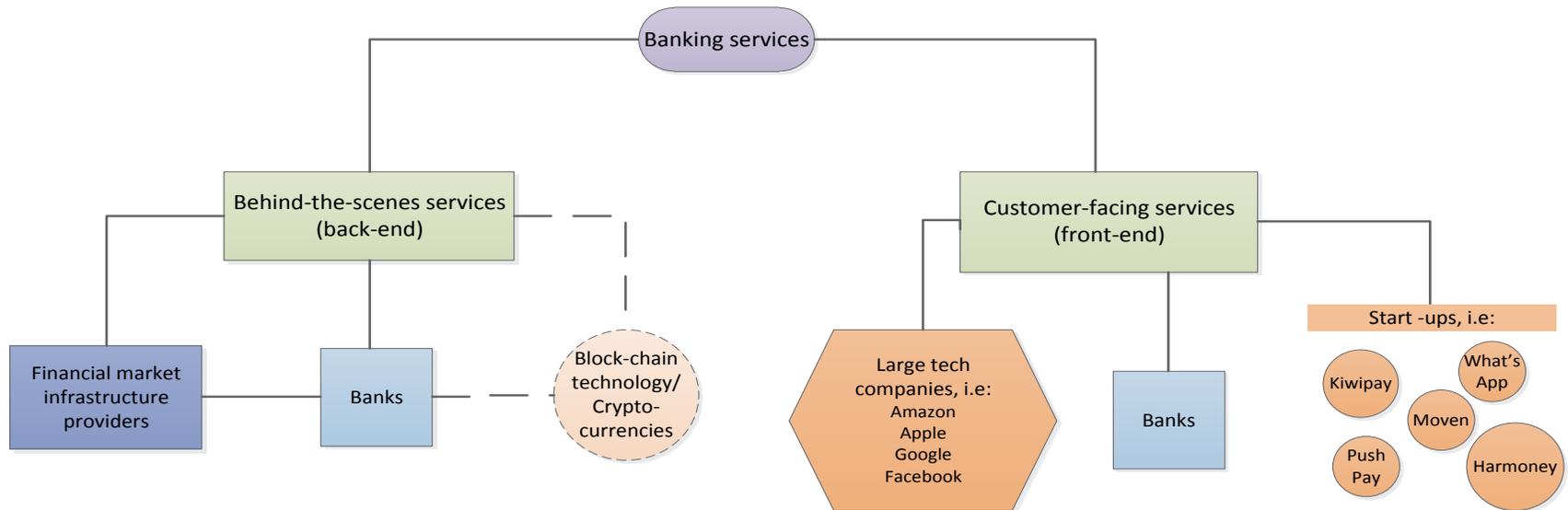
7 RFintelligence (2014).

Figure 1
A simplified
overview of
the digital
disruption
of banking
focusing on
retail banking

Current model of banking (retail)



Digital disruption in banking (retail)



New Zealand is also open to internet and mobile banking. The most recent data available from Statistics New Zealand (2013) depicts a rising trend of internet banking usage in New Zealand. In 2009, 1.74 million New Zealanders accessed internet banking, increasing to 2.5 million or about half of New Zealand's population in 2013. This access was spread across all age groups, including a 55 percent use rate in the 65-74 age bracket. Further, the 2013 data indicated that a quarter of 'recent internet users' accessed the web from their mobile phones.⁸ This corresponds with the rising trend of mobile banking in New Zealand and according to global trends we can expect these numbers to have increased. KPMG and Juniper Research estimate that the number of global mobile banking users was 0.8 billion in 2014 and will rise by 12.5 percent to 1.8 billion in 2019.⁹

On the supply side, financial innovation in New Zealand is also growing strongly. The Technology Investment Network's annual TNI100 tracking report for 2015 reported a rise in the number of New Zealand's technology companies experiencing high revenue growth and success in the United States market. These include financial technology start-ups Vend, DataTorque, PushPay, Xero, Transaction Services and Invenco.¹⁰

3 Disrupting the traditional bank model

Banks' core roles are to act as an intermediary between depositors and borrowers, help manage risks for depositors and lenders, and provide payment services. In fulfilling these roles the banks provide security and convenience to the depositors and access to credit for borrowers. Banks are also key agents in the creation of money (via fractional reserve banking)¹¹, distribution of notes and coins, and are part of the transmission of monetary policy (via the rates charged for loans and paid on deposits). A central question is if and how this 'digital disruption' described in the previous section will affect the bank's core roles or whether this disruption is limited to the banks' retail distribution models and interactions with consumers. It appears that digital disruption will impact both the retail distribution and customer interaction models of banks, as well as potentially disrupting the core role of banks.

