



The impact of the 4th industrial revolution
on the South African financial services
market



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The Centre of Excellence in Financial Services is a non-profit organisation focusing on collaborative research, bringing together local and international thought leaders, industry experts and academics to interrogate the role financial services can play in achieving national and international objectives. This research report is available in electronic format on www.coefs.org.za

Contents

Foreword.....	iii
Preface.....	v
Acknowledgements.....	vi
Abbreviations.....	x
Executive Summary.....	xiii
1 Introduction.....	1
Chapter 1: South Africa in the global context.....	6
2 Supply-side dynamics.....	8
3 Demand-side dynamics.....	13
Chapter 2: Fintech Innovation in South Africa.....	19
4 Payments.....	20
5 Deposits and Lending.....	36
6 Capital raising.....	44
7 Investment Management.....	49
8 Market Provisioning.....	55
Chapter 3: How the incumbents are responding.....	62
9 Evolution of the business model.....	65
10 How core is digitisation?.....	70
11 Data is the foundation of digital.....	75
12 Technology that underpins digital.....	83
13 What does this mean for risk?.....	93
Chapter 4: The regulatory response.....	101
14 A spectrum of regulatory approaches.....	103

15	Regulatory response in South Africa	112
16	Regulating for emerging risks and opportunities	120
	Conclusion.....	129
	References	133
	Members of the working group	138



Foreword

This research paper is a timely and welcome intervention by the Centre of Excellence in Financial Services. Financial technology, or fintech, has grabbed the attention of all involved in the design and delivery of financial services. The attraction of fintech lies in its potential to challenge how and by whom financial services are delivered, resulting in the re-imagining of financial services and the questioning of the status quo. The mantra of fintech is ‘cheaper, faster, better, simpler, easier-to-access, and on-demand services delivered through a combination of mobile and online platforms’.

For the South African community, these real and practical considerations are important in order to deliver improved access to savings, credit, insurance, payment, and investment products and services. New and innovative ways of delivering these financial services can bring significant benefits to our

citizens, many of whom remain unaware of how some of these may transform their lives. Regulators, therefore, have to embrace fintech and new ways of providing services while continuing to keep a watchful eye on familiar micro- and macro-level financial risks. These risks are non-trivial, and include money laundering and terrorism financing, operational risks (including growing cybersecurity risks), liquidity and maturity mismatches, procyclicality, as well as contagion and systemic risks. Consumer and investor protection remains an area of concern and focus, as global examples of failed offerings have resulted in increased regulation.

In line with a balanced approach to fintech, the South African Reserve Bank has recently launched a new fintech programme. The main objective of the programme is to assess the appropriateness of policies and



regulatory regimes in light of fintech innovation. A proactive approach to understanding fintech includes consideration given to the appropriateness of innovation facilitators such as innovation hubs and regulatory sandboxes. In an increasingly complex domain, collaboration and joint sense making will remain important. The South African Reserve Bank will therefore collaborate with the Intergovernmental FinTech Working Group as well as with other policymakers and regulators on this topic.

This paper sets the scene for many more dialogues on topics as diverse as advanced cryptography, quantum computing, robotics, artificial intelligence, and deep neural networks that are sure to change the way in which banking, central banking, and financial services happen over the next decade and beyond. To paraphrase Captain James T Kirk: “We must boldly go where no humans – or machines – have gone before!”

Lesetja Kganyago

**Governor
South African Reserve Bank**

Preface

The World Economic Forum published its report “The future of Financial Services: How disruptive innovations are reshaping the way financial services are structured, provisioned and consumed” and within this global context, we wanted to examine how the South African banking sector was embracing this digital revolution.

Fintech is rapidly becoming a topic of conversation as financial institutions embrace the first real opportunity for innovation since the global financial crisis. Technology is largely unregulated and with the global objective of making the financial sector, in particular the banking industry, more resilient to external shocks, combined with the focus on shadow banking and the threat to financial stability, we

wanted to include a conversation around how regulators will be responding to this new technology.

The South African banking sector is highly competitive and sharing their digital strategy with us was not easy, so we are indeed appreciative of the many contributors who made this report possible. We are also grateful to Jesse McWaters of the World Economic Forum for his advice and insights into the compilation of their reports.

The project was done by a team at Genesis Analytics under Bavani Naidoo and they interviewed all the contributors and drafted the report.

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Abbreviations

4AX	4 Africa Exchange
AI	Artificial intelligence
API	Application Programming Interface
ASIC	Australian Securities and Investments Commission
ATM	Automated Teller Machine
BBBEE	Broad Based Black Economic Empowerment
BIS	Bank for International Settlement
CDO	Chief Data Officer
CFPB	Consumer Financial Protection Bureau (US)
CISCA	Collective Investment Schemes Controls Act
CNP	Card not present
CPMI	Committee on Payments and Market Infrastructure
CREST	Council of Registered Ethical Security Testers (UK)
DLT	Distributed Ledger Technology
EFT	Electronic Funds Transfer
EU	European Union
FAIS	Financial Advisors and Intermediary Services
FCA	Financial Conduct Authority (UK)
Fintech	Financial technology
FSRA	Financial Sector Regulation Act
FSB	Financial Services Board



FSP	Financial Service Provider
GAFA	Google, Apple, Facebook and Amazon
GCHQ	Government Communications Headquarters (UK)
GDPR	General Data Protection Regulation (EU)
GEI	Global Entrepreneurship Index
IOSCO	International Organisation of Securities Commissions
IT	Information Technology
JSE	Johannesburg Stock Exchange
KYC	Know Your Customer
MNO	Mobile Network Operator
NFC	Near Field Communication
OECD	The Organisation for Economic Co-operation and Development
OTC	Over-the-Counter
P2P	Peer-to-Peer or Person-to-Person
PASA	Payments Association of South Africa
PCH	Payment Clearing House
POPIA	Protection of Personal Information Act
PSDII	Payment Services Directive II (EU)
QR	Quick Response
R&D	Research and Development
RBI	Reserve Bank of India
RPA	Robotic Process Automation
RTC	Real-Time Clearing
SADC	Southern African Development Community



SARB	South African Reserve Bank
SASSA	South African Social Security Agency
SIRESS	SADC Integrated Regional Electronic Settlement System
SME	Small and Medium Enterprise
SO	System Operator
TPPP	Third Party Payment Provider
UK	United Kingdom
UBU	Universal Basic Unit
US	United States (of America)
USSD	Unstructured Supplementary Service Device
WEF	World Economic Forum



Executive Summary

Technological innovation is taking place at unprecedented speed. It is disrupting almost every industry in every country around the world. This is the fourth industrial revolution, where technological advancements like artificial intelligence and the “Internet of Things”¹ mean that human and digital systems can interact more profoundly than ever before. Applying this technology in financial services – called fintech – has the potential to reduce costs and improve efficiency, allow customers to transact seamlessly and in real time, and improve providers’ understanding of customer behaviour and needs, allowing for the personalisation of financial services.

As with all past industrial revolutions this introduces a great degree of uncertainty. Regulators and policymakers are faced with the challenge of managing the implicit trade-offs. Digital innovation has the

potential to broaden financial inclusion but can also exclude consumer segments with low levels of digital and financial literacy. The shift towards automation creates vast opportunities for improving efficiency but also impacts financial institutions’ skill requirements, potentially entrenching the existing “low-skill low-pay” and “high-skill high-pay” labour divide.

South Africa makes for an interesting discussion on how these impacts may play out. The country’s world-class sophisticated financial sector exists within the confines of a developing economy subject to income inequality, unemployment and skills shortages. The country’s significant potential for digital innovation must be considered alongside concerns of whether this will be exclusionary, and whether the transformation will enhance or diminish domestic value creation.

¹ The interconnection of devices and systems using the internet, enabling them to collect and exchange data.



This report investigates the impact of digital disruption in South Africa's financial services sector. It provides a domestic analysis of fintech and digital adoption across core banking functions, investigates how incumbent financial institutions are responding to this, and what the regulatory impacts and considerations of this rapidly changing digital landscape are.

South Africa in the global context

Fintechs in markets like China, the US, Canada, Israel, Hong Kong and much of Europe have attracted a large amount of investment. Fintech innovation in these markets is disrupting incumbent banks and disintermediating some financial markets.² While the value of fintech investment in Africa is comparatively low, Africa is often seen at the forefront of mobile financial innovation. The high uptake of mobile phones and relatively

underdeveloped banking infrastructure has fostered an explosion of mobile financial services offered through feature phones.

South Africa's large and sophisticated financial sector is accentuated by a small but growing fintech industry, with two emerging fintech hubs in Johannesburg and Cape Town. Although fintech start-ups are supported by a number of fintech incubators, most struggle to gain traction and develop sustainable business models.

South Africa's funding environment is not well suited to supporting high-risk start-ups³, and fintechs may struggle to attract international investment due to South Africa's lacklustre ratings against classic investment considerations⁴. A shortage of entrepreneurial skills generally within the country⁵, combined with a lack of deep financial sector knowledge and experience among fintech start-ups, creates issues of

² Citi GPS, (2016), *How Fintech is Forcing Banking to a Tipping Point*

³ Based on stakeholder interviews conducted by Genesis Analytics, July-September 2017.

⁴ Quantum Global, (2017), *Africa Investment Index*

⁵ GEDI, (2017), *Global Entrepreneurship Index*



credibility when looking for funding and partnerships⁶. Lastly South Africa's current financial regulation has not created an enabling environment for fintech development. A lack of clarity and guidance on how fintechs fit into existing regulation means South Africa's comprehensive regulatory environment is daunting for fintech start-ups and generates significant compliance risk.

The uptake of digital and fintech innovation in South Africa is also constrained by the consumer market. South Africa's population has a high level of income inequality. The vast majority of consumers exist in the low-income mass market where paid work is scarce, and many earn an income from the informal (and largely cash) economy.⁷ Although South Africa has a high rate of financial inclusion (77% of the adult population are banked including South African Social Security card holders), the bulk of

financially included adults are less than adequately served. The uptake of financial products is severely constrained by a poor knowledge and understanding of available financial products, and by income – more than 80% of the population live in an “in the now mind-set” leaving little room for savings, investment or insurance products.⁸ Digital products and services have to compete with the high dependence on cash as a payments instrument, driven by the preferences and behaviour of low-income consumers.⁹

As a result, the digital and fintech innovation in South Africa largely caters to a niche, relatively affluent and financially-savvy consumer market. Although there is rising adoption of smartphones and an incoming generation of millennials more familiar with digital technology, translating this into the use of more sophisticated financial services is constrained by the state of South Africa's digital ecosystem and

⁶ Based on stakeholder interviews conducted by Genesis Analytics, July-September 2017

⁷ *FinMark Trust, (2016), Finscope consumer survey South Africa*

⁸ *Ibid.*

⁹ Genesis Analytics, (2016), *primary research on behavioural barriers to card usage in the mass and low income market*

the relatively low levels of financial literacy.

Fintech innovation in South Africa

Fintech innovation is occurring across the financial services industry in South Africa. This report uses a classification originally developed in the World Economic Forum's *Future of Financial Services* report to identify innovation in the five key banking functions of payments, deposits and lending, capital raising, investment management, and market provisioning.

Payments

The development of smartphone payments in South Africa through digital wallets and mobile banking apps are allowing customers to store card details digitally and transact using their mobiles. E-commerce and other card-based payment platforms are allowing customers to transact without merchant authentication of a physical card, or by streamlining electronic fund transfer payments. Contactless near field

communication technology is allowing physical card payments to be made considerably faster. The development of mobile POS devices is reducing the cost and complexity of device management and quick response code solutions like Snapscan and Zapper are eliminating the need for POS devices altogether. All of these developments are being supported by next generation security measures such as location-based identification, biometrics, and card tokenisation which protects customers and increases confidence in digital channels.

Innovation outside the traditional payment rails of card and electronic funds transfers has been significantly less disruptive in South Africa. Mobile money has not gained traction locally with most domestic start-ups and international brands closing operations. Cryptocurrencies have potential to significantly disrupt the international remittance market by enabling users to securely transfer value with limited transaction costs,

near real time settlement and without the need for intermediaries. While South Africans have access to international crypto-currency platforms as well as domestically-developed crypto-currency wallets and exchanges, crypto-currency use remains niche. It requires digital access, financial savvy, broad acceptance, and trust in what is a new infrastructure.

Deposits and lending

In the credit market an alternative lending landscape is emerging which provides alternative ways of assessing credit and securing funding from lending products outside the banking system. This includes peer-to-peer lending platforms and alternative scoring methods that use unconventional data sources. South Africa has a handful of peer-to-peer lending platforms and novel methods of credit scoring are beginning to be used.

In the traditional deposits market banks are using digital innovation to provide customers with

more personalised services that can be conveniently and flexibly accessed in real time. Most South African banks have modernised their channels with mobile applications and internet banking. Investec is the only bank in South Africa with a principally digital (branchless) offering but will be joined by Discovery Bank and potentially TYME in 2018. Banks in international markets are also beginning to rely on products and services from an array of innovative third party providers that exist and operate outside the bank's core banking architecture. This "banking as a platform" model has not been fully embraced by South African banks which are cautious of losing ownership of their customers, and whose legacy operating systems constrain their ability to connect with third party providers.

Capital raising

Alternative funding platforms have begun to emerge. These allow individuals and start-ups to source funding from a collection of investors



and philanthropists directly through an online market place. Crowdfunding is a nascent industry in South Africa - while a number of local crowdfunding platforms do exist, the vast majority only provide donation and rewards-based funding options. Of the investment-based crowdfunding platforms that are currently operating, most are platforms focused on investment in property developments. The equity crowdfunding platforms that have emerged in other markets are not yet present in South Africa.

Investment management

Robo-advisors are automating the human function of guiding investors' decisions by calculating risk profiles and providing a formulaic financial plan or investment portfolio. Automated investment platforms are providing access to a broad range of asset classes with lowered minimum investment requirements and automated portfolio management. Several automated advice or management platforms are available in South Africa. Individual investors

are also being empowered to engage in their own asset trading. Retail trading platforms are providing algorithmic trading capabilities, and "copy trading" allows less experienced investors to automatically replicate the trade of more experienced investors. A handful of platforms enabling these functions have been developed in South Africa but are more common in foreign markets.

Market provisioning

In capital markets trading, superior data analysis and artificial intelligence technology is providing institutional algorithmic traders with the opportunity to react in real-time to events more quickly, consider broader sets of data, and refine their trading algorithms without human intervention. While algorithmic trading is less prevalent in South Africa than in more developed markets, it has been increasing in popularity. Traders are beginning to use new data sources and artificial intelligence tools like machine learning to inform their trading



strategies. A number of alternative stock exchanges are also emerging – such as ZAR X and 4 Africa Exchange – with low-cost fee structures, real-time settlement and the ability to trade without going through a broker.

How the incumbents are responding

Fintechs have evidenced how technology can be used to create agile, customer-centric and cost-effective financial service providers. Incumbent financial institutions are responding by incorporating fintech and digital innovation into their own operations, either through collaborating with fintechs or through setting up their own innovation teams.

Bank-fintech collaboration in South Africa has matured as the fintech market developed. The early approach among banks was to acquire fintech start-ups quickly so that they could not collaborate with competitors. This was “technology searching for a problem” as banks acquired technology solutions that

were not addressing specific problems within the bank. The next phase of engagement saw banks setting up or sponsoring fintech incubators and corporate accelerators to support fintech development and identify investment opportunities. However, the success rate of participating start-ups developing into bank partners has been very low. In recognition of these problems, banks have shifted to a “problem searching for technology” approach where fintechs are sourced as vendors or partners to address a specific bank problem, with adequate buy-in and resources provided from business units and the bank’s information technology department.

Banks have realised that the power of digital innovation is more than just replacing physical channels, but actually lies in creating a digital core. This allows for the provision of consistent, accurate, enterprise-wide data enabling decision making across the organisation, and facilitates process efficiencies to improve the customer experience and reduce internal costs.

Banks in South Africa have taken different approaches to realising this. Newer banks have the benefit of building their core systems from scratch using next generation technology, allowing them to introduce innovative banking services. Older banks face the challenge of transforming legacy core banking systems built in the 1970s and 80s. These systems are largely siloed and were not designed to be integrated or communicate with external systems. Some banks are choosing to overhaul these systems entirely, incurring very large upgrading costs in the short term to accrue the benefits of modern digital banking systems in the long term. Others are adding additional system layers to their existing core systems to support a wider range of digital applications and databases. While this allows the bank to take digital products to market quickly in the short term, large long-term costs will be incurred as legacy systems will have to be replaced eventually.

This transformation to next generation banking architecture

allows banks to adopt more agile product development methodologies and integrate with innovative third party service providers easily. A number of technology advancements are assisting banks with this process. Application programming interfaces allow units within the bank and third parties external to the bank to access the bank's various systems. This allows fintech developers to create applications which draw data from the bank's operating system. Cloud services provide banks with virtual infrastructure to store data and access software applications online, with the potential for large cost saving, rapid product deployment and improved accessibility for third parties to bank data and operations.

Banks are also currently investigating whether the distributed ledger technology that underpins the well-known Blockchain ledger can be used to support traditional financial service operations. In theory distributed ledger technology is a hyper-efficient means to process and store large volumes of data among

numerous parties, and may have application in a number of financial service processes. South African banks are participating in local and international consortiums but as yet have publicised few meaningful use cases.

A bank's ability to digitally transform is founded on building a strong data capability. This allows banks to improve their risk management through real-time analytics; optimise their operations through enterprise-wide decisioning; and become more customer-centric through more relevant product development, personalised marketing and better customer retention. In addition to next generation banking systems that enable the easy extraction and flow of data, banks also need strong data governance to ensure that good quality data is used consistently and responsibly across the enterprise.

Banks in South Africa have been addressing both these underlying infrastructure and data governance needs. A number of technical capabilities are in place

including artificial intelligence tools like machine learning. But many of the banks are still on the journey of embedding these functions enterprise-wide and ensuring that data is shared across the enterprise in a way that supports critical business decisions and ultimately improves customer-centricity.

The regulatory response

The pace of fintech innovation and the way it is changing the structure of the financial market is introducing and intensifying risks specific to technology in the financial system. The expansion of digital channels and provision of real time and remote access to services is creating additional opportunities for fraud and cybercrime. The increased use and sharing of data as a central function of financial services is intensifying data integrity and privacy risks. The rapid adoption of new and emerging technologies increases the possibility of technology and systems failure. Finally, partnerships between banks and fintechs or external technology



providers are introducing a greater degree of collaboration risk as some of these providers become systemically important.

For this reason, regulators must be aware of the issues and risks associated with digital innovation, and balance this against the positive impacts that it can have on financial services. A fintech appropriate regulatory framework - in conjunction with data-security, cyber-security, consumer protection and technology use laws - can mitigate these risks while supporting the fintech industry through regulatory clarity and obligations that match fintech's risk profiles.

Regulators across the globe have responded to this challenge in a variety of ways which can be mapped along a spectrum of reactive to proactive. The reactive approach is often pursued by resource-constrained regulators in markets where fintech has not been particularly disruptive. Regulators do not take an active role in trying to make fintechs succeed but do not actively stand in the way of their

development, and adjust regulation when necessary. Financial regulators in South Africa have thus far largely taken a reactive approach.

In contrast, proactive regulators work closely with innovators to understand new fintech developments and regulatory obstacles to innovation, and support start-ups in addressing these challenges. Regulatory sandboxes are often used to permit fintechs to test products under lighter regulatory obligations, enabling regulators to keep pace with technological innovation and observe its impact on the market. Entry to these sandboxes is often subject to eligibility criteria which ensures that participants offer products and services that reflect the regulator's mandate - most often aligned with national objectives. Innovation hubs support sandboxes by providing early-stage start-ups with access to regulatory personnel to help navigate the current regulatory framework, as well as business, entrepreneurship and technical experts and funding.

The approach of South African regulators has thus far been informed by the low levels of disruption that fintech innovation has caused to the underlying activities and risks present in the financial system. However, regulators are implementing a number of changes which signal a shift to a more proactive regulatory stance. This shift will be increasingly important in the South African market for three reasons.

Firstly, the current regulatory environment is comprehensive and complex with the potential to significantly stifle innovation. Without explicit guidance, fintechs find this regulatory network difficult to navigate. This situation is worsened because workarounds to prevent a fintech business meeting the definition of one regulated financial activity often means that it would be subject to another piece of financial regulation. Adopting a more proactive regulatory stance will allow regulators to identify where this applies, and to take remedial action. Secondly, fostering innovation in

financial services through proactive regulation is important for South Africa's development, contributing to national objectives and preserving the country's status as a world-class financial hub. Lastly, proactive regulators are better able to identify, monitor and react to the emerging risks and opportunities associated with fintech which are set to intensify as the pace of technological innovation increases into the future.