A survey by McKinsey&Company of the customer segments and products of 350 globally leading financial technology firms (or leading 'disruptors') revealed that all banking segments are at risk of disruption.¹² However, the main area of concentration of these disruptors is the retail sector, and the various products and services tied to payments, lending and financing (figure 2).

8 Canstar (2013).

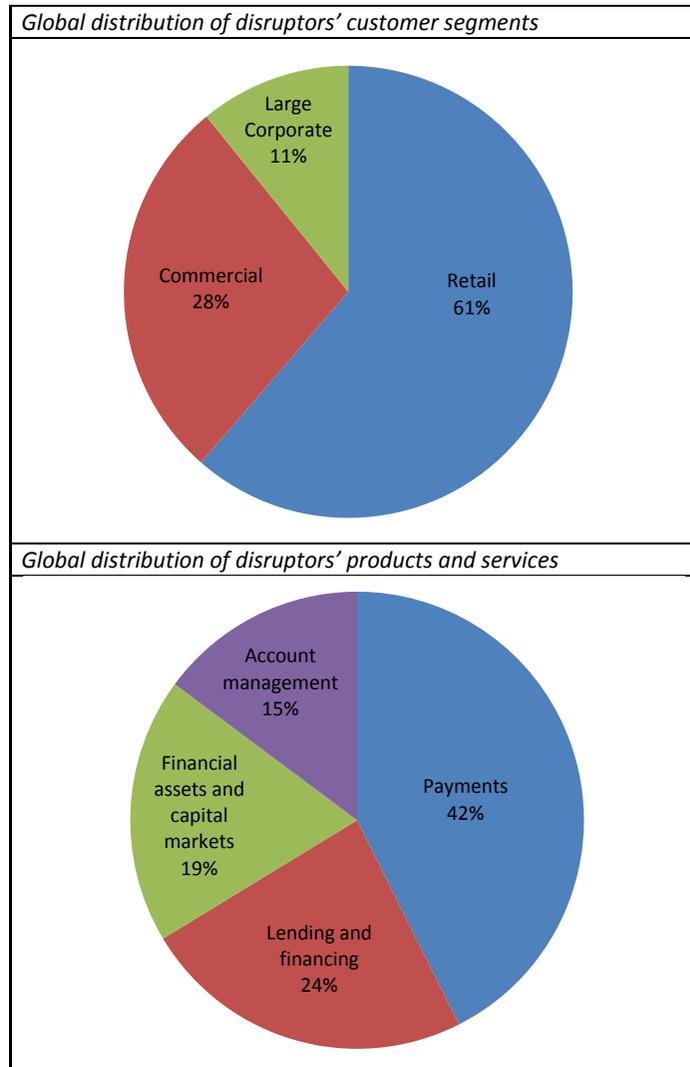
9 KPMG (2015).

10 See Ryan (2015) and Technology Investment Network (2015).

11 Banks 'create' money by holding only a fraction of their deposits at any one time, and using the remainder to make loans.

12 McKinsey&Company (2015)

Figure 2
Customer segments and products of 350 globally leading financial technology firms



Source: McKinsey&Company (2015).

3.1 The disruption in retail and commercial payments services

A notable disruption in payments services is the rise of disruptors offering person-to-person payments and person-to-business payments. Payments innovations are attractive to consumers as they offer fast and convenient methods of making payments compared to the batch payments processing currently offered by retail banks.¹³ This form of disruption can be broadly categorised into two groups: electronic wallets and digital currency.

Electronic wallets include PayPal, Apple Pay, Google Wallet, PushPay, and Visa Money Transfer. Generally these wallets operate as accounts (either online, on a mobile application or attached to a credit card) where funds are uploaded and stored in the wallet, or where funds are uploaded into the wallet after a payment instruction has been made. Funds are uploaded into the wallets via credit cards or direct internet bank transfers. These wallets enable 'real time' funds transfers in the sense that once funds are uploaded into the digital wallet they can be instantaneously transferred to a receiver's wallet by simply recording the new balance of each wallet. There is no lag time as all the funds are held within the wallet provider and only the respective wallet balances require updating.¹⁴ Hence, the wallets provide a simple and fast payment instruction process and faster payment settlement between accounts.

Some electronic wallets may operate more simply as a payment instructor that does not upload funds into an online account, but that instructs an internet bank transfer from one bank (of other financial institution that has the ability to act as a card issuer) to another. These

¹³ Where payments are processed in batches rather than individually as they are instructed.

¹⁴ This is referred to as a 'book transfer'.

wallets are efficient for users because they store the user's payment card or account details which minimises the time and effort required to instruct payments as well as funds uploads or downloads.

Digital currencies are online non-domestic currencies and include 'closed network digital currencies' such as those used in video games, and 'open network currencies' such as Bitcoin. They work in a similar manner to a mobile wallet in that users must convert funds (usually from a credit card or bank account transfer) to the currency. Once funds are converted to the digital currency the payee can instruct an instant payment to participating vendors or individuals. Certain digital currencies can also be obtained by other means, for example Bitcoin mining where Bitcoins are acquired by solving extremely complex mathematical problems.

Mobile wallets and digital currency transactions rely on existing back-end payments infrastructure to the extent that they interact with bank accounts. As funds are uploaded into the mobile wallet or used to purchase digital currency, the existing back-end infrastructure used to transfer payments between banks is required to transfer the funds into an account managed by the mobile wallet or funds owner. For example, in New Zealand funds must be processed through a central exchange settlement account system (ESAS) in order to transfer currency from a user's bank account to the account held by the wallet provider or digital currency provider. Hence, the digital innovation occurs at the front-end where the payment is instructed, rather than in back-end systems where payments are settled.

The emergence of electronic wallets and digital currency is disruptive to banks as it has the potential to separate banks from their customers' payment data because the bank can no longer see where the money is spent – the bank can only see that payments are going to payment services (as with non-bank issued credit cards). In addition, banks may

lose some customer relationships as customers can use alternative payments services for payment instructions, despite the bank providing the back-end payments settlement services. If disruptors take a share of the customer relationship and data, they reduce the banks' ability to cross-sell and develop new products that anticipate customers' needs. This could then affect banks' profitability.¹⁵

More directly, banks' payments revenue streams may be reduced if disruptors become the preferred avenue for making domestic and international retail payments. This can be understood by comparing the prices charged by banks and by disruptors to facilitate overseas payments. New Zealand banks typically charge flat rates of around \$18-30 per transaction for foreign exchange transactions, while disruptors such as PayPal, Google Wallet or Ripple charge rates between 0-4 percent per transaction. This means relatively small retail transactions will incur lower fees. The lower charges by disruptors represent different revenue models along with potentially lower transaction costs as fewer entities are involved. Banks use relationships with international banks to complete cross-border payments (this is referred to as 'correspondent banking').

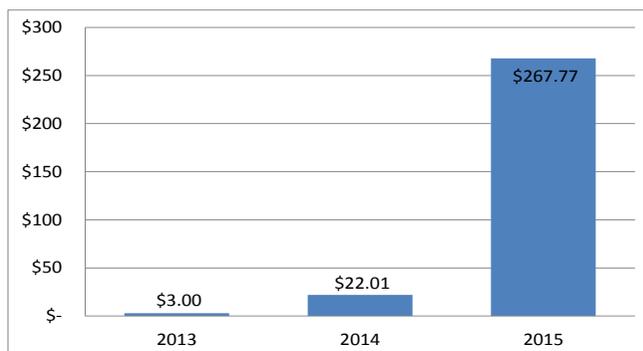
In the long term, digital innovation in the payments sector might go beyond the front-end of payments instructions to the back-end of how payments are settled. It is feasible that back-end domestic and cross-currency payments infrastructure could be changed to incorporate the technology behind digital currencies. For example, Ripple has developed an open source internet payments protocol that can be used by anyone (similar to the SMTP protocol used to send/receive emails) to conduct foreign exchange transfers.