Conclusion

Encouraging digital innovation through fintech is important because of the significant benefits it can bring. South Africa's fintech industry is small and growing, but this growth is being impeded by a number of factors. The fintech industry has therefore not been as disruptive to the structure of South Africa's financial market as has been seen in other countries, and much of the impact of digital disruption is being felt by incumbent financial institutions transforming their operations.

As the pace of technological innovation in the fourth industrial revolution increases, the infusion of technology into financial services is presenting new risks to consumers and to the stability of the financial system. Regulators therefore have the difficult position of protecting the system from these risks while allowing innovation to drive the industry forward. While the regulatory approach taken thus far in South Africa has protected consumers, it has not focused on encouraging innovation within the sector. This represents a missed opportunity for South Africa as a thriving fintech sector has the potential to contribute to employment, and improve access to a sophisticated suite of financial

services among a broader set of consumers.

Regulators in South Africa have already indicated interest in shifting to a more proactive regulatory stance. However, financial regulators can only do so much to “future proof” the industry against the changes the fourth industrial revolution brings. Much of how the transformation of production and consumption will play out rests on the state of the broader digital ecosystem. Policymakers should therefore consider investments in broad digital infrastructure and develop the skillsets required by employees in this new world of work. This will ensure broad access to digital innovations and keep the value creation from technological innovation in the country.

1 Introduction

Technological innovation is changing the way people live, work and interact with one another. As mobile technology becomes cheaper and internet coverage expands, the “Internet of Things” is seeing an increasingly connected network of devices, systems and services. This is ushering in an era of automation and is allowing new types of data to be collected and exchanged. As the creation of data expands exponentially, our ability to store, process and make sense of this data is rising in step. In particular, artificial intelligence (AI), once thought to be a futuristic aspiration, is leaping into the mainstream.

Familiar AI applications such as Apple’s Siri are being joined by self-driving cars and sophisticated algorithms that can predict behaviour and customer preferences.

This technology is heralding a new era of industrial production where technological and human systems interact more profoundly than ever before - the “fourth industrial revolution”. While this industrial revolution builds strongly on the preceding digital revolution, the pace and scope of technological innovation makes it distinct. Technological breakthroughs are occurring at an unprecedented speed and are disrupting almost every

The evolution of industrial production

The 1st industrial revolution



Water and steam power mechanised production

The 2nd industrial revolution



Electric power created mass production

The 3rd industrial revolution



Electronics and IT automated production

The 4th industrial revolution



A fusion of technologies is blurring the lines between the physical, digital and biological spheres

Source: Schwab, (2015), The Fourth Industrial Revolution, What it Means and How to Respond, *Foreign Affairs*

industry in every country around the world.

Technology within financial services is being used to develop innovative ways of producing and consuming financial products and services that can meet consumer needs more efficiently or cheaply. Financial technology (fintech) has the potential to:

REDUCE the cost and improve the efficiency of financial services,

ALLOW customers to transact and interact with their financial service provider flexibly, seamlessly and in real time, and;

IMPROVE the understanding of customer behaviour and needs allowing for the personalisation of financial services.

The emergence of new service providers whose offering is based on these technologies – called fintechs – is changing the financial ecosystem. Some traditional financial institutions are responding by

transforming their own operations – either by adopting similar technology or collaborating with fintechs. The value chain of various financial services is therefore disintegrating as fintechs capture niche market segments or provide intermediary products and services that are incorporated into a bank's operations.

This changing financial ecosystem is introducing both significant opportunities and risks to the system. With regards to financial inclusion, digital innovation has the potential to improve access to a wider suite of financial products and services regardless of income and location. However, as the majority of these services are delivered along digital channels, this process may polarise the market by excluding segments with low levels of digital and financial literacy.

The entrance of fintech start-ups and the deployment of new technologies is testing the integrity of the financial system. New market entrants help reduce concentration risk and the same technologies that

improve financial solutions can also be used by regulators to better monitor the system and identify risks. However, these technologies are new and can introduce operational and security risks among financial service providers. The failure of these technologies can have an industry-wide impact as higher degrees of collaboration drives interconnectedness amongst providers.

The shift towards automation offers significant efficiency and cost-saving opportunities. In particular, automation in banks' processing activities reduces the need for high back office head counts. These savings may be passed on to the consumer and can improve customer experience through gains in processing efficiency and accuracy. However, this impacts the skills mix that banks require and the net effect of automation on employment is unclear – there is the potential to entrench the “low-skill low-pay” and “high-skill high-pay” labour divide.

Technological innovation brings long-term productivity and

efficiency gains but can also destroy value as market resources adjust to the change. Deploying AI alongside big data sets can improve the personalisation of services and lead to more relevant product offerings and segmentation. However, the skills required to deploy these processes are in short supply and there is the potential for value to be transferred to more developed markets through off-shoring and outsourcing to international vendors.

As with all past industrial revolutions, there is therefore uncertainty as to what the end state and impact of the transformation may be. Regulators and policymakers are faced with the challenge of overseeing the transformation in a way that maximises the opportunities and minimises the risks. While the response among regulators and policymakers across the globe has been mixed – understandably so given differing market contexts – a number are taking active steps to “future proof” the industry to the

inevitable changes that the fourth industrial revolution is bringing.

The World Economic Forum has invested in developing thought leadership around the impacts of the fourth industrial revolution and in 2015 co-authored a paper entitled: *The Future of Financial Services: How disruptive innovations are reshaping the way financial services are structured, provisioned and consumed*. One of the objectives of this paper is to understand the extent to which the impact of digital disruption is being felt within the South African financial services market.

South Africa makes for an interesting discussion on how these impacts may play out. The country has a highly sophisticated financial sector with well-developed infrastructure, a world-class banking system and sound financial regulation. These features provide a strong foundation upon which digital and fintech innovation can take place. However South Africa is a developing economy with high levels of inequality and rising

unemployment. Despite a highly banked population, the market is dualistic with a small share of affluent and digitally-savvy consumers and a majority of resource-constrained consumers with relatively low levels of financial literacy. This raises concerns of whether digital innovation will be exclusionary and whether the transformation of the financial sector will enhance or diminish domestic value creation.

This report investigates the impact of digital disruption in South Africa's financial services sector. It provides a domestic analysis of fintech and digital adoption across core banking functions, investigates how incumbent financial institutions are responding to this, and what the regulatory impacts and considerations of this rapidly changing digital landscape are. The insights presented in this report were generated through interviews with stakeholders across South Africa's financial services sector including banks, financial market

infrastructure providers, fintechs, regulators and policymakers.

In Chapter 1, South Africa's unique context is described by considering the key supply and demand side characteristics of the financial services market. A scoping of digital and fintech innovation within the main banking functions is conducted in Chapter 2, illustrating where innovation has been most

concentrated and profound. Chapter 3 provides an overview of how incumbent financial institutions are responding to this innovation and the impact this has on their operations. Lastly, Chapter 4 details how regulators are responding to these changes internationally and what this means for financial regulation in South Africa going forward.

CHAPTER 1

South Africa in the global context

For the fourth industrial revolution to be sustainable, it requires a firm digital ecosystem to be in place. Access to affordable and reliable electricity is a basic requirement for making use of modern technology. In addition, internet coverage, particularly high speed internet for businesses, and affordable access to data and devices are prerequisites for participating in the digital economy. Lastly skills – in the form of digital literacy for consumers and technical knowledge for providers – are an essential “soft” component of the digital ecosystem.

As such innovation in the fourth industrial revolution has flourished in markets where this digital ecosystem is firmly in place. In 2016 the total value of fintech investment among the top 10 countries by deal value accounted for

95% of global investment.¹⁰ These countries are largely markets where a sound digital ecosystem is in place – China, US, UK, Europe, Canada, Israel, and Hong Kong. In many of these markets fintech innovation is disrupting incumbent banks and disintermediating some financial markets. China is a stand-out as the largest peer-to-peer (P2P) lender and e-commerce system in the world, and fintechs in China now have a similar number of customers as the major banks. Fintech has been significantly less disruptive in US and European markets, but the cannibalisation of banking revenue by digital business models is expected to continue growing.¹¹

While the value of fintech investment in Africa may be comparatively low, Africa is often seen at the forefront of mobile

¹⁰ Innovate Finance, (2017), *The 2016 VC Fintech Investment Landscape*

¹¹ Citi GPS, (2016), *How Fintech is Forcing Banking to a Tipping Point*

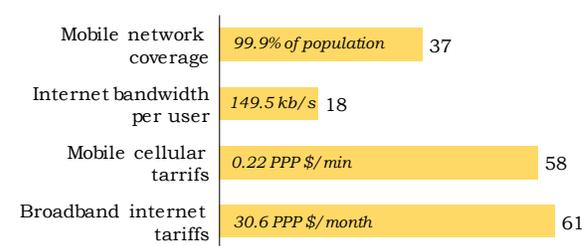
financial innovation. Despite relatively poor digital infrastructure, access to digital services has been supported by the mobile phone - sub-Saharan Africa has the highest growth rate in mobile subscriptions globally.¹² Along with a relatively underdeveloped banking infrastructure, this has fostered an explosion of mobile payment, credit, savings, insurance, and pay-as-you-go asset leasing offered through feature phones.

While South Africa's digital infrastructure may be patchy, it has been ranked as the most developed digital economy in Africa.¹³ Mobile phone penetration in South Africa already exceeds 90% of the adult population with 69% using smartphones.¹⁴ Internet penetration has been rising steadily from 46% in 2015 to 52% in 2017.^{15,16} The population is also relatively "digital-savvy" with the highest levels of digital literacy on the continent.¹⁷ This provides a solid platform for

both banks and fintech players to develop digital innovation for financial services.

However access to this digital infrastructure is limited by affordability. As shown in the graph below, South Africa ranks well in terms of mobile network coverage and internet bandwidth but poorly on mobile cellular and broadband internet tariffs.

ICT infrastructure and affordability in South Africa
 WEF Networked Readiness, 2016
 Index Rank / 139 (1 is best)



Source: World Economic Forum, (2016), *The Global Information Technology Report*

The remainder of this section investigates how South Africa's digital ecosystem is playing out in financial services by considering the key supply- and demand-side dynamics in the sector.

¹² Ericsson, (2017), *Ericsson Mobility Report*

¹³ MasterCard & Fletcher, (2014), *Digital Evolution Index*

¹⁴ We are Social, (2017), *Digital in 2017*

¹⁵ *Ibid.*

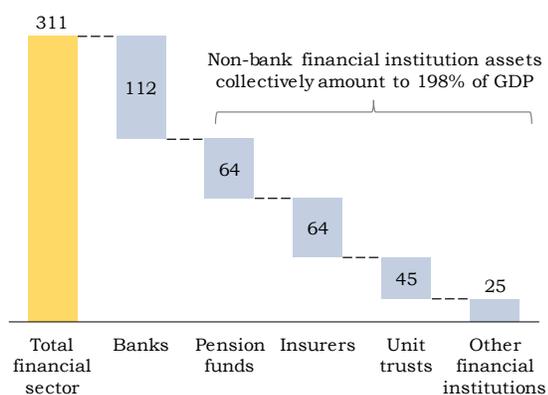
¹⁶ We are Social, (2015), *Digital in 2015*

¹⁷ Siemens and Deloitte, (2017), *African Digitalisation Maturity Report 2017*

2 Supply-side dynamics

South Africa's financial sector is large and sophisticated, as shown in the graph below, with a financial sector assets to GDP ratio that exceeds that of most emerging markets.¹⁸

South African financial sector assets
% of GDP, 2016



Source: SARB Database, 2017

The sector is internationally recognised as being well developed and fundamentally sound. In the World Economic Forum's Global Competitiveness Survey for 2016/2017, South Africa ranked 11th out of 136 countries for financial sector development. Of the composite financial sector scores, South Africa ranked 1st for "financing through

local equity markets", 2nd for "financial services meeting business needs" and for "soundness of banks", and 3rd for "regulation of securities exchanges".¹⁹ South African banks in particular are consistently ranked as some of the best in the world.²⁰

South Africa's favourable rankings benefit from a large amount of investment in financial infrastructure during the 1990s. The establishment of what is now called BankservAfrica in 1993 created a single processing hub and the country's first multi-channel payments switch. In 1994 the South African Reserve Bank (SARB) and South African banks launched a modernisation project for South Africa's payment system. This resulted in the formation of the Payments Association of South Africa (PASA), providing a robust institutional framework for payments system development and innovation. This led to South Africa being the

¹⁸ IMF, (2014), *South Africa financial system stability assessment*

¹⁹ Schwab, (2017), *The Global Competitiveness Report 2016-2017*. The World Economic Forum

²⁰ Lafferty, (2017), *2017 Global Bank Quality Benchmarking*

first country to implement real time inter-bank clearing in 2006.

While South Africa's financial sector is large and sophisticated, it has a high degree of concentration and interconnectedness as the largest banks, insurers and fund managers control the majority of assets. At the beginning of 2017 the five largest banks continued to hold more than 90% of total banking sector assets, increasing from an average of about 80% between 1994 and 2002.²¹ However the sector remains stable and the SARB actively monitors the degree of interconnectedness from a financial stability perspective.

The emergence of Capitec in 2001 introduced a banking model focusing on lower-income consumer segments with a more modern and agile technological infrastructure, placing significant pressure on other banks to react. Beyond this, South Africa's banking market has seen few new entrants. However the SARB issued three provisional licenses in

2016 to Post Bank, Discovery Bank and TYME which intend on launching banking operations in the near future.

In addition to established financial institutions, South Africa has an active and growing fintech industry. The country has two emerging fintech hubs in Cape Town and Johannesburg and both cities host a number of fintech incubators, some sponsored by banks and some by universities, which provide fintech start-ups with networking opportunities and entrepreneurial support. The fintech community in Cape Town particularly benefits from the city's emerging role as a technology hub with a collection of software developing and engineering skills – evidenced by technology giant Amazon's decision to locate an Amazon Development Centre and a customer call centre in the city.

While the industry is small compared to global fintech hubs like London, New York and Singapore, South African fintechs are producing

²¹ South African Reserve Bank, (2017), *Financial Stability Review First Edition 2017*

world-class innovation. Three South African companies featured in the global “Fintech 100 list” in 2016: Wealth Migrate, Easy Equities, and Zoono. However these companies are exceptions as most fintech start-ups in South Africa struggle to gain traction and develop a sustainable business model for the reasons discussed below. The industry is therefore relatively immature compared to established fintech hubs in a number of developed markets.

Although there are a number of fintech incubators that provide fintech start-ups with some support and guidance, there are several factors within the South African ecosystem which are driving this slow growth of the fintech market.²²

Funding is a basic requirement for any startup to move through the early phases of development. Fintechs require strong angel investment networks, seed investors and early-stage investors to fund their concepts through

inception, product development and testing, and growth phases. South Africa’s funding landscape is better suited to supporting mature business concepts that do not present a high risk to investors. Although the country has a strong established venture capital and private equity industry, there is a mismatch between investors with the risk appetite to fund start-ups and a pipeline of investment-ready business ideas.²³ Large institutional investors such as pension funds often do not have the institutional mandate to take on early-stage investments.

Entrepreneurial skills of problem solving, critical thinking, understanding risk and identifying opportunities are critical for fintech start-ups to be successful. Countries with a strong entrepreneurial culture of risk-taking and identifying opportunities are more likely to generate thriving fintech communities. The Global Entrepreneurship and Development

²² Based on stakeholder interviews conducted by Genesis Analytics, July-September 2017

²³ *Ibid.*



Institute has developed a Global Entrepreneurship Index (GEI) measuring the attitudes, abilities and aspirations of entrepreneurs in a number of countries. Sub-saharan Africa has the lowest GEI score of any region and South Africa has a rank of 55 out of 137 countries.²⁴

Industry knowledge is required for fintechs to successfully generate a customer base and distribution network, often through partnerships with existing financial institutions, and to navigate the financial sector's complex regulatory environment. Fintech hubs like London and New York often see established professionals stepping out of incumbent financial institutions to join or start fintechs, providing credibility and experience when looking for funding and partnerships. As this is not happening to the same degree in the South African market, fintech start-ups may not have the knowledge and experience to pitch their ideas to

potential partners or navigate the regulatory environment.²⁵

Investment considerations such as tax incentives, intellectual property (IP) regulation and the size of the addressable market also influence whether investors are willing to put capital at risk for fintech businesses. Flourishing fintech hubs are using tax incentives, open IP policy and passporting agreements with other countries to allow fintech innovation designed in their jurisdiction to be deployed in other markets. South Africa is yet to employ these investment tools and is considered by some to be a less-than-ideal investment destination.²⁶ In a recent investment attractiveness index South Africa only rates 4th on the continent²⁷.

Lastly, **regulation** in South Africa's financial sector has not created an enabling environment for fintech development. A lack of clarity and guidance on how South Africa's

²⁴ GEDI, (2017), *Global Entrepreneurship Index*

²⁵ Based on stakeholder interviews conducted by Genesis Analytics, July-September 2017

²⁶ *Ibid.*

²⁷ Quantum Global, (2017), *Africa Investment Index*



existing financial regulation applies to fintech business models has generated significant compliance risk for fintech start-ups. In markets with flourishing fintech communities, this has been addressed through active

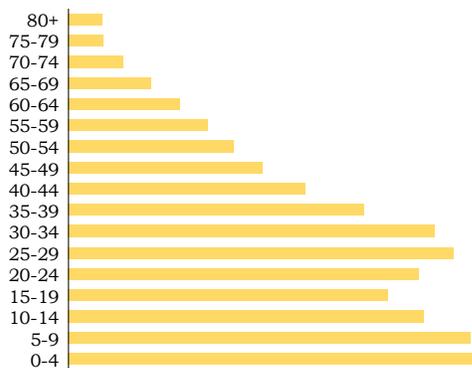
regulatory engagement, regulatory sandboxes, and the creation of distinct fintech regulatory frameworks. This issue will be discussed more fully in Chapter 4.



3 Demand-side dynamics

South Africa has a relatively young population with adults (15 years and above) making up approximately 39 million people - roughly 70% of the population – and an average age of approximately 28.²⁸

South Africa population distribution by age
Mid-year population estimate, 2017



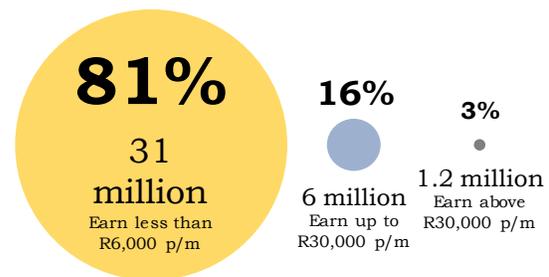
Source: StatsSA, (2017), Mid-year population estimates

While this represents a demographic opportunity by providing a high ratio of working age people, this has not translated in to a demographic dividend for the country due to the labour market’s inability to make use of the additional labour resources.²⁹

This adult population represents a smaller bankable market than a number of other African countries – approximately 111 million adults in Nigeria, 63 million adults in Egypt and 55 million adults in Ethiopia.³⁰

South Africa’s population is characterised by a high level of income inequality. The vast majority of South Africa’s adult population exists in the low-income mass market where paid work is scarce and many earn an income from the informal economy which is highly dependent on cash.

Income distribution among South Africa’s adult population



Source: FinMark Trust, (2016), Finscope consumer survey South Africa

²⁸ StatsSA, (2017), Mid-year population estimates

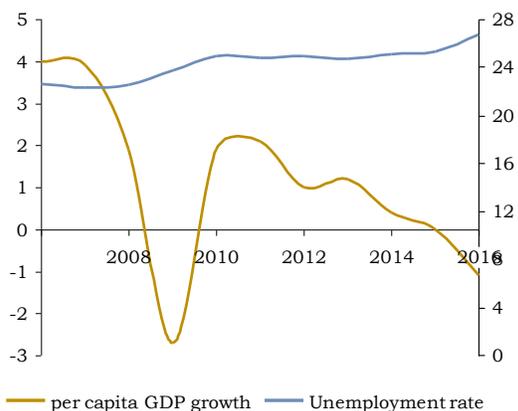
²⁹ StatsSA, (2017), *Whither a Demographic Dividend South Africa: The Overton Window of Political Possibilities*

³⁰ Countrymeters, (2017), *Country population clocks*

As shown by the graph above, 81% of South African adults fit into this category, with 16% of adults being middle-income earners and only 3% being relatively affluent.