15 Deloitte (2014)

3.2 'Disruption' in retail and commercial lending and financing

Disruptors provide individuals and small businesses alternative access to funds through online alternative financing platforms. A recent study showed that New Zealand's alternative (non-bank) online finance market grew 1117 percent from 2014 to 2015 (year-on-year), making it one of the fastest growing alternative finance markets in the Asia-Pacific region (figure 3). It is also the second largest per capita market in Asia-Pacific with alternative online finance volume per capita of USD 59.37. China was the largest market with USD 74.54 per capita and Australia was the third largest with USD 14.83.¹⁶

Figure 3
Total alternative finance market volumes for New Zealand (USD millions)



Source: University of Cambridge, Tsinghua University, The University of Sydney, and KPMG (2016).

Alternative financing platforms encompass 'financial-return crowd funding' which is a broad term encompassing peer-to-peer lending and equity crowd funding.¹⁷ In New Zealand, financial-return crowd funding platforms must be licensed under the Financial Market Conduct

¹⁶ In this study alternative online finance markets include the provision of finance to individuals and businesses through alternative channels (outside of banks) using online platforms. University of Cambridge, Tsinghua University, The University of Sydney, and KPMG (2016).

¹⁷ Kirby & Wornor (2014).

Act (2013) by the Financial Markets Authority (FMA). In addition, they are subject to the responsible lending code provided under the Credit Contracts and Consumer Finance Amendment Act 2014 and enforced by the Commerce Commission. But they are not regulated by the Reserve Bank.

The most significant of the alternative funding platforms for New Zealand has been the peer-to-peer lenders; currently four peer-to-peer lending platforms are licensed in New Zealand. Peer-to-peer lending platforms match savers and borrowers via an online platform. While each platform operates a unique business model, the general premise of peer-to-peer lending platforms is that they offer more attractive rates to both lenders and borrowers. This is enabled by the platforms' lower operating costs as they do not incur the fixed costs of a physical presence or the capital costs of holding deposits. The platforms also provide convenient and faster access to credit, over mobile or internet channels.

Harmony is New Zealand's first and largest licensed peer-to-peer lending platform (September 2014). In its first year, Harmony facilitated \$100 million in personal loans (and received an additional \$900 million in applications). Just over half of the loans accepted by Harmony were used for debt consolidation. TradeMe, Heartland Bank and P2P Global Investments hold equity stakes in the platform and the majority of funding comes from institutional lenders. Harmony reported that its growth rate has outperformed that of similar lenders in other countries with the exception of China.¹⁸ A recent study further indicated that in New Zealand institutional lending to consumers over peer-to-peer platforms totalled USD 245 million (0.2 percent of total personal credit, five times larger than Australia) and accounted for 88 percent of all alternative online market financing from 2013 to 2015.¹⁹

¹⁸ Harmony (2015).

¹⁹ University of Cambridge, Tsinghua University, The University of Sydney, and KPMG (2016)

As with payments, banks still play a core service-provider role in the operation of these platforms. Peer-to-peer lending platforms generally coordinate lending using either a ‘client-segregated’ model or a ‘notary’ model. In both models the bank takes the role of deposit taker and facilitates the transfer of the funds once the match has been made²⁰ (no New Zealand peer-to-peer platform is a deposit taker). Once again, the third party provider (the platform) takes the more valuable relationship role of matching the borrowers and lenders, including owning customer data, as well as the ability to ‘clip the ticket’ or generate intermediary revenue such as a portion of lending interest or upfront fees.

Equity crowd funding platforms give small businesses alternative access to capital through an online matching platform. These platforms differ from banks as they offer equity funding rather than debt funding. Small businesses may find these platforms to be more accessible than more established equity markets. However, the take-up of equity crowd funding in New Zealand appears to be moderate. Seven crowd funding platforms are licensed in New Zealand, and since the industry launched in 2014, the platforms have raised \$13.7 million in 24 successful offers, with another 11 offers failing.²¹

The extent to which financial return crowd funding platforms disrupt the business models of banks depends on what lending areas they target. It may be the case that these platforms first challenge niche-lending banks or non-banks, although they could move into direct competition with mainstream banks in due course.²²

20 Kirby and Worner (2014)

21 Chaston (2015)

22 Very little data is available on the asset quality and performance of loans originated through New Zealand financial return crowd funding platforms, due to the infancy of the industry.