South Africa's challenging macroeconomic environment has exacerbated this income dynamic. As the following graph shows, the country's lacklustre GDP growth has resulted in a declining rate of growth in GDP per capita, with a contraction in national income per person in 2016. Consequently, South Africa's official unemployment rate has been rising steadily as sources of formal work have become scarcer.

Per capita GDP growth and unemployment in South Africa
%, 2006-2016

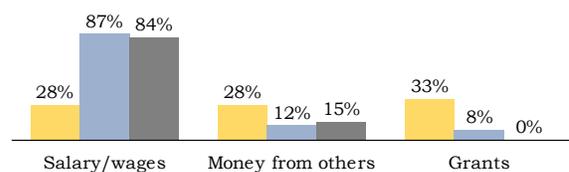


Source: SARB, (2017), statistical database

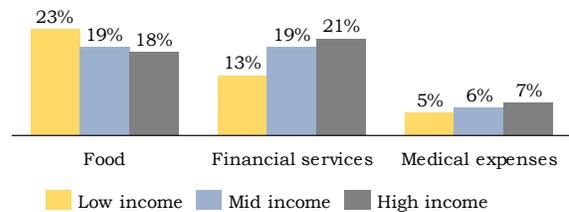
This lacklustre economic performance has contributed to low-

income consumers' inability to spend on tertiary services such as banking and insurance. The graphs below evidence this by considering the main sources of income for each group and comparing the proportion of spending on food to two tertiary services. Mid- and high-income earners source most of their income from salaried work while low-income earners are significantly more dependent on grants and transfers from others. Lower income groups spend the majority of their income on food, but as income increases a greater proportion is spent on tertiary needs such as financial services and medical expenses.

Sources of income
% of total income



Sources of spending
% of total spending



Source: FinMark Trust, (2016), Finscope Consumer survey South Africa

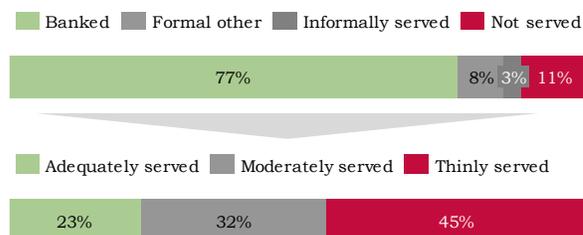


Many low income consumers do not have the financial resources to access sophisticated financial services. More than 80% of the population live on a day-to-day basis with an “in the now” mind-set, leaving little room for savings, investment or insurance products.³¹ This is evidenced in South Africa’s poor savings culture and high levels of indebtedness – since 2006 aggregate household savings has been negative and the average ratio of household debt to income was 80%.³²

In addition to constrained spending ability, South African consumers do not make optimal use of available financial products. South Africa has a high overall rate of financial inclusion and 77% of the adult population are banked (excluding South African Social Security Agency (SASSA) card holders, this ratio decreases to 58%). However, this high overall financial inclusion rate belies the quality of financial inclusion. As shown

alongside, FinMark Trust’s quality of financial inclusion measure indicates that the bulk of financially included adults in South Africa are less than adequately served.

Financial access strand in South Africa



Source: FinMark Trust, (2016), *Finscope Consumer survey South Africa*

The Finscope survey attributes this to the low uptake of convenient transactional products, such as digital payments, and poor knowledge of financial products. Only 37% of adults use digital payments on a monthly basis and 56% of salaried adults do not have any retirement financial product. 5.5 million adults have the same type of funeral cover from two or more providers, evidencing poor levels of financial product knowledge and understanding.³³

³¹ FinMark Trust, (2016), *Finscope consumer survey South Africa*

³² South African Reserve Bank, (2017), *statistical database*

³³ FinMark Trust, (2016), *Finscope Consumer Survey South Africa*

One of the drivers of this problem is the high dependence on cash as a payments instrument, particularly within lower income segments. A key example of this emerges from the digital payment of social grants in South Africa. Prior to 2012 SASSA grants were mostly paid in cash, leading to high distribution costs and a propensity for fraud. As a result a biometric SASSA card linked to an account at Grindrod Bank was developed to distribute social grants digitally. While the account provides free POS card payments and limited mobile phone purchase functionalities, over 90% of SASSA grant recipients withdraw all of the funds in their account in cash as soon as it is deposited.³⁴

This preference for using cash among lower-income segments is driven by a number of behavioural and cultural factors.³⁵ Cash is cited as being more real, tangible, and accessible in communities where cash remains the primary instrument of exchange. It is

perceived to provide users with an increased level of control over their finances, making it easier to judge how much income they have and what they are spending it on. Cash is also perceived as a way of connecting to the community – it is easier to provide friends and family members with financial assistance in cash and does not exclude anyone without access to digital payments.

The overall impact of these demand-side dynamics is that current fintech and digital innovation caters mostly to a niche, relatively affluent and financially-savvy consumer market. Beyond P2P mobile-based remittances, more advanced fintech solutions are therefore not well suited for the majority of mass market low-income consumers. Although there is rising adoption of smartphones and a large group of millennials familiar with digital technology within this segment, this does not necessarily translate to an ability to access and use more sophisticated financial

³⁴ FinMark Trust, (2016), *Why use accounts? Understanding account usage through a consumer lens*

³⁵ Genesis Analytics, (2016), *primary research on behavioural barriers to card usage in the mass and low income market*



services. A number of barriers to the adoption of innovative financial services in this segment still remain.

The first relates to the state of the digital ecosystem in South Africa. Affordable electricity access is required to charge and make regular use of smartphones. While 90% of households in South Africa are connected to electricity³⁶, poor households may not be able to afford regular use of electricity sources. In 2015 South Africa was ranked the 10th most expensive country for electricity.³⁷ Mobile data affordability constrains access to digital innovations that require the use of smartphone apps or .mobi sites. The cost of 1GB of data in South Africa averages around USD7.5 compared to USD4.9 in Kenya, USD2.8 in Uganda and USD2.3 in Tanzania.³⁸ This high cost associated with downloading and using apps impacts the lower end of the market more so than middle and upper class consumers.

The second barrier relates to the level of financial literacy within South Africa's consumer market. Financial literacy is critical to an individual's ability to access and make meaningful use of the right kinds of financial services for their context. The Organisation for Economic Co-operation and Development (OECD) defines financial literacy within four categories: *financial control* - an individual's ability to manage their daily finances and make ends meet; *financial planning* - an individual's ability to set financial goals and work towards them; *product choice* - an individual's knowledge and use of available financial products; and *financial knowledge* - an individual's basic numeracy skills and understanding of financial concepts such as inflation, interest, and risk diversification.

The level of financial literacy in South Africa is relatively low, as shown in the graph on the next page. Overall South Africa scores the worst

³⁶ StatsSA, (2016), *Community Survey Statistical Release*

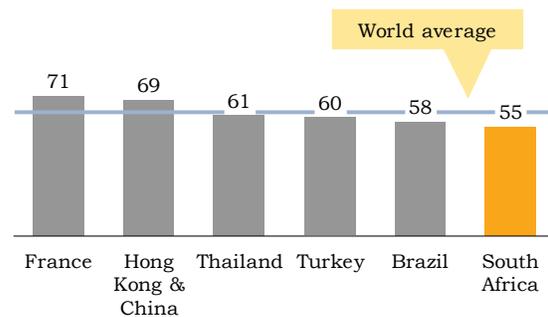
³⁷ NUS Consulting, (2015), *Global Energy Market Survey*

³⁸ ResearchICTAfrica.net, (2017), *Cheapest price for 1GB basket in Africa by country*



on the product choice and financial planning categories, both important for demanding and successfully choosing more sophisticated financial products. This is particularly the case among lower-income groups which score consistently worse across all categories.³⁹

Overall financial literacy score
2016



Source: OECD/INFE, (2016) *International Survey of Adult Financial Literacy*; HSRC, (2016), *South African Social Attitudes Survey*

³⁹ HSRC, (2016), *Financial literacy in South Africa: Results from the 2015 South African Social Attitudes Survey*

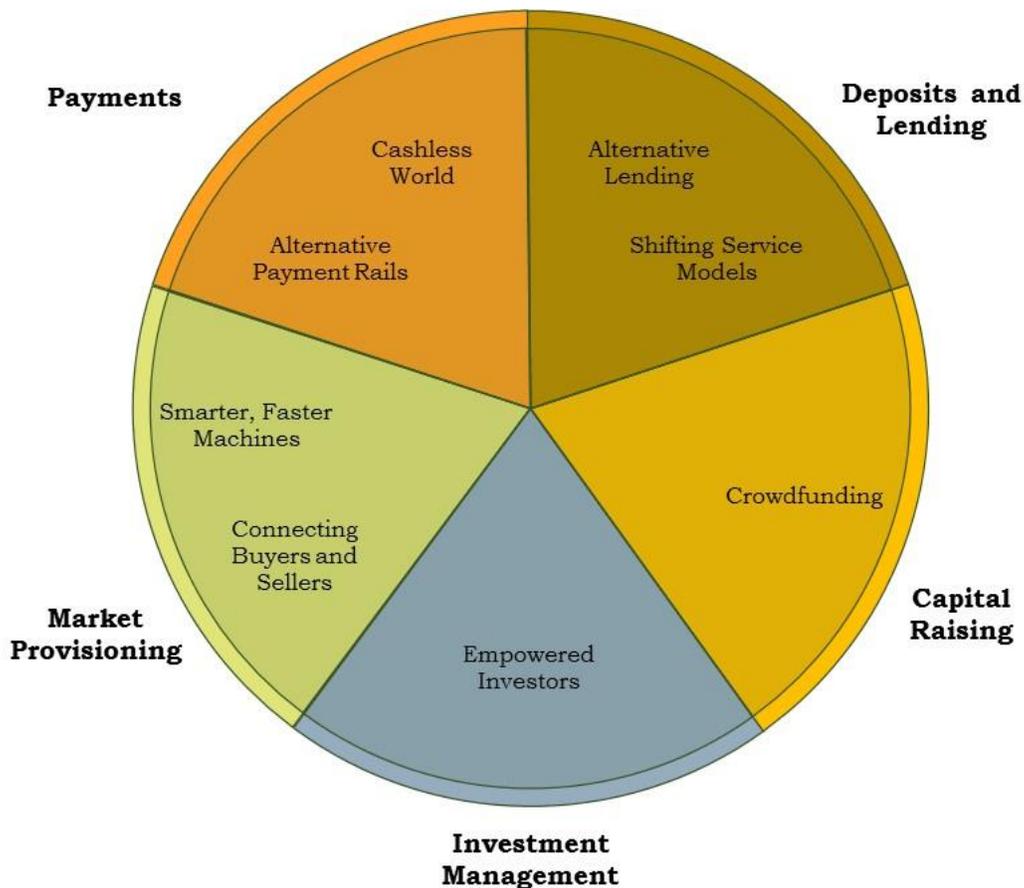


CHAPTER 2

Fintech innovation in South Africa

Fintech innovation is occurring across the financial service industry. The diagram below groups focal areas for innovation in five of the core financial service functions using a classification that was originally developed in the World Economic Forum's 2015 *Future of Financial Services* report. This chapter focuses

on benchmarking innovation in South Africa's banking sector against the trends identified in the World Economic Forum (WEF) report. As such the focus is on the main banking functions of payments, deposits and lending, capital raising, investment management and market provisioning.



4 Payments

As a core financial service, payments are a high frequency touchpoint between consumers and retail banks. Being less regulated than deposit-taking functions makes payments an attractive area for innovation and disruption.

Globally payments innovation has occurred within traditional payments infrastructure or “rails” - namely card and electronic funds transfers (EFT) - and is now occurring on new rails outside of traditional payments infrastructure such as mobile money and cryptocurrencies. Many of the innovations in payments leverage the internet, smartphone and unstructured supplementary service device (USSD) platforms to make electronic payments faster and more convenient. In many instances payments have become so seamless they fade into the background of a process, transaction or experience.

Key to success in payments innovation is creating a network effect in which there is widespread

customer and merchant adoption. The degree to which traditional products have been adopted is also influencing the adoption of new products and services. In markets with a low penetration of banking products and limited banking infrastructure, alternatives such as mobile money have become wildly popular.

Mobile money is a good example of innovation in payments being driven by the entry of participants from other industries - mobile network operators (MNOs) and the ‘GAFA’ technology companies (Google, Apple, Facebook and Amazon). These technology companies enjoy high and frequent customer or user interaction, making payments a logical place for them to play.

Parallel to global trends, the largest share of fintech innovation in South Africa has been in the payments sector. Unlike other African markets this innovation has not been led by MNOs, probably

because a large proportion of the adult population have bank accounts and access to the well-developed payments infrastructure.⁴⁰ This is the result of the investments made in South Africa's payments infrastructure during the 1990s and the industry and regulators' focus on enforcing interoperability between the providers of payment services. The establishment of a single inter-bank processing group in 1993 (BankServAfrica) provided multilateral switching capabilities.⁴¹ EFT modernisation occurred in 2006 with the introduction of real time clearing (RTC).⁴² These two functions are underpinned by centralised clearing conducted and governed by designated payment clearing houses (PCHs).

The Payments Association of South Africa oversees the National Payments System and governs the PCHs, PCH operators, system operators (SOs) and third party payments providers (TPPPs). Most

fintechs operate in the SO space and need to be licensed by PASA. There are currently approximately 120 licensed SOs. Importantly the infrastructure and regulatory environment facilitates market-wide adoption of digital innovation.

The rest of this section of the report is divided into two components. Section 4.1 – *A Cashless World* – explores whether South Africa has followed the global trend of moving payments away from cash and onto digital channels. Section 4.2 – *Alternative Payment Rails* – reviews innovations outside of the traditional infrastructure of card and EFT.

4.1 A cashless world

South Africa has a relatively low level of cash in circulation, shown in the graph below, evidencing a degree of sophistication in the use of payment instruments. With approximately 77% of the population formally banked, most South African

⁴⁰ Based on stakeholder interviews conducted by Genesis Analytics, July-September 2017

⁴¹ South African Reserve Bank, (nd), *The National Payments System in South Africa 1995 to 2005*

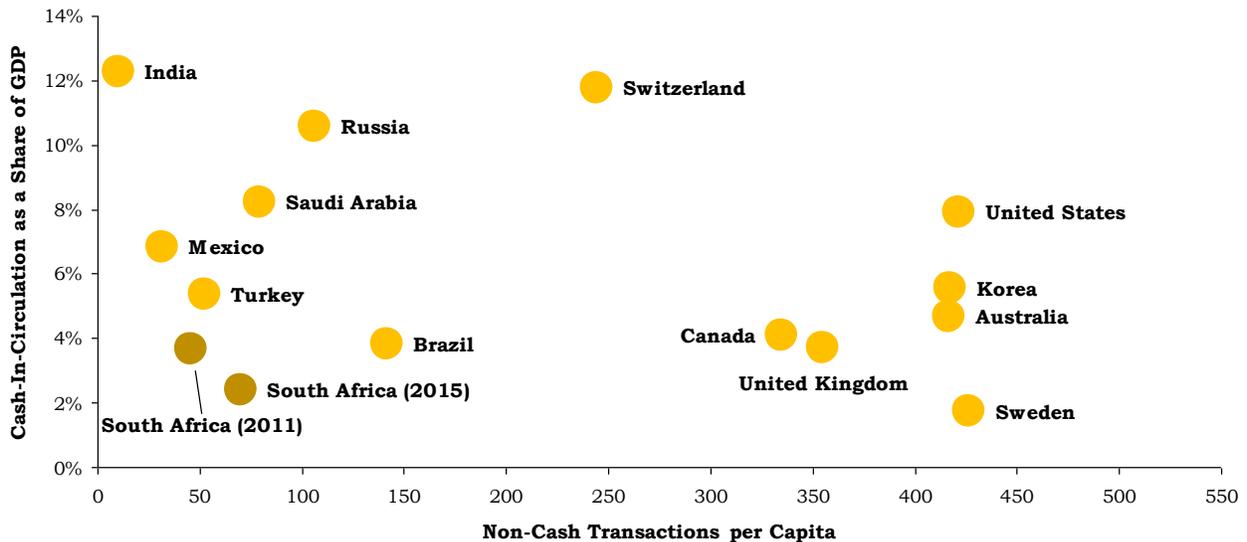
⁴² Ernst & Young, (2017), *#Payments. Insights. Opinions*

consumers have access to EFT and card rails.⁴³ However the graph also highlights how the average usage of non-cash channels remains low. Despite being a highly carded market, the average number of transactions per card was only 2.4 per card per month in 2015, compared to over 30 in developed markets.⁴⁴

For low income individuals cash continues to be the main means of transacting. A survey conducted on 97 social grant recipients receiving funds digitally found that

90% withdrew all funds from the account as soon as available.⁴⁵ In contrast higher earning individuals frequently make use of digitised solutions, and may have a higher usage of electronic transactions than in other countries due to the high crime rate and the risk of carrying cash. Increasing the adoption of electronic payments - especially amongst low income individuals - presents an opportunity to alleviate the social cost of cash which has been estimated at 0.52% of GDP.⁴⁶ These include the cost of its

Cash-in-Circulation as a Share of GDP; Non-Cash Transactions per Capita
2015



Source: Adapted from CapGemini, (2017) World Payments Report; BIS, (2017), Redbook Comparative Tables

⁴³ FinMark Trust, (2015), *Finscope Consumer Survey South Africa*

⁴⁴ BIS, (2016), *Redbook – Country Statistics*

⁴⁵ FinMark Trust & Eighty20, (2016), *Why Use Accounts: Understanding Account Usage Through a Consumer Lens*

⁴⁶ Genesis Analytics, (2017), *Determining the True Cost of Cash*

production and handling, the physical infrastructure required for distribution, travel costs for consumers to physical infrastructure and the cost of crime. Non-cash channels are superior in these regards and provide the user with better means of monitoring their financial health.

Given the level of bank penetration, increasing the volume of digital transactions requires more individuals to spend on their card or other emerging digital instruments. This offers payment system participants opportunities for growing transaction revenues and accessing new transaction data sources. This opportunity will increase significantly going forward due to a number of factors:

RISING smartphone penetration and falling data costs which facilitate mobile payments,

RISING incomes and internet access increasing e-commerce spending,

FALLING costs for POS infrastructure leading to increased merchant adoption.

However this shift towards digital payments also presents risks to both payment providers and their customers. As payments is a high frequency contact point with the customer, banks that leverage third party solutions or deploy new innovations need be wary of securing brand visibility and avoiding disintermediation of the banking brand. Banks need to work closely with third parties and vet their operations as operational failures that impact the customer experience could have a significant cost and reputational impact on the bank.

Arguably the greatest risk with digital payment innovation is the potential for fraud and cyber-crime. The use of smartphones and a variety of app-based payment products has introduced new access points for malicious intrusions. In addition, the rise in e-commerce and online payments create vulnerabilities if card details are stored on a compromised merchant system.

Improved security features such as tokenisation are provided both by banks and start-ups and help increase consumer confidence in the use of digital channels.

Addressing these risks incurs significant costs and requires educating consumers to be more vigilant. Introducing security features is challenging as consumers tend to respond poorly to the increased friction of improved security measures.⁴⁷ Banks must balance security requirements against customer experience.

4.1.1 Disruptive innovations

Within disruptive innovations we consider smartphone payments, integrated and streamlined payments, and next generation security in a cashless world.

Smartphone payments

Smartphones have enabled digital wallet apps that allow customers to store card details and transact

without physical cards. Banking apps allow consumers to use their mobile phones for bank-to-bank EFT payments, bill payments and pre-paid purchases.

International Examples



Google Wallet - Mobile application digitising users' cards to facilitate P2P and P2B payments online and at POS



MasterPass- A mobile application digitising users' cards allowing payment through QR codes and online

Domestic Examples



Snapscan - Pay-by-proxy allowing businesses to accept card transactions with mobile phones



WiGroup - Mobile transactions solutions provider offering mobile transaction platforms and applications

Mobile payments are expected to rise alongside increasing smartphone penetration. Mobile banking apps leveraging this platform have been growing rapidly from 21% of the adult population in 2015 to 34% in 2017.⁴⁸ This will similarly drive the use of digital wallets. Card-based pay-by-proxy solutions that use quick response (QR) codes are increasingly popular and are provided by fintechs such as SnapScan and Zapper. GAFA innovations such as Google wallet are yet to enter the market.