4 Potential impacts of the digital disruption on banks

4.1 Short to medium term

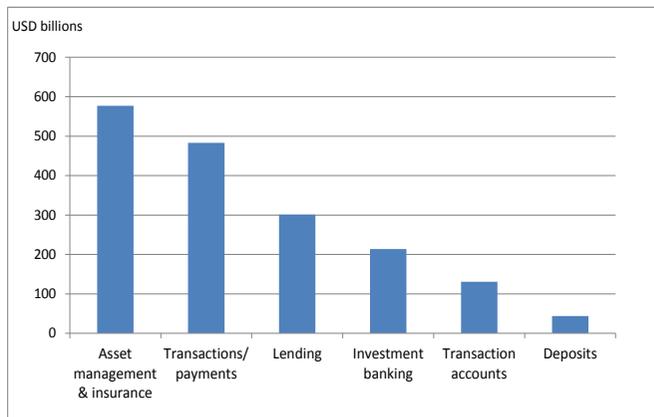
A key potential effect of digital disruption on banks in the short to medium term is the loss of profitable activities and services. Table 1 and figure 4 show that a large portion of profits are generated by front-end services. Table 1 demonstrates that in 2014, origination and sales activities generated 59 percent of global banking profits (and 22 percent of return on equity). Figure 4, overleaf, demonstrates that the revenues within origination and sales activities were generated in a large part by ‘Transaction and Payments’ services and ‘Lending’ services. Figure 2 has shown that these activities are largely where disruptors have been focussing their services.

Banks and deposit takers benefit from financial regulation in the short to medium term. Disruptors appear keen to avoid providing banking services that are captured by prudential regulation so they can maintain

Table 1
Global banking revenues and profits by activity, 2014

(USD billions)	Origination and sales	Balance-sheet provision
Total revenues	1536 (46%)	1939 (54%)
Total after-tax profits	621 (59%)	436 (41%)
ROE	22%	6%

**Figure 4
Global
banking
origination
and sales
revenues by
activity, 2014**



Source: McKinsey Panorama - Global Banking Pools.

their flexibility and capacity for innovation and development.²³ However, this prudential regulation also at the margin diverts banks' resources away from innovation to compliance.

4.2 Long term

In the long term, banks' role in the financial system may be challenged. Disruptors may become systemically important if they supply a large portion of front-end banking services. For example, if peer-to-peer or equity lending platforms grow rapidly then it is possible that a significant number of credit decisions could be made by lending platforms. Likewise it is possible a significant number of payments may be initiated using mobile wallets.

If banks lose profits generated at the front-end of banking services they may become less resilient in an economic downturn. Stress test

results reveal that the profitability of New Zealand banks provides a buffer against losses in downturn scenarios where a large number of creditors default on their loans.²⁴ Lower profitability results in a smaller buffer against potential losses caused by an economic downturn, and also reduces access to international capital markets as the cost of funds increases in proportion to the riskiness of the bank.

In a more hypothetical long term scenario, banks may be challenged to change the fundamental model of banking in order to meet the demands of Millennials as they progress through life. As described above, digital disruptors are more likely to have a stronger relationship with younger customers (or Millennials) which could pose a considerable threat to the business models of incumbent banks.

5 How banks are responding

The digital disruption has challenged banks to think and operate like competitor technology firms to be at the forefront of the banking industry.²⁵ This has motivated banks to make 'digital' a key growth strategy. Notable examples of this strategy include pursuing mobile banking strategies, remodelling branches and building partnerships with disruptors. However, banks still face a fundamental barrier to implementing their digital strategies - the current state of their core banking systems.

23 McKinsey&Company (2015).

24 Dunstan (2016)

25 McKinsey&Company (2015)

5.1 Mobile

Mobile banking refers to banking applications on mobile phones that give customers access to banking services. It has become a mainstream form of banking. UK's Juniper Research has estimated that there will be about 1 billion mobile banking users across the world by the end of 2017, up from 590 million in 2013.²⁶ Customers of major UK banks transfer more than £1.7 billion each week using mobile phones or tablets.²⁷ Most New Zealand banks now offer a range of mobile products and services and report a quick uptake of these offerings. New Zealand's largest banks are reporting an increasing proportion of customers using mobile banking applications (upwards of 50 percent). They are also reporting that more banking transactions are initiated through mobile banking applications than through internet banking websites on desktops.²⁸

5.2 Branches versus help centres

Banks are also remodelling the way that branches service their customers. Hongkong and Shanghai Banking Corporation (UK) has reported a 30 percent drop in visitors at its branches since 2009. The Royal Bank of Scotland (RBS) has seen a similar decline. Banks are finding that retail customers come to branches for solutions to problems, so are remodelling branches to service customers better.²⁹ In New Zealand, banks have responded to this trend by establishing café-style branches, providing 'virtual helpdesks' and increasing their social media presence.