⁴⁷ First Annapolis, (2016), *The Path to Digital Transformation*

⁴⁸ We are Social, (2017), *Digital in 2017*



Integrated payments

E-commerce and other card-based payments platforms allow payments without merchant authentication of a physical card, known as card-not-present (CNP) transactions. Innovative payments solutions additionally provide one-click payment processes, reducing the time taken to make a payment or “friction” for the customer. The value and volume of these CNP transactions is set to increase

International Examples



Uber - A transportation application stores users' preferred card details and automates payment when used



Amazon - An online retail store that enables 'one-click payments' by storing a user's payment details

Domestic Examples



PayFast - A payments service provider offering recurring 'once-off' payments without user authorisation



Peach Payments - A recurring and one-click payments service provider utilising card tokenisation

rapidly.

Incorporating customer card or EFT details into a payment platform streamlines the consumer's payment experience. Integrated

payments are common in sharing economy platforms such as Uber and have informed customer expectations of a seamless payments experience. The 'invisible' payments process improves customer experience but decreases the likelihood that a consumer will vary the card they pay with. This may result in a reduction in the number of cards a customer uses and changes in the competitive dynamics in the card market.

Although e-commerce currently only accounts for 1.6% of total retail value in South Africa, online retail spending has grown rapidly and is expected to double within the next three years.^{49,50,51} Card payments are used more often in e-commerce than EFTs with 58% of South African online shoppers preferring to pay with a card.⁵²

Card payments are currently more attractive as they do not require setting up a new beneficiary. In addition cards can be used for cross-

⁴⁹ SARB, (2016), online statistical database

⁵⁰ Deloitte, (2015), African Powers of Retailing

⁵¹ Genesis Analytics, (2017), team analysis

⁵² IAB, (2016), E-Commerce Industry Report

border transactions and allow consumers to purchase on credit. While most integrated payment innovation has been focused on cards, there has been activity in the EFT space. Fintech i-Pay provides a workaround solution for merchants accepting EFTs, mimicking RTC EFTs through the use of escrow accounts.

Streamlined payments

With an estimated 726 POS devices per 100 000 people in 2015, POS device penetration in South Africa is the highest on the continent.⁵³ The POS infrastructure is now beginning to change in response to the prevalence of smartphones and the growth of contactless near field communication (NFC) cards. NFC has made physical card payments considerably faster, while mobile POS is reducing the cost and complexity of device management. QR based solutions in which the customer scans a merchant code

International Examples

 **Apple Pay** – Mobile wallet with NFC enabled capabilities allowing for contactless POS payments

 **FitPay** – A technology provider enabling contactless payments through wearable devices

Domestic Examples

 **Yoco** – Supplier of cost-effective mobile POS that communicate through Android and iOS devices

 **CardsPlus** – A producer and supplier of contactless and contact chip cards

have eliminated the need for a POS device altogether.

Contactless cards are now offered by all four major banks in South Africa although NFC-enabled POS terminals are still being rolled out. Contactless card usage has and is expected to continue to increase rapidly. Wearables are unlikely to generate any meaningful disruption outside the closed loop systems where they are usually adopted (e.g. events and concerts).

Mobile POS solutions have been developed in South Africa to address the high merchant costs of traditional POS terminals, although it has been estimated that the majority of these offerings remain too costly for informal merchants.⁵⁴ Improvements in mobile POS

⁵³ BIS, (2016), *Redbook – Country Statistics*

⁵⁴ Genesis Analytics, (2017), *Card Acceptance in the Informal Sector*

adoption would encourage card usage in the informal sector, increasing the volume of low value card transactions.

Next generation security

Innovation in security limits fraud, protects consumers and increases confidence in digital channels. Location based identification and biometrics confirm a cardholder's identity while tokenisation prevents online card mirroring.

International Examples



Bill Guard - Notification of consumers to potential fraud by analysing users' card based transactions

Domestic Examples



Entersekt - Provider of push-based payments security and authentication, as well as biometric verification



MasterCard - World-first large-scale tester of biometrically secured cards conducted in South Africa



Virtual Card Services - A card payments service provider that offers 3D Secure solutions

The preceding disruptive payments innovations require sophisticated security to prompt adoption by guarding consumers against a new and wider range of threats. A survey conducted in 2015 found that 47% and 41% of global IT

professionals considered mobile payments and card payments respectively to be insecure.⁵⁵ Debit and credit card fraud in South Africa amounted to R480 million in 2015 with card-not-present accounting for approximately 75% of South Africa's credit-card fraud.⁵⁶

South Africa's payments industry has developed world class fraud and cyber-security counter measures. 3D Secure infrastructure secures online payments by authenticating the cardholder before the transaction takes place. Biometric cards utilising fingerprints have been successfully piloted in local retailers and may soon be deployed. Location-based identification remains nascent though domestic capabilities do exist.

4.2 Alternative payment rails

Alternative payment rails use technology to enable payments outside of traditional payments

⁵⁵ ISACA, (2015), *Mobile Payment Security Study*

⁵⁶ SABRIC, (2015), *Credit Card Fraud*



infrastructure or make use of traditional rails without having the customer interact with the bank directly. Examples of the former include decentralised currencies as well as MNO-led mobile wallets.

These alternative rails offer the opportunity for decreased cost and increased efficiency in domestic and international remittances. In East Africa mobile money usage has become extremely widespread and is increasingly replacing card transactions. Crypto-currencies hold the same potential, although adoption is limited and fragmented and the technology may suffer from scaling issues leading to rising transaction costs.

Usage of alternative payment rails beyond retailers for domestic P2P payments has been limited in South Africa. Traditional channels remain the preferred means of domestic remittance, with banks, automated teller machines (ATMs) and cash being utilised by 71% of the population, whilst retailers are used

by 42%.⁵⁷ A mature and competitive payments infrastructure provides domestic remittance services at much lower costs than are typically the case with stand-alone money transfer operators.

The cross border remittance market holds significant potential for innovations using alternative payment rails. The international remittance flows of approximately R25 – 30 billion are primarily destined to Lesotho and Zimbabwe.⁵⁸ Charges are substantial with the average remittance cost along formal rails estimated at 17% of the value sent - nearly 10% above the global average.⁵⁹

4.2.1 Disruptive innovations

Disruptive innovations within alternative payment rails cover domestic and international remittances and the use of crypto-currencies.

Domestic remittances

⁵⁷FinMark Trust, (2015), *Fincscope Consumer Survey South Africa*

⁵⁸ Technoserve, (2017), *Domestic Remittances in South African*

⁵⁹ World Bank, (2017), *Remittance Prices Worldwide – Issue 23*

Application-based P2P payments are leveraging growing mobile and internet penetration. Retail channels offer instant domestic cash transfers without the need for a formal bank account. Mobile money allows users to store and transfer value through mobile networks. This may or may not require a bank account. The low

International Examples

-  **MPesa** - An agency based mobile money operator renowned for its popularity in Kenya
-  **MTN Mobile Money** - A competitor to MPesa that is dominant in Uganda

Domestic Examples

-  **Shoprite** - A large South African retailer providing near instant cash-in cash-out transfers from its branches

cost and simple structure has proved attractive and popular among low-income and unbanked populations in Africa.

Domestic P2P payment innovation has not been hugely disruptive in South Africa with the sector remaining dominated by cash and bank-led channels. With the exception of retailers, alternative rails are little used for domestic remittances.

Retailers are widely used for cash-in cash-out domestic remittances with a select few having

international capabilities. Retailers partner with a sponsoring bank and utilise BankservAfrica's Money Transfer Solution. Usage of international online solutions such as PayPal is limited. The social communication application WeChat has recently partnered with Standard bank to introduce a digital wallet, but adoption of this service has yet to take off.

Mobile-money has not gained traction in South Africa with most domestic start-ups and international brands closing operations. The vast majority of South Africans have access to bank and retailer-led P2P options, meaning that there is significantly less room for competition than in other African markets. In addition, regulatory requirements that limit the provision of e-money to deposit taking institutions require mobile money operators to either acquire a banking license or partner with a licensed bank. This regulatory requirement was not in place in Kenya with the launch of M-Pesa and is noted as one of the reason for its success.

International remittances

International remittance providers partner with banks, fintechs and retailers to provide alternatives to bank and informal channels. These facilitate cross-border P2P transfers

International Examples



PayPal – A PayPal account facilitates online P2P and P2B payments



Transfer Wise – An international remittance platform that pairs senders and receivers in local markets

Domestic Examples



Mama Money – International remittances from South Africa to five African markets with payments made in cash or electronically



Mukuru Money – An international remittance platform that operates through partnership with retailers, fintechs and banks

of wealth and are needed most by migrant workers.

Informal channels dominate international remittances to and from South Africa. This is due to the high costs along the formal Southern African Development Community (SADC) remittance corridor and strict know your customer (KYC) requirements that exclude consumers without formal documents from utilising formal channels. However regulatory

changes in 2015 have allowed entities to register as Money Transfer Operators without the need for a bank sponsor. This has led to an increase in independent entrants to the market such as Mama Money, Mukuru and Hello Paisa. To date this has not translated into a significant decline in average international remittance costs.⁶⁰

Foreign solutions such as TransferWise side-step cross-border requirements by utilising country-specific balance sheets and matching senders and receivers in local markets. As no international transfer of value takes place, asymmetrical developed-developing country flows create problems of insufficient liquidity.

Cross-border electronic payment systems facilitate international payments for trade, investment and remittances by reducing costs and increasing efficiency relative to the traditional method of correspondent banking. Participating commercial banks are

⁶⁰ World Bank, (2017), *Remittance Prices Worldwide – Issue 23*



able to settle cross-border payments directly through settlement accounts

International Examples



SEPA - The system unifies Euro payments systems across the Euro-zone, streamlining international bank-to-bank transfers

Domestic Examples



SIRESS - A cross-border interbank settlement system for the SADC region

held with a central party or indirectly through their central banks, avoiding the added costs and time delays incurred through correspondent banking arrangements.

South Africa is a member of the regional economic grouping SADC. In 2013 SADC launched its Integrated Regional Electronic Settlement System (**SIRESS**) among the four member states of the rand-based Common Monetary Area: Lesotho, Namibia, South Africa and Swaziland. Participating commercial banks hold a rand-based settlement account with the SARB as the appointed SIRESS operator. These banks can submit cross-border payment instructions to one another electronically which are then settled centrally using the SARB accounts, with the option for real-time

settlement. Currently the system accommodates high value commercial payments which can be settled without clearing. However, SADC is planning on introducing a low-value retail stream, with batch processing and clearing undertaken by a regional clearing house and settlement executed using SIRESS.

While membership to the system has been expanded to the rest of SADC, settlement is still conducted in rand. As such the system is mostly being used to facilitate payments to and within the Common Monetary Area.⁶¹ Most intra-SADC payment are conducted in USD and these payment flows cannot currently be executed through SIRESS. Furthermore, while the hope was for SIRESS to significantly reduce the cost of cross-border payments, to date this has not occurred. For many participating banks transaction volumes are too low to realise economies of scale, and recipient banks are still charging correspondent banking fees when

⁶¹ Genesis Analytics, (2016), *Study on the impact of SIRESS on transaction costs and practices*. FinMark Trust



receiving funds in their SIRESS accounts.⁶²

Crypto-currency

Crypto-currencies employ decentralised ledgers to enable users to securely transfer value with limited transaction costs, near real time settlement and without the need for intermediaries.

International Examples



Kraken - One of the world's largest crypto-currency exchanges trading 17 crypto-currencies



Bitcoin - The first, most traded and most valuable crypto-currency

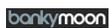
Domestic Examples



Ice3X - A crypto-currency exchange allowing users to trade in Bitcoin, Ethereum and Litecoin



Monero - The 10th most valuable crypto-currency at the time of writing



BankyMoon - The leading blockchain fintech and blockchain infrastructure service provider

South Africans have access to international crypto-currency platforms as well as domestically-developed wallets and exchanges. Lumo, Crypto-Change and Ice3x allow South Africans to invest and trade in various crypto-currencies. These currencies see significant domestic trade activity during

periods of volatile prices, suggesting it is predominantly an investment mechanism at present. With few online and physical retailers accepting crypto-currencies as payment, network effects are poor. Retailer Pick 'n Pay is piloting Bitcoin acceptance at one of its branches to evaluate its potential use as a payment channel. To date, no feedback on its success has been publicised. Management has suggested that until regulatory frameworks are established to mitigate the risks of Bitcoin use, it is unlikely the option will be rolled out to other stores.⁶³

Further innovations include crypto-currency Monero - heralded for its superior anonymity measures - which was co-founded by a South African. A more philanthropic local project known as the Universal Basic Unit (UBU) will see the distribution of UBUs to all interested individuals without charge. This hopes to establish a universal currency, the

⁶² *Ibid.*

⁶³ Tshandu, P., (2017), No Paying via Bitcoin just yet says Pick 'n Pay, *Business Day*



value of which is ensured by usage and wide-spread participation.

The SARB has taken a neutral approach to virtual-currency regulation as it engages with leading virtual-currency fintechs in order to understand the underlying technology, likely use cases and the risks it may introduce to the financial system. As outlined in its position paper, virtual-currencies are not recognised as legal tender though the public is not restricted from using it. Subsequently individuals are personally liable for all risks associated with its use. Crypto-currency use remains niche as it requires digital access, financial savvy, broad acceptance, and trust in what is a new infrastructure.

4.3 Outlook

Disruption in the South African payments landscape differs to that observed in the rest of Africa. This is partly due to a large banked population with access to a modern and functional payments infrastructure, a sophisticated regulatory framework, and the

presence of sophisticated bank and start-up led payments service providers.

As cash usage falls, non-cash rails have the opportunity to increase their share of total payments volumes and values. The channel that provides superior benefits for its consumers will successfully take up this opportunity. These benefits must include: easy access to the platform, a seamless customer experience, merchant acceptance of the channel; cost effectiveness, initiation and settlement efficiency, and robust security.

EFTs are fundamentally less risky than card transactions as push payments do not require customers to provide their personal details. Although domestic EFT infrastructure is well functioning there are significant opportunities for modernisation that will greatly improve the channel's attractiveness and encourage innovation using EFT rails. These should be targeted at mitigating the inefficiencies of loading beneficiaries and the time



taken for settlement, as well as reducing the costs levied for RTC.

Card rails provide more efficient payment instruments as the sophistication of the infrastructure and widespread adoption has been driven by the investments of global providers such as VISA and MasterCard. With the infrastructure and competitive landscape as is, card and its digitised form is set to increase its share of total transactions more rapidly than EFT.

Changes to the EFT infrastructure could impact this trend. Banks are migrating to the ISO20022 messaging standard which offers increased information bandwidth to accompany EFTs, facilitating RTC with credible notifications. The Nigerian person-to-business MCash offering illustrates the possibilities of innovation leveraging an RTC infrastructure. MCash operates from USSD- and application-based interfaces to provide zero-cost and real-time account-to-account payments. To initiate a payment, the user need only input a unique eight

digit code identifying the merchant's account. Its cost-structure and accessibility make it a feasible platform for low value transactions. This has seen a healthy rate of adoption. An evolution could include a pay-by-proxy QR code functionality.

While alternative payment rails present significant opportunity, they also create risk for incumbent payment providers and customers. Banks are at risk of decreased transaction revenues and customer visibility if transactions occur on alternative infrastructures. Disruption may be broader should a financial ecosystem develop around alternative rails that provide further services traditionally offered by banks, as has been the case with MNO-led mobile wallets in East Africa.

The use of alternative payment rails may also present consumer protection issues. Banks engage in significant self-regulation to guard against reputational risks which subsequently protects the consumer. This may not necessarily be the case



in a parallel ecosystem. For example, crypto-currencies employ novel security measures and the absence of a centralised authority means the currencies are volatile and subject to bubbles. Being an unregulated system, its users are not protected from these risks. Both crypto-currencies and mobile money users have no institutionalised insurance against a lost mobile phone or hacked digital wallet.

The imminent introduction of a twin peaks regulatory model in South Africa will lead to increased scrutiny of market conduct issues. A review of the payments system may find that increased efficiency and reduced costs for RTC and POS infrastructure are necessary to protect the interests of consumers. In addition international regulatory trends have sought to increase competitiveness

in the payments space by mandating banks to open their infrastructure to third parties. While South African regulators do not currently mandate open APIs, regulation similar to the EU's Payment Services Directive II (PSDII) is anticipated in the future. Open APIs will drive competition in the market by easing entry for innovative independent payment providers.

In order to manage the current and expected disruptions to the payments sector, regulatory changes may be required. PASA's ambit could be expanded to include payments innovations that currently sit outside of the PCH structure. This would provide consumers with confidence in using innovative payment methods and provide innovators with clear structures to operate within.



5 Deposits and lending

Banks in South Africa fulfil the traditional intermediary role of collecting deposits and on-lending, typically owning the full value chain including customer acquisition, credit scoring, accounts processing and customer service. However these banking functions are being disrupted by innovation in two key areas – in the credit market and in the way customers are serviced.

5.1 Alternative lending

The alternative lending landscape consists of a collection of innovative service providers across the lending value chain that provide alternative ways of assessing credit and securing funding for lending products outside of the banking system. Some lenders are attempting to use new and alternative sources of data to risk

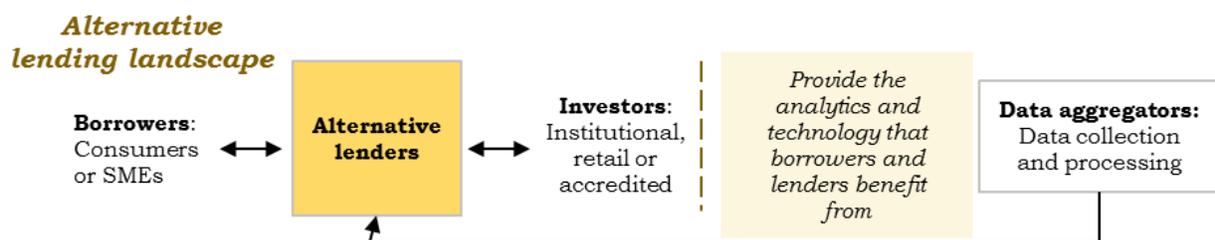
assess customers that have been excluded from receiving credit using traditional risk assessment tools. Others are attempting to use crowd-based funding platforms to secure funding for lending and in some instances passing the risk to the investors.

5.1.1 Disruptive innovations

Disruptive innovations in alternative lending include peer-to-peer lending, asset financing, and alternative scoring.

Peer-to-peer lending

Peer-to-peer lending provides credit to individuals or businesses through online platforms that match lenders to borrowers, eliminating traditional financial intermediaries. The global consumer P2P market was estimated



at USD 80 billion in 2015 and is expected to grow in the near term.⁶⁴

International Examples

 **Lending Club** - World's largest P2P lending platform

 **Upstart** - P2P lending platform integrating alternative scoring methods

Domestic Examples

 **Rainfin** - An online P2P and P2B lending platform

 **Lendico** - An online P2P lending platform launched in 2013

 **StokFella** - A digitised social lending and savings platform

The idea of P2P lending is a familiar concept in South Africa - many South Africans are already familiar with stokvels, a form of social lending in a physical form. P2P lending follows a similar structure but takes place on an online platform. South Africa and Kenya are market leaders for alternative lending in Africa with USD 15 million and USD 16.7 million raised from online channels respectively.⁶⁵ In South Africa these lending platforms are largely seen as an alternatives for credit-worthy borrowers seeking lower interest rates.

Asset financing

Asset financing is being shaped by innovations relating to big data, the “internet of things” and sharing economies. Vehicles and assets connected to the “internet of things” enables lenders to gather data on the use of the asset and on the borrowers’ behaviour, allowing the lender to alter rates or shut off access in the case of default. The increase in services such as Uber and Taxify has increased the demand for vehicle loans and led to specialised asset

International Examples

 **Tugende** - A Ugandan platform allowing users to finance and pay off a motorcycle

 **MKopa** - A Kenyan solar panel financing company

Domestic Examples

 **The Sun Exchange** - Investors purchase solar panels in infrastructure projects and lease them to the users

lenders.

There has been significant innovation in Africa around asset leasing and pay-to-own financing alternatives using machine-to-machine or mobile communication. These technologies ultimately control

⁶⁴ KPMG and Cambridge Centre for Alternative Finance, (2016), *Global insights from regional Alternative Finance studies*

⁶⁵ Cambridge Centre for Alternative Finance & Energy 4 Impact, (2017), *The Africa and Middle East Alternative Finance Benchmarking Report*

risk and provide pay-as-you-go financing to consumers in the lower-end of the market. However this model has not yet picked up in South Africa. The market is still dominated by banks and largely uses traditional methods of financing.

Alternative scoring

Alternative scoring assesses a potential borrower's credit worthiness using unconventional data sources such as social media, bank transactions, behavioural data and cash flow rather than credit history. The use of alternative data broadens access to lending products among sub-prime borrowers and those without a formal credit history or traditional records of income.