26 Canstar (2015)

27 BBA (2015)

28 See ASB Bank (2014), Canstar (2013), Canstar (2015), and Sims (2015).

29 BBA (2015)

5.3 Partnerships

Banks are also building partnerships with third party providers in order to retain customer data and control of the customer relationship or take advantage of new technologies. Some banks are acquiring equity stakes in small and innovative start-ups, such as peer-to-peer lending platforms. This enables banks to take advantage of new technologies developed by the start-ups, depending on their share of ownership in the third party and type of relationship. Alternatively, a bank can develop a partnership with a disruptor without acquiring ownership, for example by allowing it to access the bank's data to develop new mobile applications or customer-facing services that the bank can offer its customers.

5.4 Upgrading core banking systems

A key challenge many banks face in implementing their digital strategies is the state of their core banking systems. Many banks, globally and in New Zealand, are faced with dated, sprawling and complex technology systems resulting from years of uncoordinated developments and minor platform changes.³⁰ The complexity of these systems and the manner in which they have evolved has left banks with disjointed core banking systems. This means banking services cannot always be connected to each other. For example, often phone or mobile banking systems are separate from those in the physical branches, meaning a bank representative at a branch cannot assist with phone or mobile banking queries. While these systems are effective in providing existing banking services, they hinder banks from providing a seamless digital banking experience to consumers.

30 BBA (2015)

Therefore, a fundamental response by banks to the digital disruption is to upgrade their core banking systems. They have several options. They could rely on their current systems which effectively provide existing banking functions. Or they can completely replace their core banking systems, a costly and time consuming project often involving bespoke technology but which can deliver a simple and nimble core system with superior functionality and future flexibility.

The third option for banks is to implement middleware that enables them to build APIs³¹ on top of their core systems. This approach facilitates better access to the core systems and faster implementation of new technologies but it does not compensate for any pre-existing limited functionality within the core systems. Middleware is attractive as it buys the bank time before it needs to replace the underlying core systems. If and when the bank implements a new core system the API can also make the replacement less disruptive to customers, by enabling more advanced testing before new systems go live. Further, APIs enable the bank to outsource the development of customer interfaces to third party providers, while retaining control over customer data. See box 1 for a detailed description of APIs in the banking context.

Replacing or modernising a core banking system is not a straightforward process for any bank. Banks with larger and more complex existing core banking systems may find it relatively more expensive and technically difficult than those banks with relatively newer systems and fewer operations. However, banks with larger systems will tend to be better resourced and may benefit from economies of scale.

5.5 *The state of core banking systems in New Zealand and Australia*

New Zealand and Australian banks appear to be active in modernising their core banking systems in response to digital disruption.

Two large Australian banks have replaced their core banking systems in large-scale replacement projects. The time to complete these projects was at least six years. These banks now say they are well placed to respond to threats that digital disruption will bring both now and in the future. Several smaller, domestically owned New Zealand banks have also replaced their core systems in large scale projects.

Most New Zealand banks have opted to use middleware to enable better customer-facing technologies and faster product development in the short term while replacing their core banking systems section-by-section over a longer period of time. These banks will use middleware and APIs to smooth out the replacement process, resulting in a less disruptive, albeit more gradual, process.

6 Reserve Bank considerations

6.1 *Potential impacts on financial system soundness and efficiency*

In the short to medium term, digital disruption may result in new risks and increased instability in the financial system. For example, peer-to-peer lenders do not take on credit risk in the same manner as a bank, but

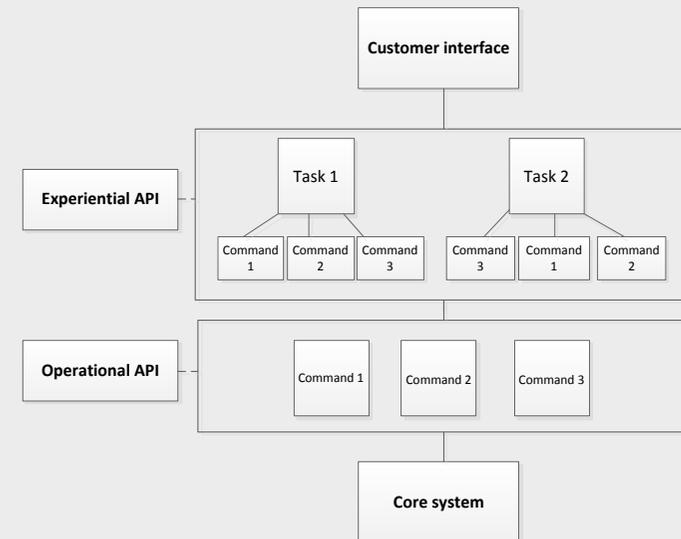
31 Application programme interface.

Box 1

A brief explanation of application programme interfaces (APIs) in a banking system context

- An API can be thought of as a contract between two systems: it sets the terms and defines the communication between the systems; and enables one system to query or retrieve information from another system in a standard format, even though the systems have different software or different ‘languages’.
- In the banking context, a basic ‘operational’ layer is built over the core system. This layer allows queries to be made to the system that will return a standard response in a standard format. For example, commands for credit checks, account balance checks, and income verification checks are built.
- On top of this an ‘experiential’ layer can be built. This layer combines a set of commands into a single task. The commands can be reused and combined in different ways to create different tasks, for example to initiate a mortgage or a personal loan, or set up a new bank account. This makes adding new banking products or customer functions easier and faster as the bank can reuse commands rather than building an entire new system as it would have in the past.
- Because APIs control the communication between the front-end and back-end systems they provide a way for developers to test out new software in the back-end systems without disrupting the front-end systems. This makes it easier to replace the core bank system(s), and reduces the risk of failure or disruption in doing so.

- The API can also be made public or available to developers. Because the API enables standard commands into the system that will return information in a standard format, developers can then use this information to build new customer-facing applications. The bank can therefore open its data and information to external developers who can build new mobile applications for customers. The bank retains the customer data and relationship while also making use of the specialisation and capabilities of disruptors (BBA, 2015; BIAN, 2015; Tesselaar, 2015).
- A basic abstract example of how layers of APIs could be built into a bank’s IT system is set out below.



- It is important to note that many APIs might be built into different systems within the bank’s core IT systems. Further, new or modern banking systems already have APIs built into them as APIs are now considered a standard functionality.

they do undertake decisions on behalf of lenders and so may introduce different operational risks to the borrowing and lending process. Likewise, payments innovations may introduce new operational risks to the payments system.

Further, as banks undertake core banking system redevelopment projects this may increase project risks to the banking system. Large technology projects commonly run over time and over budget and if these projects are not managed appropriately they could result in significant disruptions to customer services and bank profitability.

In the medium to long term, digital disruption of the banking sector may improve the efficiency of the financial system. For example, new payments providers increase the speed and ease of initiating payments for consumers, and the application of new technologies (such as 'blockchain') could increase the speed and reduce the cost of making cross-border payments. In addition, P2P platforms reduce the cost of matching borrowers with lenders as there are no physical branches to maintain.

The long term impact of digital disruption on financial system soundness is less clear. Soundness may be reduced if existing banks' profitability buffers are reduced due to increased competition from digital disruptors. However, digital disruption may also improve financial system soundness if it results in more competitors entering the banking sector and fewer systemically important banking entities. This may reduce the impact of a single entity failure. Further, this may alleviate the 'too-big-to-fail' risk where authorities may feel pressured to prevent large banks from failing due to systemic concerns. This would in turn, reduce the probability of banking entities taking on risks that they are not willing to bear (moral hazard).

6.2 *Current regulatory settings and Reserve Bank response*

In New Zealand, disruptors engaging in lending practices are subject to regulation by the FMA and Commerce Commission, and disruptors that participate in a payment system in New Zealand are subject to the Reserve Bank's information gathering powers under Part 5B of the Reserve Bank of New Zealand Act (1989). However, there are currently no coordinated prudential regulations of 'disruptor' entrants to the banking system that address the risk that a systemic failure of these entities could pose for the financial system.

As the prudential regulator, the Reserve Bank is maintaining awareness of the emergence of digital disruption in the banking system. There are no current plans to change the regulatory framework as a result. The Reserve Bank is aware of the potential impacts on financial soundness and efficiency, and incorporates this into its supervision of banks and assessments of overall system stability. The Reserve Bank will continue to assess whether and how it might respond to the digital disruption with any regulatory changes.