International Examples



Kreditech - A lender integrating social media into credit scoring



Kabbage - Credit worthiness assessments integrate online retail spending behaviour

Domestic Examples



Commuscore - Credit scoring integrates data from informal social saving and lending groups



Compuscan - A credit-bureau integrating psychometric data into credit scoring

New innovative ways of scoring consumers are emerging in South Africa. CommUscore is being used in

informal markets (stokvels) to provide members with a credit record that can be linked to their South African identity number. Independent credit bureau, Compuscan, recently partnered with Coremetrix, a leading creator of psychometric data, to assess credit worthiness for consumers with limited credit information using psychometric scoring that complements traditional scoring methods. These tests are able to add an additional layer of understanding to the potential borrower by accounting for their personality and behaviours.

5.1.2 Outlook

P2P lending in South Africa holds potential as an alternative to traditional lending. As mobile/internet penetration and the uptake of e-commerce increases in South Africa, consumers will be increasingly comfortable with online credit and embrace the digital application and scoring models as faster and more convenient than applying for a loan at a bank branch.



However as there is considerable uncertainty as to how to apply the provisions of the National Credit Act (NCA) to peer to peer lending, and what provisions should be in place to protect investors. With the minimum threshold recently being reduced to zero rand, individual lenders on a P2P platform may have to register as credit providers, a lengthy and onerous process that would undermine the efficiency of the P2P model. If the platform elected to register as the lender and accept deposits from individual investors, this could be interpreted as a deposit taking activity requiring a banking licence.

There is ample opportunity for the use of new innovative technologies such as machine-to-machine communication and big data analytics to inform credit decisions and increase asset financing.

5.2 Shifting service models

The skewed income distribution in South Africa, with 81% of the adult population earning less than R6 000 per month, means that banks have to cater for a very wide range of consumer behaviours, needs and financial literacy.⁶⁶ Banks have created digital offerings to respond to the fast-changing preferences of middle and high income earners in particular. These customers have come to expect a similar experience to that gained with digital retailers, including:

PERSONALISED products and services suited specifically to their needs

CONVENIENCE and accessibility becoming a key consideration when choosing product and services

SPEED, often through digital channels, via real-time and remote access to services

A large amount of the innovations are targeted at

⁶⁶ FinMark Trust, (2016), *Finscope Consumer Survey South Africa*

financially literate and tech-savvy individuals who are already comfortable with using online banking services over traditional methods. There is a danger that innovation will ignore or fail to reach the large number of low income customers who have lower levels of financial literacy and trust in digital platforms. Amongst these customers digital channels (USSD functionalities and mobile apps) are usually used for small value transactions such as airtime and prepaid electricity purchases, but human interaction through branches is still crucial for gaining knowledge of products and driving customer sales processes. This gap in desired engagement models becomes particularly significant as digital banks seek to compete with traditional banks that provide both digital and traditional engagement channels.

5.2.1 Disruptive innovations

Disruptive innovation in the traditional deposit-taking space

include a shift toward digital banks and banking as a platform.

Digital banks

Digital banks seek to allow

International Examples

-  **Fidor Bank** – A German digital bank
-  **Atom Bank** – An English digital bank

Domestic Examples

-  **Discovery** – An incoming digital bank
-  **Tyme** – An incoming digital retail bank
-  **Investec** – A currently operational digitised specialist bank

consumers to conduct bank transactions solely on digital channels (online and mobile platforms), normally at lower banking fees and favourable interest rates as they have a lower cost structure.

Although most banks in South Africa have physical branch networks, they have modernised their channels with mobile applications and internet banking that provide a convenient way for customers to access services without needing to visit a branch.

However, these do not always provide full functionality and

customers are still often required to go to a branch for certain services (e.g. KYC process for opening a new bank account). It is for this reason that digital banks in more developed markets have not been as disruptive as foreseen.⁶⁷

Investec is the only bank in South Africa that has a principally digital (branchless) offering. Discovery Bank, a subsidiary of Discovery Limited, is anticipated to launch a branchless digital bank in 2018 that will compete in the retail market.

Banking as a platform

Banks are increasingly beginning to rely on products and services from an array of innovative third party providers that exist and operate outside of the bank's core banking application architecture.

International Examples



Credit Agricole - A French bank integrating fintech provided services



N26 - An application based bank platform offering 3rd party produced financial products and services

The emergence of platform banking is being driven by three factors: The first is an attempt to reduce costs and achieve scale in back office processing to enable banks to focus on distribution. Secondly banks are looking to enhance their customer value proposition by offering financial value-adds (such as personal financial management tools) and a range of non-financial services (from on-line shopping to property valuations) to improve customer loyalty and retention. Lastly regulatory developments such as PSDII in the EU and the open banking initiative in the UK are mandating banks to share customer data and access to customer accounts with third party service providers.

If digital banking platforms become the norm, existing banks will have to choose between a strategic focus on product distribution or manufacturing. Banks that are able to leverage their existing customer network to incorporate innovative

⁶⁷ World Economic Forum, (2017), *Beyond Fintech- A Pragmatic Assessment of Disruptive Potential in Financial Services*

service providers into their core offering will be able to play in the distribution and manufacturing space. If they cannot there is a risk that fintechs, technology firms or alternative financial service providers will develop the winning digital platforms, relegating banks to the manufacturing role and removing banks' ownership of their customers.

The banking as a platform business model typically makes use of APIs to allow third party developers to build and integrate customer-facing services and enhancements into a bank's core offering. In South Africa, API banking is still in the early stages of development and regulation has not yet mandated banks to open their systems to third parties. Some banks in South Africa, such as ABSA, Standard Bank and FNB, have begun to use APIs to connect to external parties as a form of collaboration, but South African banks have generally struggled to shift to proper API-led connectivity due to the constraints of legacy core banking systems.

South African banks have realized the benefit of providing a suite of value-added services, such as airtime, electricity and mobile device purchases, as well as loyalty programmes integrating online shopping and travel experiences. Some South African banks are interested in developing a full "banking as a platform" business model and are investigating the technology and capabilities required to execute this, however South African banks are cautious about losing ownership of their customers for the financial services they provide.

5.2.2 Outlook

South African banks have thus far made important progress in digitally transforming the front-layer of their businesses and are increasingly looking to address the constraints of legacy systems and back-office processes. While the roll-out of digital channels has proven important for improving customer experience, the focus is now on



efficiency and cost reduction benefits.

Branches need to evolve from being a daily transaction environment to a sales environment to suit customers who still require human interaction. Branches in developed markets are shrinking in size and using technological capabilities to convert onerous manual processing to seamless automation.

The large diversity in South Africa's demographics does, however, present challenges to the banking sector in optimising this channel mix. Banks need to better

understand the gaps in the experiences of different customers on a product-by-product level in order to inform the appropriate channel mix.

The other risk for banks relates to the operational risks associated with implementing technological innovations. Technology failures and the opportunities for cyber-crime become more evident as banks' channel offering and underlying processing becomes more digital. This has implications on customer confidence in the banking sector and customers' willingness to adopt new technologies

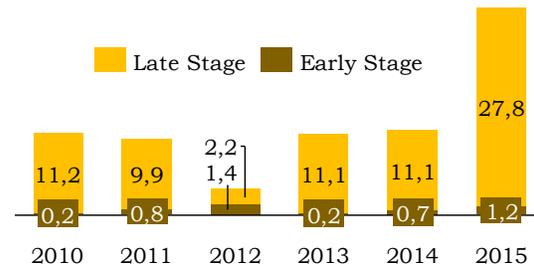
6 Capital raising

The long-term capital requirements of firms in South Africa are largely provided by traditional intermediaries such as investment banks and private equity and venture capital funds, as well as development finance institutions. Private equity and venture capital funds in South Africa have seen a high rate of growth and enjoyed strong returns on their investments in the last few years.⁶⁸ However part of this growth has been in the form of large Broad Based Black Economic Empowerment (BBBEE) acquisitions and these funds tend to be relatively conservative in their investment decisions, favouring later stage investments as shown in the graph alongside.

This has created a funding need for the small and medium enterprise (SME) and start-up segments in South Africa.⁶⁹ As a result, alternative funding platforms

have begun to emerge which allow individuals and start-ups to source funding from a collection of investors and philanthropists directly through an online market place, called crowdfunding.

Private equity funds raised by funding stage
R billion per year, 2010-2015



Source: SAVCA, (2016), *Private equity industry survey*

There are four forms of crowdfunding. Donations-based funding is provided on a charitable basis without any expectation of a reward. This type of funding is largely seen in philanthropic and non-profit projects, such as providing funding to students for school fees. Reward-based crowdfunding follows closely from donations-based. This type of funding provides an item of clear

⁶⁸ South African Venture Capital Association, (2016), *Private Equity Industry Survey*

⁶⁹ Small Enterprises Development Agency, (nd), *SEDA factsheet: Sources of finance: private equity*



monetary value in exchange for the funding provided (e.g. coupons). Loan-based crowdfunding, also called P2P lending, involves an investor expecting to earn interest and capital repayments on the amount funded. Lastly, investment-based crowdfunding, the focus of this section, is funding provided to earn capital gains and dividends.

Crowd investing platforms can also provide investors with access to a far broader array of investment opportunities with the ability to select and have control over where their funds are invested. This provides investors with the ability to manage their investments based on their risk appetite and align their investments to their social interests.

However, crowd investing platforms also carry their own form of risk. Some investors may not have adequate financial literacy skills to understand high-risk investment opportunities without an intermediary's advice. The absence of specific regulations for crowdfunding

creating well-defined and well-balanced investor protection rules exacerbates this. Furthermore there is no guarantee that crowdfunding platforms' due diligence process and investigation of the start-up's risk profile is sound and trustworthy. These platforms' reliance on the "wisdom of the crowd" is therefore dangerous and early evidence suggests that start-ups receiving crowdfunding are valued far higher than they would be through traditional funding sources.⁷⁰

Lastly, start-ups and growing companies making use of crowdfunding platforms may not get access to the advice and experience of private equity and venture capital investors which is often crucial for informing their growth strategy.

6.1 Disruptive innovations

The disruptive innovation covered here is the equity and securitised-debt form of crowdfunding.

⁷⁰ De Vasconcelos, (2015), Valuations in Crowdfunding: Are We All Barking Mad? *Forbes.com*

Crowd investing

Crowd investing may be in the form of equity or securitized debt and the platform usually manages the legal aspects of the investment. The “wisdom of the crowd” is harnessed as projects are typically only funded once they achieve a certain funding threshold. While crowd investing mostly applies to start-ups, a number of platforms also provide opportunities to invest in established businesses or property developments.

International Examples



Seedrs - European equity crowdfunding platform



Crowdcube - British equity crowdfunding platform

Domestic Examples



Wealthmigrate - Property investment company offering real estate investments to a network of investors through an online platform



Angel Investment Network - global network of angel investors offering crowdfunded investment opportunities in South Africa



Realty Africa - Property crowdfunding platform for sub-Saharan Africa

Crowdfunding remains a nascent industry in South Africa. While a number of local crowdfunding platforms do exist, the vast majority only provide donation-

and reward-based funding options. Of the investment-based crowdfunding platforms that are currently operating, many are platforms focused on investment in property developments.

This is partly driven by regulatory uncertainty in South Africa as crowdfunding is not explicitly regulated. The Financial Services Board (FSB) has stated that loan- and investment-based crowdfunding may, however, be subject to a number of existing pieces of financial legislation, including:⁷¹

ANY ACTIVITIES that could be seen as deposit-taking must adhere to The Banks Act;

A PLATFORM that matches investors with securities falls under the Financial Markets Act;

INVESTMENTS that are pooled and invested in securities (may be seen in investment-based crowdfunding) are subject to

⁷¹ Financial Services Board, (2016), Strengthening South Africa’s financial institutions, *FSB Bulletin Q1 2016*



the Collective Investment Scheme Control Act, and;

A PLATFORM that collects information for individuals using their service must use the Protection of Personal Information Act.

The FSB has undertaken research on whether specific rules are required for crowdfunding in South Africa. No communication has yet been provided but the regulator has indicated that they will communicate their position in due course.⁷² A number of countries such as the US, UK, Australia, Thailand and Malaysia have created specific regulatory frameworks for crowdfunding. Crowdfunding platforms require specific licenses to operate and adhere to certain rules relating to information disclosure and marketing practice.

6.2 Outlook

The low level of equity crowdfunding activity in South Africa is partly due to the lack of regulatory clarity. The

absence of specific crowdfunding regulation means crowdfunding platforms are at great risk of running foul of the law or having to adhere to expensive regulatory obligations, undermining their business models.

Two South African crowdfunding platforms – Thundafund and Wealth Migrate – have established an African Crowdfunding Association. One of the mandates of the association is to lobby for the creation and reform of crowdfunding legislation. This may assist in generating momentum towards developing a regulatory framework for crowdfunding in South Africa.

If equity crowdfunding is to take off in South Africa, platforms will have to be careful to make the industry appealing and accessible to investors. This would include providing sufficient education and commercial due diligence tools to protect investors from the “wisdom of the crowd” being wrong. It would also require the industry to become

⁷² Timm, S. (2017), FSB misses crowdfunding deadline, *Ventureburn*

sufficiently integrated with the mainstream financial sector by providing a secondary market for crowdfunded equity and connecting

with wealth managers where the majority of retail investment gets channelled through.



7 Investment management

Globally innovation in investment management has introduced new forms of competition for incumbents, with new-entrants offering affordable investment products to consumers. New entrants tend to use technology-enabled solutions to provide advice, market information and easy to use investment tools.

This innovation has been observed along the entire investment management value chain:

ADVISORY SERVICES guide investors' decisions in the absence of human oversight. Robo-advisors estimate investors' risk appetites and identify appropriate investment portfolios without the need for bespoke portfolio management. Improved access to digestible market information informs investment decisions. Digitised customer-facing channels and automated customer support ease access to the industry.

TRADE EXECUTION can be automated or handled by investors through the direct use of an investment platform. These platforms provide access to a broad range of domestic and international asset classes with lowered minimum investment requirements. Automated portfolio management and asset allocation reduce the time and effort required to participate in the market.

BACK-OFFICE PROCESS automation streamlines investment management's administrative processes. This is facilitated by robotics and reduces staff costs and increases efficiency. This improves the customer experience and reduces the likelihood of human error.

7.1 Disruptive innovations

The disruptive innovations covered here include automated advice and management, social trading and retail algorithmic trading.

Automated advice and management

International Examples



Wealth Front - Investment firm providing robo-advice reflecting investors' observed financial behaviour



Betterment - Largest robo-advisory investment management firm by assets under management

Domestic Examples

EasyEquities

Easy Equities - Online platform providing users with access to assets and investment funds



Wealth Migrate - Online platform facilitating investment in international real-estate projects



Advicement - Robo-advisor directing investors towards appropriate ETFs

Automated advice platforms are available in South Africa. Consumers provide personal information and answer questions regarding risk appetite, investment knowledge and financial aspirations. This data is used by robo-advisors to calculate risk profiles that provide a formulaic and appropriate financial plan or investment portfolio. In the pursuit of reducing consumer risks, the FSB requires that these platforms either obtain or make use of an existing

financial service provider (FSP) license. Additionally, organisations operating robo-advisors must have staff who understand the mechanics and assumptions of the algorithm and are able to monitor and test it. The platform operators are therefore responsible for the platform's outputs.

Easy Equities appeared on the 2016 Fintech Top 100 list and provides consumers with a web based stock trading platform. The platform is widely accessible - transaction costs are approximately 0.6% of the value traded and investors are able to purchase 1/1000th of a share.

Fintech 'Advicement' has partnered with Easy Equities to provide robo-advice which directs investors towards bundled ETF investment portfolios that reflect their financial needs. Wealth Migrate - another 2016 Fintech Top 100 - allows domestic investors to invest in foreign real-estate developments and provides estimates of expected returns. In addition to tools, calculators and investment



platforms, start-ups such as Stock Shop provide information and tutorials on investing and money management.

Social trading

Social trading allows traders to display their portfolios on public profiles so that they can be shared with other investors. Copy trading allows less experienced traders to automatically replicate the trades of a more experienced investor with a public profile. This strategy can decrease the risk of trading as novice investors align their portfolios with expert traders.

International Examples



Iron FX – A forex mirror trading platform in 180 countries



eToro – A trading platform facilitating the social trading of stocks with an estimated 4.5 million users

Domestic Examples



Vunani Ltd. – Providing private clients with mirror traders vetted by the firm



Khwezi Trade – Mirror trading conducted in dollars and subject to a minimum of R10 000.

Domestic social trading platforms provide access to mirroring both forex and stock market portfolios. These platforms are not widespread in the South African market although international

platforms are accessible to domestic investors.

In addition to the possibility of increased returns for novice investors, costs can be reduced using social trading platforms such as Khwezi Trade's zero management and performance fees. However, the firm clearly states that it is not liable for any investor losses as mirror trading strategies cannot be construed as financial advice.

Should social trading grow significantly in popularity and a "lead" trader amass a following of traders who copy their positions, the lead could manipulate prices to their advantage, knowing that any position would be replicated driving prices in their favour.

Retail algorithmic trading

Algorithmic trading allows investors to build automated quantitative investment strategies based on patterns observed in historical data. The availability of financial data, powerful algorithmic platforms and crowdsourced funding is set to



disrupt a major area of wealth management - the hedge fund industry.

Trading platforms are increasingly able to support algorithmic trading strategies by providing real time statistics, strategy testing and optimisation capabilities, as well as data visualisation tools. This empowers individual traders to develop their own algorithmic trading strategies by testing their strategy against historical data.

International Examples



QuantConnect - Users back-test algos on a data library before using them on the platform



Quantiacs - Users develop algo trading strategies that are utilised by institutional investors. The developer is paid a share of the algo's performance fees

Domestic Examples



Velocity Trade - Trading platform offering an algo trading programming and testing module



One Financial Markets - The trading platform allows 3rd party services such as algo systems

As with social trading, domestic and international platforms with algorithmic capability are available for local retail traders. The One Financial Markets platform allows for the integration of third party applications such as algorithmic and social trading.

Velocity Trader and Avior are further examples of trading platforms with algorithmic functionality. FXCM – an international firm operating locally – provides users with the capacity to back-test algorithms to evaluate performance in a mock forecast.

As the success of algorithmic traders becomes increasingly visible on public profiles and mirror trading platforms, more investors will be attracted to mirroring algorithmic traders. Subsequently, a larger share of investments is vulnerable to losses should these algorithms perform unpredictably or poorly.

7.2 Outlook

Start-up investment platforms that provide a wider-suite of cost-effective investment options have largely broadened access to local and international markets. Social and algorithmic trading innovations are more often led by established investment firms and are in their infancy. Whilst social trading does not require financial savvy (investors are merely copying the positions of other investors), the platforms that



do provide them are sophisticated in nature.

This mirrors global investment management trends. A 2016 global survey found that the wealth and asset management industry has been slow to adopt new technologies and fintech solutions.⁷³ Regardless of the fact that 61% of wealth and asset manager's primary concern with fintech innovation is pressure on margins, 34% never engage with fintech companies whilst 17% believe that new entrants pose no challenge whatsoever. This is likely associated with a belief that personal relationships between investment managers and high net worth clients will remain necessary. Fintech innovations such as robo-advisors have simple capabilities and are considered better suited for lower income segments. Clients are found to value bespoke advice and as clients grow in net worth they tend to favour tailored advisers as opposed to programmed advice.⁷⁴ This suggests that the role of human

advisers will continue to be important as a differentiated service to wealthy investors, where the adviser focuses on customer engagement and decision support.

In response to pressure on profit margins, incumbent firms will benefit significantly from back-office technology investments. The same survey demonstrates that the vast majority of asset and wealth managers consider data analytics capability as extremely important. In addition, 69% of respondents expect cost-reductions when partnering with fintechs. Cost-reductions from back-office process automation may be substantial due to the large number of processing requirements that rely on highly trained and therefore high-earning staff. Vendors such as DigiBlu and LarcaI provide smaller firms with access to intelligent and robotic process automating capabilities. These help smaller firms compete with incumbents by reducing costs in the absence of economies of scale.

⁷³ PWC, (2016), *Beyond Automated Advice: How Fintech is Shaping Asset & Wealth Management*

⁷⁴ World Economic Forum, (2017), *Beyond Fintech - A Pragmatic Assessment Of Disruptive Potential In Financial Services*



By automating processes cost should fall as investment management firms' reliance on staff and personal interaction declines. Lower fee structures give a larger number of investors the opportunity to achieve higher rates of return than those offered by traditional savings and deposit products.

Incumbent firms are subsequently faced with a new set of challenges. Firstly, customer expectations are changing as customers are increasingly seeking frictionless interactions and operations. Investment managers need better, faster processes with quality customer servicing that is available 24/7. Secondly, direct platforms cannibalise traditional financial advisor based sales and distribution models.

Customers also face new challenges. Established fund and investment managers are experts in their field and deploy vetted techniques with a verifiable performance record. In contrast, retail algorithmic and social trading applications are not regulated.

Incumbents can respond by either conceding the middle income market to new-entrants and focusing on personalisation and value-add services in the high net worth segment, or by continuing to integrate innovative, digital solutions to expand access to the middle income market. This allows established firms to compete with new entrants but runs the risks of decreasing the profitability of their existing business lines.



8 Market provisioning

Financial institutions play an important “market making” role in capital markets. Corporate and investment banks help companies structure public share offerings and investors provide liquidity to the market by trading equities. Market infrastructure such as exchanges and central securities depositories support this by creating efficiency as securities can be traded and settled electronically. In the over-the-counter (OTC) market where securities that are not listed on regulated exchanges are traded, financial institutions often play a direct market making role by connecting buyers and sellers together.

The adoption of technology has a profound impact on this market-making role in two areas: the use of smarter and faster machines to inform and execute trades on exchanges, and platforms which help to connect buyers and sellers together in OTC markets.

On the first, the use of algorithmic and high frequency trading in South Africa has expanded since the Johannesburg Stock Exchange (JSE) migrated to a new trading platform and relocated to Johannesburg from London in 2012. The new platform allowed traders to execute trades 400 times faster than before. The introduction of a colocation centre two years later allowed high frequency traders to take advantage of very low latency by locating their systems in the same location as the JSE’s trading platform.

However, the key opportunity of high frequency algorithmic trading – exploiting arbitrage opportunities through low-latency access to exchanges – is being eroded as more traders adopt the approach. The physical limits of fast-as-light trading and increasing regulatory scrutiny are diminishing the returns to high frequency trading, and traders are searching for new techniques to recapture their edge. The focus on execution speed

through hardware is turning to extracting and acting on information from vast market data flows as quickly as possible using software. Advances in big data analytics and artificial intelligence technology provides algorithmic traders with the opportunity to react to real-time events more quickly, consider broader sets of data, and improve their trading algorithms without human intervention. As algorithms are able to learn and adjust strategies automatically, the lack of human intervention creates the potential for decreased internal costs and more profit.

The key risk associated with this shift to processing information as quickly as possible relates to data and software integrity. As algorithms make use of new machine-readable data sources and AI capabilities, there is a risk that a lack of human intervention creates sub-optimal trading decisions due to poor quality of data or errors in the algorithm's programming. An example from the use of machine-readable news sources is the prevalence of fake

news combined with the limited capability of AI technology to discern real from fake data sources as well as humans can.

In addition, algorithmic and high frequency trading has received a large amount of negative attention globally due to its potential to destabilise markets. Exploiting arbitrage opportunities between exchanges, currencies and asset classes at very high frequencies provides the market with liquidity, but may worsen large market swings and generate volatility as markets respond to price changes triggered by computer algorithms rather than new fundamental information.

While algorithmic trading has not been regulated in South Africa, the JSE has implemented its own restrictions on high frequency trading to address this. This includes a circuit breaker to halt trading if prices decrease too quickly, and a lock-out mechanism if a trader exceeds a certain threshold of trades per unit of time.

In South Africa's OTC equities market innovation occurred with

electronic share matching platforms that formalised the OTC market without necessarily involving financial intermediaries, particularly useful for restricted share trading required for BBBEE holding companies and agricultural co-ops. These platforms provide the opportunity for greater price transparency and improved liquidity as buyers and sellers are connected more easily. However, this opportunity was limited in 2014 when the FSB ruled that these platforms constituted exchanges according to the definition set out in the Financial Markets Act and should be regulated as such. The platforms had to restructure to only provide buy/sell-side data in OTC markets without electronically matching shares, or register as exchanges. This resulted in the emergence of a number of alternative stock exchanges to the JSE which provide exchange services at a lower cost for a niche client base not wanting to list on the JSE.

8.1 Disruptive innovations

Disruptive innovations here cover smart, faster machines for trading and new platforms which connect buyers and sellers together.

Faster smarter machines

Algorithmic and high frequency trading will shift from reading market information (share prices) to real-life events through news and social media sites. Big data analytics will allow traders to analyse broader and deeper sets of data to connect seemingly less relevant factors to inform trading strategies. Artificial intelligence allows algorithms to self-correct and continuously improve with minimal human interaction through machine learning.

International Examples



Semlab – technology provider allowing traders to generate computer-readable news alerts

AYASDI

– Big data analytics technology provider helping traders derive trading hypotheses

Domestic Examples



Opti-Num Solutions – Data analytics technology provider helping traders develop and test trading strategies



Algorithmic trading has been increasing in popularity in South Africa as the JSE's trading infrastructure improved, but remains less prevalent than in more developed markets. The JSE estimates that roughly 35% of its daily trades are made by traders using their colocation facility, allowing traders to execute orders very quickly by locating their servers in the same location as that of the exchange.⁷⁵ This provides a rough indication with the understanding that algorithmic trading has broader application than high frequency trading.

Traders in South Africa are making use of machine-readable news and sentiment analysis. However, this approach carries a higher risk than algorithms based on market prices and so adoption has been limited due to differing risk appetites. A greater number of traders are making use of big data analytics and artificial intelligence technologies such as machine learning to inform their trading

strategies. While South Africa has a number of big data analytics and machine learning software providers, most traders are using software sourced offshore.

Connecting buyers and sellers

The trade of unlisted securities in the OTC market is traditionally facilitated by financial intermediaries which connect and act on behalf of buyers and sellers. This role is necessary as supply and demand is not centralised so intermediaries provide an aggregating function by building relationships with one another to create a market. A number of new platforms are emerging globally which redefine how this market creation occurs by collecting demand and supply data to create an aggregated view of the market. Some of these platforms provided added services of analysing this data to inform the decisions of buyers and sellers (and their intermediaries).

⁷⁵ Based on stakeholder interviews conducted by Genesis Analytics, July-September 2017.

International Examples

- NOVUS7** - A portfolio intelligence platform that automatically gathers and analyses data on investment funds for fund-of-fund managers
- LIQUITY** - Provides company directors with a comprehensive suite of shareholder and equity management services

Domestic Examples

- OTC EXPRESS** - A de-centralised platform allowing OTC market participants to trade through bilateral negotiations
- ZARX** - An alternative stock exchange
- 4AFRICA EXCHANGE** - An alternative stock exchange

Since the FSB ruled that OTC share matching platforms need to be regulated as an exchange in 2014, the operators of these platforms had to either adapt their offering or apply for a registered exchange license.

The main platform that was running at the time, Equity Express, has subsequently revised its service to fall outside the definition of an exchange. One of the Equity Express co-creators established a new platform, called OTC Express, which does not provide a share matching engine but offers a web-based bulletin board that allows investors to advertise their intention to buy or sell shares, and then connect and negotiate a price. OTC Express provides an environment where buyers and sellers can connect as well as the back-office infrastructure

to settle the negotiated transactions without meeting the legal definition of an exchange.

Another of the Equity Express co-creators took the route of establishing a licensed exchange to address the FSB's ruling. This resulted in the licensing of South Africa's first alternative exchange to the JSE, ZAR X. The exchange uses fintech to provide T+0 settlement and allow investors to trade through a broker, on their website or a smartphone app. Their pricing model is also designed to make investing more accessible as fees are only charged when investors transact. The exchange also discourages high frequency trading and short selling as trades need to be pre-funded with cash.

A second alternative exchange, 4 Africa Exchange (4AX), has received a license from the FSB and will begin trading in 2017. 4AX has less onerous listing requirements than the JSE to make listing more accessible to companies and also offers pre-funded clearing and real-time settlement. The exchange also



has a unique centralized registry which verifies whether participants adhere to the requirements of restricted shares (e.g. BBBEE) on a once-off basis and a low-cost fee structure targeting retail and mid-market investors.

Most recently the FSB granted another exchange license with clearing infrastructure to A2X, a partnership with British Aquis Exchange which runs a multilateral trading facility in the UK. A2X's aim is provide secondary listing opportunities to the JSE at much lower cost and with a better share matching engine and market surveillance.

Financial intermediaries in South Africa also make use of global platforms that aggregate buy and sell side data in OTC markets for liquid assets where they do not play a strong market-making role, although these platforms are not specific to the South African market.

8.2 Outlook

Being able to spot and react to arbitrage opportunities used to be how high frequency traders earned margins. Making use of superior data analysis to support trading strategies is how these traders are likely to continue finding profits.

To protect these margins, the shift to using smarter faster machines to process market information as quickly as possible may encourage internalisation – the process of executing trades in-house and out of sight of public markets. As large financial institutions invest in the software and capabilities to collect and analyse market information, participating in public exchanges and providing bid and offer quote data to other less-informed participants erodes their competitive advantage. As such these institutions may prefer trading in-house or in dark pools of liquidity to preserve their information asymmetry.

Conversely the emergence of alternative stock exchanges and legal

OTC information platforms has the potential to improve price transparency and market liquidity and decrease counterparty risk as trades are migrated from private to public markets. This matches well with global regulatory moves towards improving the visibility and transparency of OTC markets – South Africa is currently implementing an OTC trade repository.

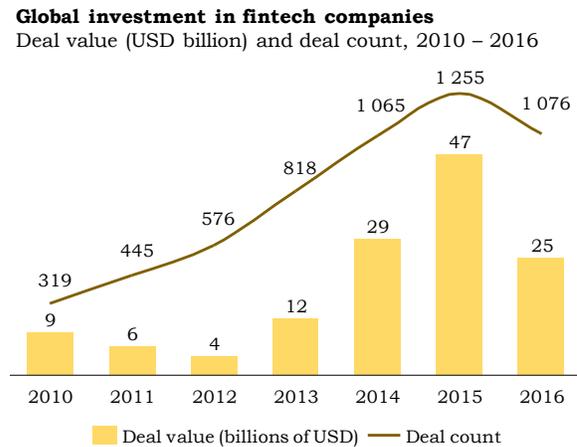
However, the impact of alternative exchanges will take time to observe and the sustainability of multiple exchanges is not certain. ZAR X and 4AX are geared towards a different segment of listing companies and investors to the JSE and are largely facilitating trades which were previously occurring in the OTC market.



CHAPTER 3

How the incumbents are responding

When commentators began discussing the fintech revolution many predicted that fintechs would significantly disrupt or even usurp incumbent financial institutions. To date this has not been the case. The WEF observes that “fintechs have materially changed the basis of competition in financial services, but *have not yet* materially changed the competitive landscape”.⁷⁶ Fintechs have been constrained by scaling challenges and face the reluctance among customers of switching to new entrants.⁷⁷ These changing sentiments are well captured by the level of investment in fintechs over the last several years, shown in the graph alongside.



Source: KPMG, (2016), *The Pulse of Fintech: Global Analysis of Investment in Fintech*

The dropping off in both the value and count of fintech investment deals last year may be an indication that the initial enthusiasm about fintech’s disruptive potential is reaching the peak of the “hype cycle” – the tendency to overestimate the implications of innovation in the short term and underestimate the implications in the long term. While technological innovation often follows this boom-bust hype cycle, it can still have a profound long-term

⁷⁶ WEF, (2017), *Beyond Fintech: A Pragmatic Assessment of Disruptive Potential in Financial Services*.

⁷⁷ *Ibid.*



effect on the market. The internet is a prime example – despite the dotcom bubble bursting in 2001, the internet has become an entrenched part of life for most individuals around the world. Similarly, while some early fintech experimentation and investment has failed to deliver results, fintech has already changed the financial services market by showing how technology can be used to create agile customer-centric organisations.

The response among incumbent institutions has been to incorporate fintech and digital innovations into their own operations. As customer perceptions are increasingly being shaped by their experiences outside banking, some banks have moved away from a *product centred* approach to a *customer centred* approach. This means a reduced focus on standardised products and channels and a larger focus on solving for customer needs through the right combination of functions and features. A customer-centric bank must also focus on taking a more

flexible approach to banking; leveraging the vast amount of customer data to deliver customised interactions through a combination of digital and physical channels and incorporating third party and fintech service providers into their operating models. Customers want to determine how they interact with their bank and digital innovation can improve the customer experience through:

PERSONALISED interactions:

Sophisticated data analytics and predictive models that can anticipate customer needs and ensure that communications with customers are relevant, personalised and targeted for the customer's situation.

REAL-TIME interactions:

Digital communication equates to speed. Customers are increasingly expecting real-time feedback during an interaction with their bank and banks need to have real-time data to support these communications and decisions.

OMNICHANNEL experience: A single view of the customer that supports a multi-channel approach; and ensures consistent messaging across all platforms and channels allowing the customer to choose the channel that suits them best.

The bank of the future will secure its survival by being agile, easy to connect with and operationally cost-effective. Banks with agile product development methodologies can take advantage of rapid innovation, increase the speed of bringing new product to market and keep pace with shifting customer preferences.

Connectivity enables banks to leverage the opportunity of a growing financial ecosystem. With easy means of access, banks can integrate niche fintech providers into their operations, use external data sources for the development of

personalised services and develop curated platform offerings to enhance the customer experience.

Increased competition from fintechs, challenger banks and technology companies require banks to keep their cost profile low. This is complicated by the compliance cost of increasing bank regulation and the high maintenance costs of legacy banking system.

This chapter investigates how digital innovation is allowing banks to transform into agile, cost-effective customer-centric organisations. The first section explores how banks are collaborating with fintechs to incorporate digital innovation into their operations. This is followed by an investigation of the digitization process banks are undergoing and the data and technology requirements that support this. The last section looks at the implications of all these factors on banks' risk management.



9 Evolution of the business model

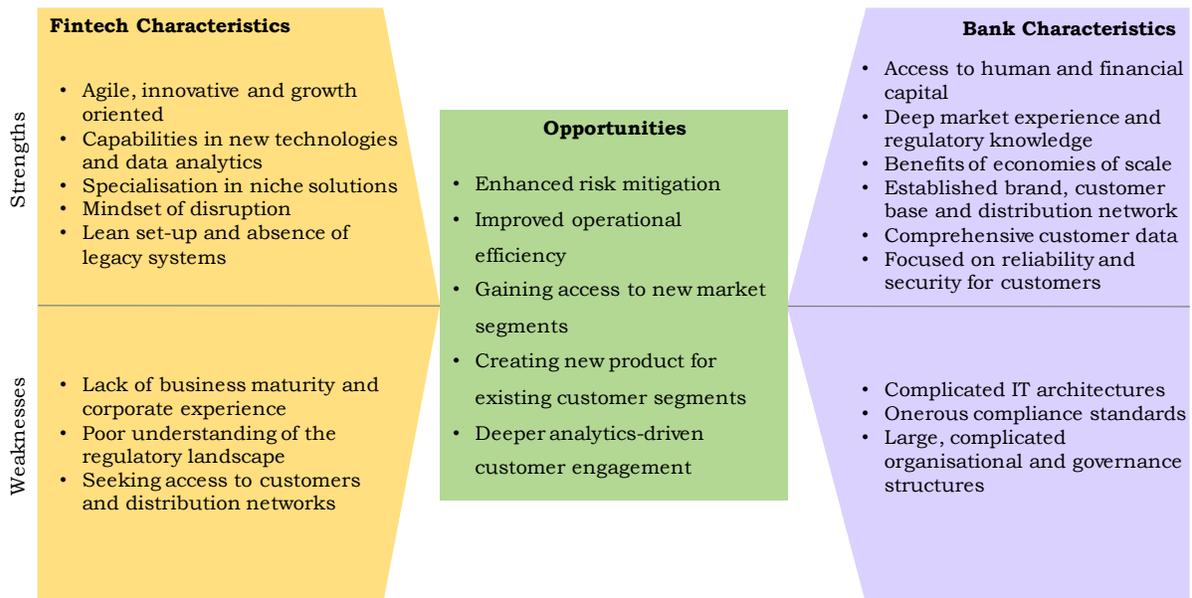
As the fintech hype begins to dissipate, the dominant view is that fintechs are more likely to be collaborators with incumbent financial institutions rather than outright competitors. Collaborating with fintechs is a priority, as incumbent financial institutions have noted that it would take 3-4 times the resources to develop the same technology in-house.⁷⁸

The characteristics of fintechs and banks provide significant

opportunity for collaboration, as shown in the graphic below. In particular fintechs are well suited to creating disruptive innovations but often lack the customer and distribution networks or regulatory understanding to successfully get this innovation to market, a process banks have the means and experience to execute.

While fintechs provide one avenue for introducing innovation into banks, banks and fintechs both

Bank and Fintech Characteristics and Opportunities



Source: Genesis Analytics, (2017); based on stakeholder interviews conducted July-September 2017

⁷⁸ Kelly, Ferenzy, and McGrath, (2017), *How Financial Institutions and Fintechs are Partnering for Inclusion*. Institute of International Finance and Centre for Financial Inclusion

face a number of challenges when collaborating.⁷⁹

Before a partnership can take place, banks need to be convinced that the fintech has a viable business solution. While fintech start-ups may develop fantastic technology, they often lack the business maturity and corporate sales capabilities to conceptualise its business application and successfully sell their ideas to a bank.

Once a viable partnership has been established, the second set of challenges relates to clashes in organisational culture. Fintechs are fast-moving and agile organisations that often take a “test and fail fast” approach to product development. Traditional banks are behemoth organisations with strict controls and organisational structures and a more cautious approach to deploying solutions that have been thoroughly vetted. These two extremes on the corporate culture spectrum can make it difficult for fintechs and banks to integrate their work teams

and often leave fintechs frustrated at the slow pace of progress.

As fintechs seldom have a thorough understanding of the regulatory landscape, they may not develop solutions with prevailing regulation in mind. Banks are highly regulated entities with a mandate to provide reliable and secure services to their customers. As such fintech solutions often fail banks’ compliance and risk standards.

Lastly the bank’s internal structure may create additional resistance to collaborating with fintechs. Individual business units within the bank are concerned with optimising specific products or channels rather than optimising the customer’s entire user journey. While fintechs can help business units optimise products and channels, these projects often end up being ring-fenced and see little integration with the rest of the bank. The greater opportunity – helping banks transform the entire customer journey – can be missed if individual

⁷⁹ Based on stakeholder interviews conducted by Genesis Analytics, July-September 2017

teams within the bank do not view this as a priority.

9.1 Collaboration in South Africa

Bank-fintech collaboration can be categorised into four different models, detailed in the figure alongside.

Initially South African banks pursued an equity-driven approach to collaboration. This was in line with global banking trends at the time – in response to the initial fintech hype banks acquired fintech start-ups quickly so that they could not collaborate with competitors. US and European banks in particular set up large corporate venturing arms to acquire emerging fintech firms. While the degree of bank investment in fintechs in South Africa is small by comparison, it did provide an alternative source of funding given South Africa’s limited start-up funding environment.

Bank-Fintech Models of Collaboration



Equity driven

Banks acquire varying stakes in a fintech in order to incorporate their solutions and human capital into the banks operations



Incubation and corporate acceleration

Banks create or sponsor fintech accelerators which provide startups with business skills, networking, support and potentially funding if a viable solution develops



Fintech as a vendor/partner

An independent fintech has developed or proven capacity to develop a solution to a specific bank problem



Consortium participation

A loose consortium of banks, fintechs and possibly regulators facilitate the collaborative development and co-ordinated design of new solutions

Source: Genesis Analytics, (2017); Based on Stakeholder Interviews Conducted by Genesis Analytics, July-September 2017

This early approach can be described as “technology searching for a problem” as fintechs were acquired without adequate consideration of which specific problems within the bank the technology could be used to solve. During this phase the scouting and acquisition of fintechs was primarily undertaken by a central innovation unit within the bank without adequate support and buy-in from individual business units. Due to the challenges arising from bank and fintech characteristics discussed above, these acquisitions have often proven unsustainable with the fintech’s founding team either



leaving or buying the bank's equity stake back, as in the examples of Old Mutual and 22Seven and Barclays and Rainfin.^{80,81}

The next phase of engagement saw banks setting up or sponsoring fintech incubators and corporate accelerators. As was the case globally, these incubators were an important part of banks' marketing strategies to maintain their image as fintech acquirers and show that they are serious about innovation. They also provided banks with the opportunity to identify fintechs with viable business solutions. Most of South Africa's large banks have invested in incubator labs; Barclay's has Africa's Rise; Nedbank has LaunchLab in Stellenbosch; the First Rand Group has AlphaCode in Johannesburg; and Standard Bank has the Standard Bank Incubator program.