More generally, the Reserve Bank does not wish to inhibit innovation within the financial system. The Reserve Bank has indicated that it supports fair and open access to the payments system and encourages competition between participants and innovation. For example, the Reserve Bank has indicated it will not be adopting an overly prescriptive approach in terms of the future payments systems architecture or force solutions that may unnecessarily inhibit innovation and competition.³²

32 See Reserve Bank of New Zealand (2015) and Spencer (2014).

Globally, there is no standard regulatory response to digital disruption by financial system regulators. Many regulatory authorities are currently engaged in better understanding the implications of digital disruption in the financial industry and how this might affect statutory mandates to safeguard financial systems. Like New Zealand, Australia has no current proposals to change regulatory settings in response to the digital disruption of the banking industry, although Australian authorities are improving their awareness of such developments in the banking industry.³³ Elsewhere, the Bank of England has developed a research agenda to assess how digital disruption will affect financial regulation and the central bank's operations,³⁴ while the Federal Reserve has established a board to analyse financial technology innovation, which will include the impact of digital disruption.³⁵

7 Conclusion

Digital disruption is changing the way consumers interact with their banks both globally and in New Zealand. The disruption is driven by evolving consumer demands and enabled by new technologies. While basic banking services do not appear to be challenged by digitisation, there is evidence of disruption at the front-end of banking services. Consequently, banks are motivated to adapt and develop new forms of providing their services in order to remain competitive. A key challenge that banks face in their ability to join in with the digital disruption is their large and complex core banking systems. Some Australian and

33 Byres (2015)

34 Bank of England (2016)

35 Brainard (2016)

New Zealand banks have already responded by undertaking large modernisation projects in this area.

This disruption may ultimately improve the soundness of the financial system by reducing the systemic importance of individual banking institutions, thereby decreasing moral hazard and the potential impacts of a single failure. However, in the medium term digital disruption may introduce new risks to the systems if unregulated entities provide a significant portion of banking services and if existing banks no longer have large profitability buffers. The Reserve Bank will continue to monitor the impact of digital disruption on the banking industry in line with its statutory objective to promote the maintenance of a sound and efficient financial system.

Glossary

API

A set of functions and procedures that allow the creation of applications which access the features or data of an operating system, application, or other service.

Book transfer

Transfer of funds from one deposit account to another within the same financial institution.

Back-end banking services

Behind the scenes banking services such as holding deposits and settling payments.

Corresponding banking relationships

Where one financial institution provides services on behalf of another financial institution, including conducting business transactions, accepting deposits, and gathering documents.

Client-segregated model

A peer-to-peer lending model where a bank provides a bank account for a special purpose vehicle that facilitates the loan transfer.

Disruptor

Innovative technology firms, start-ups and third parties that provide bank-like services so they can enter the banking industry.

Electronic payments

Method of paying for goods and services electronically, i.e., via credit or debit card, internet transfer, mobile transfer, electronic wallet, or online currency.

Efficiency

Ability to deliver services at a low cost, in a timely way incorporating growth and change as well as directing resources towards more productive uses.

Fractional reserve banking

Banks 'create' money by holding only a fraction of their deposits while lending the remainder.

Front-end banking services

Banking services that customers see and interact with. This includes the origination of loans, instruction of payments, and methods of accessing bank services such as branches, internet banking, and mobile banking.

Middleware

Software that 'glues together' separate, often complex and existing programmes. Software components that are frequently connected with middleware include legacy systems and web services (i.e. APIs).

Mobile/digital wallet

Online account (accessed via a mobile phone application or internet browser) where funds are stored and payments can be initiated or received.

Moral hazard

The possibility that an entity may take on extra risk because it knows that it does not have to bear the full costs of the risk because another party such as the government or regulator will provide support if the risk materialises.

Notary model

A peer-to-peer lending model where a bank transfers the loan balance to the borrower and then issues a note to each lender entitling them to repayments for the value of their investment and transferring default risk to the lenders.

Supply chain (of banking services)

Processes or sequence involved in the production and distribution of a (bank) service.

Value-chain

The process by which a company (bank) adds value to a service.

Value proposition

The ability to provide valuable services.

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