These incubators have contributed to creating a supportive environment and access to the market for fintechs in South Africa.

However, the success rate of participating start-ups developing into bank partners has been very low. The less controlled nature of development within an incubator means that solutions have not necessarily been aligned with banking business cases. South African banks still partner with a number of international fintechs to provide their required technical solutions.

In recognition of these problems, South African banks have shifted to a "fintech as vendor/partner" model. Instead of fintech development occurring within an isolated innovation hub, it is increasingly being driven by business units with a business representative driving the process. This represents a shift to a "problem searching for technology" approach where fintech partners are sourced to address specific bank problems with adequate buy-in and resources provided from business units and the bank's internal IT department. This

⁸⁰ Simons, H. (2017), Old Mutual brings 22Seven in-house, founders leave. *Ventureburn.com*

⁸¹ Van der Made, G. (2017), Exclusive interview: RainFin CEO on buying back company from Absa. *Ventureburn.com*

approach also provides clearer “rules of engagement” for the fintech partner as the relationship is governed through a service agreement or contract rather than through direct bank ownership.

While this partnership approach appears to be the one that is winning globally, actualising this approach is proving challenging. Banks in South Africa still struggle to fully incorporate fintech solutions into their operations, resulting in the development of “ring-fenced” solutions that run outside the bank’s normal functions.

The last model of consortium participation has seen the least amount of activity in South Africa. As banks and fintechs are still investigating how best to engage within a fast changing market, competitive pressure has hampered the open development of new technology. Consortium participation is therefore better suited for non-competitive industry-wide innovations rather than specific products or solutions. Examples include consortiums investigating the use of distributed ledger technology, such as R3 and The South African Financial Blockchain Consortium.

10 How core is digitisation?

Traditional banks' response to digital has evolved as customer behaviour and expectations have shifted. At the onset of the digital revolution, digital strategies were centred on creating digital channels and access points for customers. But as the benefits of digital were better understood and lessons from other industries such as retail became clearer; the question of *what it means to be a digital bank* became more important. Banks began to realise the power of digital was more than just replicating physical channels, but actually creating a digital core. This allows the provision of consistent, accurate, enterprise wide data that enables decision making across the organisation.⁸²

Like their international counterparts, South African banks have all embarked on a digital journey. The major South African banks⁸³ all have a digital strategy in place and digital forms a pillar of

most banks' corporate strategies. Many have appointed a Chief Digital Officer and have invested in growing the digital capability with a combination of domestic and foreign skills, highlighting the importance of digital in the banks infrastructure. However, the approach to digitising the core banking *systems* has been different amongst South African banks.

Capitec, the newest retail bank in South Africa, has successfully penetrated the market with its single segment strategy. The bank has had the advantage of a cost-efficient core banking system without the complication and expense of having to transfer from older, legacy systems. Capitec's banking system has allowed the bank to introduce innovative banking services such as paperless processes; account opening in ten minutes; payment solutions for informal merchants and card readers installed at retailers

⁸² Skinner, (2014), *What is a digital bank?*

⁸³ The major banks by number of customers are: Standard Bank, Absa, First National bank, Capitec and Nedbank

that give customers access to account balances and ultimately encourage card usage.⁸⁴

In contrast other major banks in South Africa have had to approach digitisation differently. Some banks have opted to replace their legacy banking systems, which has seen them invest large sums of money and resources in upgrading systems. In the long run this approach is expected to pay dividends as legacy architectures are complex, expensive to maintain, and incompatible among applications which hamstrings the bank's ability to innovate.

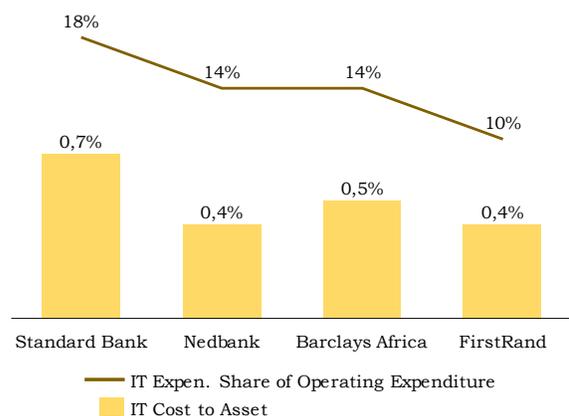
Other banks have decided to maintain their core banking systems but add additional system layers to support a wider range of digital applications and databases. This approach allows the bank to go-to-market with digital solutions more quickly and often less expensively, and build a technical architecture based on mature and tested core systems. However, there is a limit to

which a legacy system can support bolt-on solutions and there is always a risk of downtime due to incompatible applications.

Digitising an entire bank, no matter the system choice, is challenging. With the exception of Capitec, the major banks in South Africa have spent between 10 and 18% of operating costs on IT expenditure in 2016, as shown in the graph below. Collectively the ratio of IT costs (as the sum of amortisation and depreciation) to assets in South African banks is almost double that of the top four banks in the United Kingdom.⁸⁵

IT investment among South African banks

Share of operating expenditure and cost-to-asset ratio, 2016



Source: Bank annual reports, 2016

⁸⁴ Microsoft, (2008), *Core banking Partner Guide*

⁸⁵ Genesis Analytics, (2017), calculations using bank annual reports

Banks have had to prioritise their efforts⁸⁶ focusing digitisation and innovation on areas such as payments which is a high contact point with customers and where banks are most threatened by innovative solutions offered by non-banking competitors.

To date investment in digital solutions has largely been in the retail banking space focused on improving the customer experience. The major South African banks all support internet banking channels, mobile apps and digital payment facilities and offer a cash remittance product that allows customers to transfer money to a recipient without a bank account. There has not been a great deal of differentiation between the banks' digital solutions. One reason for this could be the result of the way banks approach innovation compared to fintechs.

Fintechs are technologists by nature and consider how to leverage technology to revolutionise banking. Banks think about how to improve

existing processes through the use of technology; their focus is on continuing to provide customers with reliable and secure banking facilities more efficiently.

Incumbent banks have focused on ensuring that physical banking processes have been replicated on digital channels. We have yet to see banks use digital capabilities to explore new revenue streams.⁸⁷ The investment in digital has also yet to realise material gains in efficiency or make any real impact on costs; cost-to-income ratios of the major banks remain around 55%.⁸⁸ As banks continue to face cost challenges in a weak economy, digital innovation could be a way to find greater operational efficiency.

Banks face a number of challenges in digitising their back office operations. Growth through product developments, mergers between banks and regulatory changes have added layers of procedural requirements and left banks with complicated IT

⁸⁶ Based on stakeholder interviews conducted by Genesis Analytics, July-September 2017

⁸⁷ *Ibid.*

⁸⁸ The combined cost-to-income ratio was 55.4% as at 2H2016; PWC, South Africa - Major banks analysis, March2017

architectures that are difficult to automate and reform. Automating these infrastructures requires new governance frameworks and skills and banks will increasingly have to partner with technology firms to either implement or outsource back-office digitisation.

Some of the opportunities for process efficiency include robotic process automation, AI for decision making, and smart contracts.

Robotics process automation (RPA)

RPA differs from traditional software as it automates user interface processes, essentially replicating the actions a human user would take and creating digital processes instead. This technology is expected to deliver dramatic time and cost savings to banking operations. Some estimate that financial service firms can use RPA to cut back-office costs by up to 75%.⁸⁹

A number of South African banks implemented RPA technology to enhance their chat functions on digital banking platforms. Absa's Facebook banking answers common questions from customers which saves time for call centre agents.⁹⁰

Standard Bank partnered with WorkFusion, an RPA provider, to automate a credit application process. WorkFusion provided an enterprise platform for end-to-end automation that extracted KYC data from third party databases rather than customers submitting their own documentation. This reduced the application process from 22 days to five minutes. Machine learning was applied when third party data was not available to "learn" with human assistance where to pull data off KYC documents.⁹¹

AI for decision making

Deep learning models can be employed to track large volumes of data and pick up predetermined

⁸⁹ KPMG, (2016), Rise of the Robots, *KPMG Insights*

⁹⁰ Alkema, P. (2017), *IT Leadership Insights, Robotic Process Automation – coming to a job near you!*

⁹¹ WorkFusion, (2016), Standard Bank Case Discussion: Improving customer experience through RPA + AI-powered cognitive automation, *WorkFusion Webinar*

trends that help make decisions faster. MyBucks, a fintech company started in South Africa, delivers seamless financial services to banked and unbanked consumers. It makes use of a credit-scoring engine which efficiently analyses cell phone bill payment history, bank account history (if the person has a bank account), utility bills, geolocation, and credit scores to check for fraudulent behaviour patterns. This proprietary software takes a number of factors into account such as behavioural data, transactional data and employment information to assign a customer with a unique credit score and determine the customer's probability of default. The customer then receives a unique credit offering (loan amount, term and interest rate) in 15 minutes.⁹²

Smart contracts

Smart contracts are programmes using distributed ledger technology

that record and automatically enforce the terms of a contract when pre-defined conditions are met. They are seen as being a way to reduce costs and inefficiencies such as delays and errors that result from physical contracts.⁹³ Smart contracts could have applications in investment banking by shortening settlement periods using automated approvals between parties; retail banking in areas such as secured lending where much administrative effort is spent validating financial data; or business banking where loans agreements stipulate covenants and contractual obligations. However, as smart contracts are run on decentralised distributed ledger technology, they do not fall in any legal jurisdiction and there are very few courts or authorities that are set up to recognise the legality of financial smart contracts.

⁹² Forbes, (2016), *Meet the man championing Fintech in Africa*

⁹³ Capgemini, (2016), *Smart contracts in financial services: Getting from hype to reality*

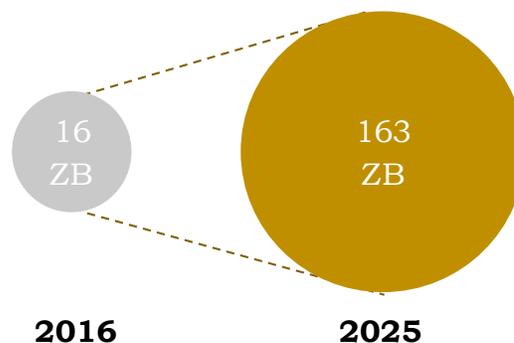
11 Data is the foundation of digital

Data is the foundation of the digital economy. Technological innovations such as artificial intelligence, predictive analytics, process automation, real-time transacting and the hyper-personalisation of services are all reliant on streamlined access to large volumes of high quality data.

The opportunities presented by data and its use are expanding rapidly. The modern era is witnessing phenomenal growth in the amount of data being generated. Digital devices such as cellphones are wide-spread and closely integrated into individuals' lives. Globally, the daily number of digital interactions per connected person is expected to rise from an average of 218 in 2015 to 4 785 in 2025.⁹⁴ This rise in part explains the explosion in the total global volume of data expected in the same year, of which 20% will be generated in real-time (see the diagram alongside).⁹⁵ Data usage in

South Africa will likely increase at a similarly rapid rate.

Annual Size of the Global Datasphere
Zettabytes, 2016 - 2025



Source: Reinsel et al., (2017), *Data Age 2025, IDC White Paper*

Note: 1 ZB = 1 trillion gigabytes

Banks are privileged to have access to large bodies of personal and transactional data that can provide valuable insights into customer behaviour. Banks face the challenge of determining how to unlock value from this data.

Translating this opportunity into business value has been challenging, but the digital revolution has given banks many ways to embrace and use the data at

⁹⁴ Reinsel, Gantz and Rydning, (2017), *Data Age 2025: The Evolution of Data to Life-Critical, IDC White Paper*

⁹⁵ *Ibid.*



hand to provide greater customer value and operational efficiency.

Banks now consider data a core-competency with most banks having a data strategy in place that standardises how data is sourced, stored, overseen, validated, shared and used.⁹⁶ In the digital age a bank's ability to differentiate itself will rest on its capacity to access and use data effectively and efficiently. A Data competency makes the achievement of a digital strategy possible.

11.1 The benefits of a data competency

The value of a data competency can be observed across the banking value-chain and aims to leverage the real-time flows of internal data between business and product lines, supplemented by external data sources.

The benefits can be broadly grouped into three areas:

RISK MANAGEMENT - banks are better equipped to monitor

internal operations and can subsequently better detect fraud, individually price risk, oversee regulatory compliance and identify impending operational risks.

CUSTOMER CENTRICITY - a more complete understanding of the customer can assist in relevant product development, customer retention, personalised marketing and cross-selling as well as personalised advisory services. Additionally, omnichannel servicing is made possible.

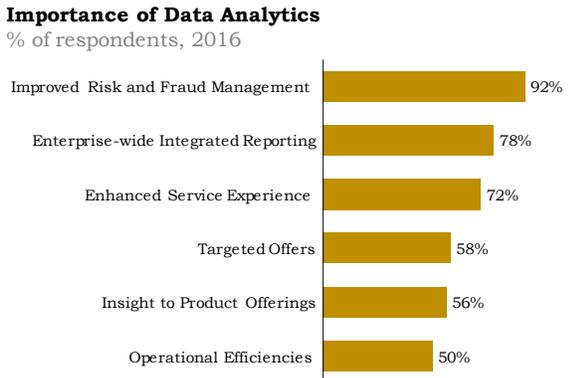
OPERATIONS

OPTIMISATION - with improved enterprise-wide decisioning, credit scoring and trading strategies, costs can be reduced and revenues increased. A developed data competency provides standardisation and coordination, reducing process overlaps and effort duplication between business units.

⁹⁶ SAS, (2016), The 5 Essential Components of a Data Strategy, *SAS White Paper*



The ultimate goal is a data analytics capability that is able to support a customer-centric bank. By moving beyond solely providing financial services and towards anticipating and introducing value-adding services targeted at a broader range of needs, banks can further integrate and embed themselves into the lives of their customers.



Source: KPMG, (2016), *Banking Systems Survey (Netherlands)*

The data-competent bank has an enterprise wide approach and is able to make data available to all units of the bank. This is achieved through the centralisation of data storage and the standardisation of rules governing data. With this in place, data analytics is an asset integrated into the business decision-making process.

Banks across the globe are evolving in their approach to data in recognition of its role in digitising and improving bank operations and customer experience. Previously, data was largely a by-product of business processes and when deployed was static and one-dimensional.⁹⁷ Integrating data into digital processes was initially for the development and operation of digital channels. This application of data was solely for the delivery of transactional services and did not extend into analytics, providing little in terms of business intelligence and insight into customer behaviour.

Successfully leveraging data within an incumbent bank is a challenging and lengthy process. The vast majority of banks continue to operate from legacy core-banking systems which are located in independent business units and product lines, making the integration and extraction of data difficult. Migrating data within the organisation is possible but difficult and expensive to achieve. These

⁹⁷ SAS, (2016), *The 5 Essential Components of Data Strategy, SAS White Paper*

banks therefore frequently rely on external data sources as they are more accessible and easier to utilise.

Unlocking the value of data is facilitated by next-generation, open systems that allow for the easy extraction and use of data. These systems can scale rapidly in response to changes in data workloads and volumes. With easily accessible interfaces and a consolidated, centralised data lake, an efficient data supply chain can be established.

In addition to the need for infrastructure modernisation, leveraging data requires a cultural shift within the enterprise that embraces data as a strategic asset. Large banks have created the role of Chief Data Officer (CDO). By organising data as a separate entity to IT, this role elevates the significance of data within the organisation and serves to help drive the necessary cultural shift. These individuals bridge the gap between data capabilities and business

functions. Having both business acumen and data science expertise makes communicating the compatibility between the two functions to other C-level staff more effective. This facilitates business-level buy-in and fosters broader and deeper support of a data competency. Having knowledge of the bank's functions and pain points ensures that the data and technological solutions deployed are business relevant.

11.2 The role of data governance

A bank's ability to access and effectively utilise data rests on the underlying technical infrastructure of the bank as well as the governance structures overseeing the process. With the introduction of new and external sources of data into decision making processes, data governance structures become increasingly integral. Data governance introduces accountabilities for the lifecycle of data - how it is created, stored, used, archived and deleted.⁹⁸ Given the

⁹⁸ Oracle, (2011), *Enterprise Information Management: Best Practice in Data Governance*

increase in collaboration with fintechs who utilise or introduce external data sources, these standards should apply to all vendors connected to the bank.

The need for data governance is critical – a survey conducted on 500 Chief Information Officers found that 92% had experienced problems due to inaccurate data.⁹⁹ CDOs champion the data agenda and oversee data analytics teams. It is the task of these individuals to embed data governance and data-led decisioning across the enterprise. The same survey found that organisations with a CDO are 20% less likely to have a siloed view of data. It is also estimated that an organisation with a CDO is 70% more likely to reduce risk than those without.¹⁰⁰

As security threats and cyber-crimes increase, data governance becomes even more important. Data security used to guard individual systems from intrusion. As data has become more fluid across the bank,

data security has increased its scope to protect the entire organisation. This is coupled with the potential risks of utilising external data sources of questionable quality.

The importance of data security has been recognised at the national level and internal governance and compliance need to reflect the requirements of legislation. The incoming Protection of Personal Information Act (**POPIA**) will hold legal entities that utilise an individual's personal information accountable for the manner in which it is used and stored.¹⁰¹ The POPIA requires banks to ensure clients give consent to the use of their data and that banks clearly communicate to clients the purpose of the data's use. This constricts data use to 'relevant' functions, limiting the banks' freedom to utilise it as they see fit. Furthermore, personal data stored by legal entities need be destroyed if requested by the client, necessitating the ability to effectively locate and extract data within the organization.

⁹⁹ Experian, (2016), *The Chief Data Officer: Bridging the Gap between data and decision making*

¹⁰⁰ PWC, (2015), *Devil in the data: How Banks can Improve Data management*

¹⁰¹ Luck, R. (2014). POPI – Is South Africa keeping up with international trends? *De Rebus – The SA Attorney's Journal*



The POPIA draws many parallels to the General Data Protection Regulation (GDPR) in the EU. Both regulations have cross-border limitations. In the case of the POPIA, the international transfer of personal data is prohibited unless: the receiving party is subject to corporate or national personal data protection laws, the data subject consents to the transfer and the transfer is necessary for performance.

The GDPR legislation additionally has trans-national jurisdictional reach. Subsequently domestic banks using or processing data concerning EU citizens must conform to the GDPR requirements. While South African banks are struggling to prepare for the POPIA's requirements they must now also adhere to the GDPR which has a tighter timeline.

Although the POPIA has been enacted and the Information Regulator established, it is yet to be enforced. As a result, certain factors within the legislation and how they will impact the financial services

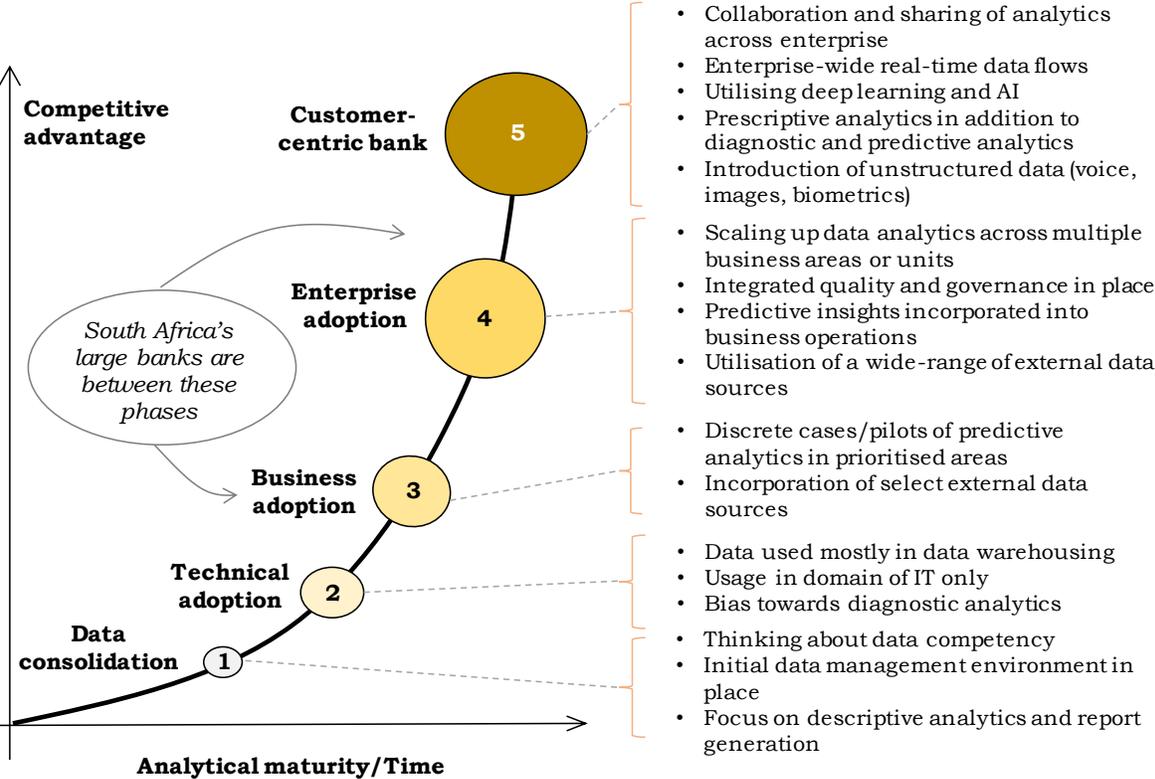
industry remain unclear. For instance, personal data might be utilised in highly sophisticated data analytics. If the subject of the personal data is unable to completely grasp these complexities, are they able to consent? Further complications arise in terms of permissions for personal data sharing internally within the bank – can customers' personal data flow through the organisation or is it constrained for use within the business unit that sourced it?

11.3 Data analytics in South African banks

In the South African context, banks have developed data analytics capabilities and invested in modernising underlying banking infrastructure in the pursuit of enterprise-wide real-time data flows. Additionally, South African banks are rapidly developing data governance capabilities, have largely appointed CDOs and invested in

Social media and other non-financial, external data sources have become an important resource that helps banks communicate with customers and better understand public sentiment and customer preferences. Some fintechs have developed technology that aggregates social media feeds. The largest South African banks are integrating these external data sources into their operations. The integration of external data sources provides

Roadmap to building data analytical maturity
 Size of bubble = relative potential value unlocked



Source: Genesis Analytics, (2017); IFC & MasterCard Foundation, (2107), Data Analytics and Digital Financial Services

growing data analytics teams.

insight into the banking sector's

interest in pursuing a customer-centric model.

A number of the technical components and data capabilities are in place in South African banks, as illustrated in the graph on the previous page. This includes competencies in artificial intelligence and machine learning. Many of the banks are still on the journey of embedding these functions enterprise-wide and ensuring that data is shared across the enterprise in a way that supports critical business decisions and ultimately improves customer-centricity. This process is contributed to by educating staff on the role of data in the business which establishes a consensus on its value.

As with the rest of the globe, data science skills in South Africa are scarce. This has led to a mix of international and local employees and an engagement with open-source communities. As a result, third party fintechs with data analytics competencies are frequently partnered with to enrich back-office capabilities.

The absence of local data science skills may impede South African banks. Banks that are unable to develop in-house capacity may turn to generic solutions provided by large vendors. In-house and bespoke IT solutions have a far higher satisfaction rate than package products.¹⁰²

¹⁰² KPMG, (2016), *Banking System Survey (Netherlands)*

12 Technology that underpins digital

Banks are adopting new technologies which allow them to be more agile, connected and cost-effective going forward. Four key technologies that are allowing banks to do this are discussed: modularised architectures, application programming interfaces, cloud banking and distributed ledgers.

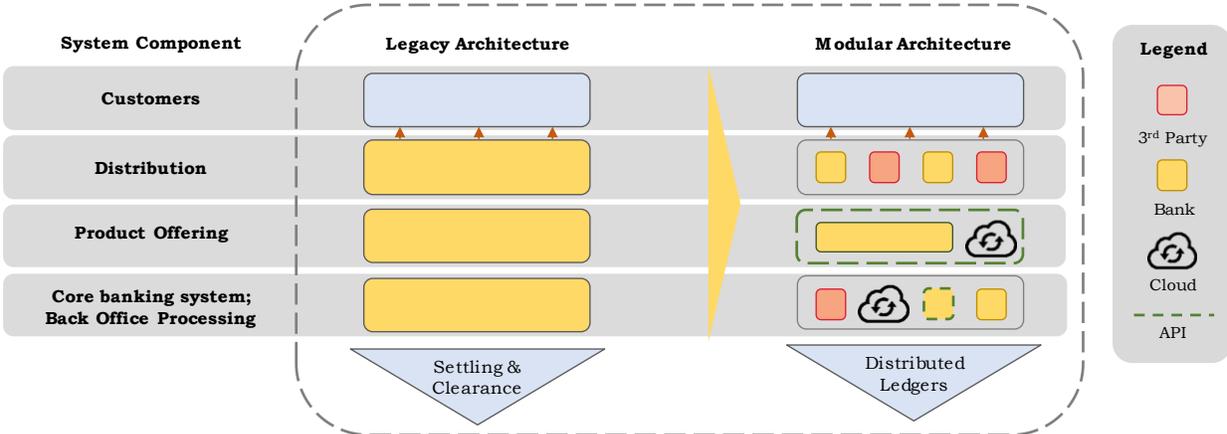
12.1 A changing banking architecture

Many of the major banks in South Africa still make use of “legacy” core-banking systems deployed in the 1970s and 1980s. These mainframe based systems provide the foundational data housing and

processing operations of the bank. Their design is often siloed – a business or product line’s system operates independent of other systems. These legacy systems were not designed to be integrated or communicate with external systems.

Data flows between these legacy systems require work-arounds and bolt-on solutions. The repeated application of these work-arounds increases the complexity of the legacy infrastructure, reducing stability and inflating IT costs to as

The Transformation of Traditional Banking



Source: Genesis Analytics, (2017)

high as 75% of bank and insurance company IT budgets.¹⁰³

In contrast modern, modularised architectures are dynamic and designed with next generation technology in mind, meaning they can readily adapt to changing conditions. A modularised architecture utilises a standardised interface that integrates data between business lines and enables easy ‘plug-and-play’ for 3rd parties.

This adaptability and integration capability is a competitive advantage enabling the bank to keep pace with rapid innovation and shifting customer demands. An illustrative example of the transformation of banking architecture enabled through modular design is provided in the diagram below. This enables the introduction, removal and upgrading of modules (products, services, processes etc.) without jeopardising the integrity of the system. It also enables the “banking as a platform” business model discussed in Chapter

2. This offers customers a wider range of financial and non-financial products and services. For example, German bank Fidor uses a modularised architecture to integrate investment and crowd-funding products produced by third parties into its service offering.

The opportunities of modular design need to be balanced against the risks and costs associated with platform migration and increased collaboration. These risks include decreased control over the customer experience, loss of technical knowledge and increased data vulnerability.

While the legacy systems most common to South Africa were not designed with a modular architecture, increasing levels of collaboration with fintechs across the value chain indicate a movement away from banks serving as the sole producer and distributor of banking services. New players such as Discovery Bank and TYME are likely

¹⁰³ Crotty & Horrocks, (2017), *Managing Legacy System Costs: A Case Study of a meta-assessment model to identify solutions in a large financial service company*



to invest in next generation architectures.

12.2 Application programming interfaces

Application programming interfaces (APIs) allow units within the bank and third parties external to the bank to access the bank's various systems. In much the same way as third party software developers can create applications which work on smartphone operating systems, banks can use APIs to allow fintech developers to create applications which draw data from the bank's operating systems.

There are three main types of APIs within banking.¹⁰⁴ The first is internal APIs which provide access points to siloed data for use within the bank. Internal APIs are common in South Africa due to legacy infrastructure constraints and the need to migrate data between silos, assisting in the achievement of digital and data strategies.

The second is partner APIs which provide select external parties with access to the bank's systems. Banks can share client data with these partners or plug innovative applications from third party providers in to the bank's system, improving their service offering and client experience.

Globally, most use cases of partner APIs have been in payments functionalities.¹⁰⁵ For example American bank BBVA Compass has partnered with fintech company, Dwolla, to offer real-time payments to BBVA customers. Customers are now able to move their money immediately and on the weekend. Citigroup has also offered access to three APIs from PayCommerce, aimed at cross-border disbursements and enterprise payments. In South Africa partner APIs are in the early stages of developments. For most banks access through APIs is restricted to select third party developers,

¹⁰⁴ Forrester, (2016), *Four Ways APIs are Changing Banking*

¹⁰⁵ IBM (2016), *Identifying API use cases in the banking industry*

allowing banks to drive innovation in directions they are comfortable with.

The third type is open APIs which provide third parties with access to bank systems with fewer or no restrictions on developer identity. The use of open APIs in banking has been gaining momentum across the globe, particularly in Europe driven by changing regulatory mandates. The EU's revised Directive on Payment Services, PSDII, introduced new regulated services which require providers and other third parties to access customers' bank account information.¹⁰⁶ Although the Directive does not explicitly mention APIs, the general understanding is that open APIs are the technical means by which banks will be able to fulfil their obligations.

Regulators in the UK have gone a step further to mandate open banking more generally. The Competition and Markets Authority has ordered banks to create open APIs adhering to a common set of

standards by January 2018.¹⁰⁷ The objective of this regulation is for customer's bank data to be shared between organisations and incorporated into third party applications.

The regulatory drive towards open banking is intended to stimulate innovation in the personal and business banking markets. The sharing of customer bank data will allow financial service providers and other third parties to develop applications that can manage customers' account from multiple financial institutions, easily transfer funds between these accounts, make simple and safe price comparisons, and provide financial management and cash flow forecasting services, among others.

In the absence of a similar regulatory mandate in South Africa, banks have not had to provide open access to their APIs or develop industry standards for open APIs. The expectation in the market is that

¹⁰⁶ European Union, (2015), Directive 2015/2366 of the European Parliament and of the Council on payment services in the internal market. *Official Journal of the European Union L337/35*

¹⁰⁷ Competition & Markets Authority, (2017), Retail Banking Market Investigation. *The Retail Banking Market Investigation Order 2017*



a similar set of regulation will eventually filter through to South Africa.¹⁰⁸ However banks also realise that open APIs have application beyond the use cases envisaged in the PSDII and open banking regulations. For example, Absa has launched an open API platform which provides third party developers with access to a selection of APIs to connect to a limited range of the bank's services including biometric identification, transactional capabilities and ATM locators.¹⁰⁹

12.3 Cloud banking

Cloud services provide banks with virtual infrastructure to store data and access software applications online. Banks can choose from a range of cloud strategies. These include the choice between developing a cloud infrastructure in-house or making use of external vendors. When using vendor solutions, banks select between private clouds for proprietary use

and public clouds shared with other users.

Developing a cloud in-house requires larger investments than utilising an off the shelf, vendor provided solution. Vendor solutions are often pay-per use, reducing upfront capital requirements and eliminating the need for investments in physical infrastructure and IT skills. These are a substantial barrier to entry for new entrants. The total IT cost savings from cloud use can be substantial at an estimated 300%.¹¹⁰

Cloud infrastructure is also flexible – new servers can be deployed quickly and scaled rapidly. This provides banks with agility. The building and release of new products and services can be sped up as product data and processes are hosted on the cloud.

Cloud servers improve the accessibility of third parties to bank data and operations by removing the need for these parties to be on site. Subsequently banks may collaborate

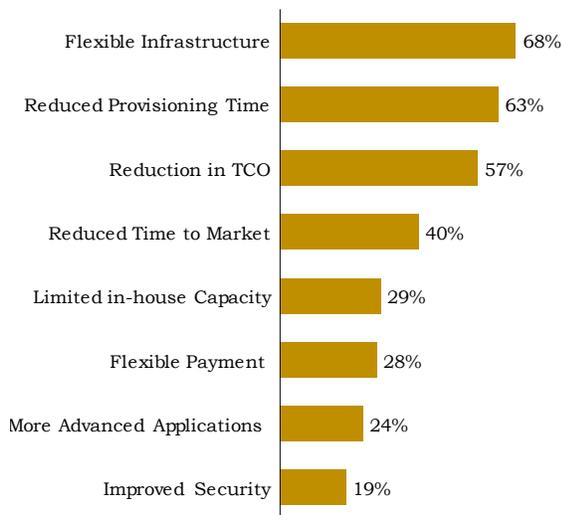
¹⁰⁸ Based on stakeholder interviews conducted by Genesis Analytics, July-September 2017

¹⁰⁹ Malinga, (2016), Absa introduces API platform for SMEs, *ITWeb.co.za*

¹¹⁰ BBVA, (2016), *Cloud Banking or Banking in the Clouds*

with local or foreign firms to make use of sophisticated analytics capabilities that are unavailable or more expensive to access locally. This is particularly true for data analytics as modern cloud infrastructure has been developed to support large datasets and data analytic capabilities.¹¹¹ This borderless nature of the cloud also allows banks with pan-African operations to more easily integrate their services and improve accessibility irrespective of location.

Select Primary Reasons for Adopting Cloud Computing



Source: CSA, (2015), *How Cloud is Being Used in the Financial Sector: Survey Report*

Although cloud banking benefits are well understood,

security concerns are a substantial barrier to uptake. Vendor provided public clouds held off-premise are the least secure while clouds hosted on-site and developed in-house are understandably the most secure. As a result of these security concerns, the majority of core banking data and operations remain on physical infrastructures with generic and standardised processes accounting for the bulk of cloud use.

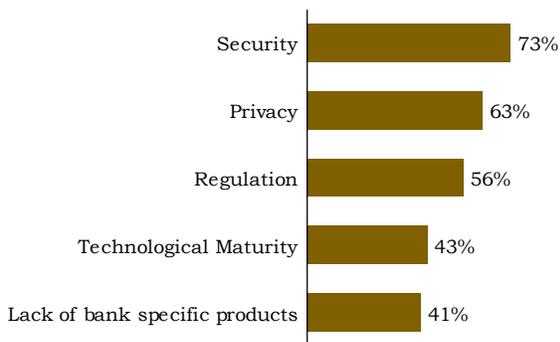
However, the security competencies of large technology firms providing cloud infrastructure may suggest that these security concerns are misguided. Providers such as Amazon face reputational risk should their cloud offerings be compromised. It is possible that these large technology companies can developed more sophisticated security measures than many banks.

In addition to security, collaboration risks may reduce the independence and integrity of banks making use of cloud services. Banks that migrate to a cloud become

¹¹¹ BBVA, (2016), *Cloud Banking or Banking in the Clouds*

reliant on the cloud service provider. Banks may face a service lock-in and find it challenging to migrate to an alternative provider with a superior product. Additionally, transitioning to the cloud can be time-consuming and unforeseen challenges may cause spiralling costs.

Select Primary Reasons for not Adopting Cloud Computing



Source: Forrester, quoted in BBVA, (2016), *Cloud Banking or Banking in the Clouds*

Security issues have decreased interest in the use of cloud technologies among typically risk-averse South African banks. The SARB tends to interrogate cloud usage on a case by case basis. The openness of the SARB to cloud usage varies by department - different departments have different mandates and concerns around the

use of the technology. The SARB has established a cloud banking working group to generate a consolidated position.¹¹²

12.4 Distributed ledger technologies

Distributed ledger technology (DLT) is a means of decentralised record keeping. Transactions authorised within the distributed ledger are added to digitised databases held by the ledgers' members. Most distributed ledgers are designed so that the content of these databases cannot be manipulated.

Blockchain is the best known distributed ledger, providing the underlying technology supporting Bitcoin. The blockchain ledger facilitates transacting without the need for intermediaries, governing bodies or trust amongst parties. Instead, the system verifies transactions through establishing a consensus amongst its users. These features mean that providing unrestricted access to the blockchain

¹¹² Based on stakeholder interviews conducted by Genesis Analytics, July-September 2017

for the public does not jeopardise its security. With Bitcoin's current success and the emergence of many other crypto-currencies, interest in the underlying DLT has spiked.

The financial sector is investigating how the technology may support traditional financial service operations. In theory, a DLT is a hyper-efficient means to process and store large volumes of data amongst numerous parties. Additionally, costs can be reduced by eliminating the need for intermediaries and governance. The specific applications in financial services include clearing and settlement, P2P transfers and remittances, syndicated loans, digital identity and trade finance. The technology therefore has the potential for applications within and between bank processes. By restricting access to permissioned parties and incorporating alternative governing rules, consensus is not a necessity for validation.

The interest in DLT in financial services has taken off globally – a PwC global survey of financial services and fintech experts found that 77% of respondents anticipate having DLT integrated into their business systems or processes by 2020.¹¹³ Significant investments have been made by the industry to understand and develop the technology to the point of commercialisation. Part of this process includes global collaboration between firms to ensure the interoperability of solutions and the development of global standards.

The R3 consortium is arguably the best known of such collaborations with an estimated 75 world leading financial firms as members, including two of South Africa's largest banks. However, to date, no meaningful use cases have been publicised.

This indicates that DLT is still immature and is likely still in the upward-sloping component of the technology hype curve. It has been

¹¹³ PwC, (2017), *Redrawing the Lines: FinTech's growing influence on Financial Services*

argued that restructuring the technology to operate in closed environments eliminates the benefits of decentralisation. Whereas cryptocurrency DLTs are decentralised in nature, development for use by incumbent financial institutions is largely focused on centralised structures which already have well-functioning and vetted alternatives in place that DLT technology, in its present form, may not provide a superior solution to.

In addition, the successful application of DLT requires regulatory evolution. For example, one of the most cited DLT use cases is smart contracts – programmes embedded in distributed ledgers that record and automatically enforce the terms of a contract as soon as the contract conditions are met. Beyond the questionable legality of smart contracts under current contract law, regulators would additionally have to recognize tokenised assets – a virtualised symbol of an asset that can be owned on a DLT - as reflective of ownership in reality.

Interest in DLT in South Africa has been growing in line with global trends. Domestic banks are investigating its potential application within banking operations and in international remittances. The largest financial institutions each have individuals or teams investigating and championing the technology.

Domestic collaboration amongst major financial players is taking place within the South African Financial Blockchain Consortium. The consortium is structured with a primary working group and secondary work streams each studying technology, regulation and education. The committee has prioritised investigation into digital identity and payments and has successfully tested a distributed ledger whereon an asset was traded. Strate is a participant spearheading an investigation into DLT's use in capital market settlements.

The SARB and FSB sit on the committee as observers. The regulators are interested in understanding the technology but,

as the technology is far from being commercially deployed outside of the crypto-currency space, are unable to regulate its use. As crypto-currencies are the only DLT use case currently being employed, the SARB has engaged with Bankymoon – a leading blockchain fintech - to understand the mechanics of the technology before trying to impose regulations.

The commercialisation of DLT may also be constrained by skills. While one requires software engineering capabilities to learn how

to build DLT technical solutions, there is a shortage of people with technical and business skills who understand how the technology can be used to create new business opportunities. Universities are beginning to respond to this shortage - the forthcoming data science and financial technology course to be offered at the University of Cape Town will provide DLT application and development content with a focus on inspiring entrepreneurship.

13 What does this mean for risk?

The pace of fintech innovation and the way it is changing the structure of the market is introducing and intensifying risks specific to technology and its impact on bank operations. The focus of this section is on the new or intensified reputational risks that banks face as they digitise and adopt new technologies:

THE EXPANSION of digital channels and offering real time and remote access to services creates new opportunities for fraud and cybercrime.

THE INCREASING use and sharing of data as a central function of financial services introduces data integrity and privacy risks.

THE RAPID adoption of new and emerging technologies increases the chances of technology and systems failure.

THE PARTICIPATION of third party fintechs or technology

vendors in bank operations introduces collaboration risk.

The fast pace of technological innovation and adoption within financial services means that banks will increasingly face a common set of operational risk around new technology. If these risks are not properly managed by banks they have the potential to create instability and undermine consumer trust in the banking system as instances of cybercrime, systems failure and compromised data increase in frequency. In South Africa this could be exacerbated by the high degree of concentration and interconnectedness within the sector.

13.1 Cyber and data security

Fraud and cybercrime is the greatest reputational risk facing organisations in the digital age. 8.8 million South Africans were victims of cybercrime in 2016, costing the economy an estimated R5.8 billion a

year.^{114,115} As the guardians of sensitive private and financial data, banks are a favoured target for cyber-attacks. Last year Standard Bank was the victim of a sophisticated and co-ordinated cyber-attack which led to the theft of 1,600 customer's credit card details. The credit cards were cloned and used to withdraw R300 million worth of Yen across ATMs in Japan, which was then likely smuggled into neighbouring countries.¹¹⁶ This example highlights the borderless nature of cybercrime – information stolen from one country is monetised in another and the funds are extracted to yet another jurisdiction, making investigation and prosecution of the crime difficult.

There are a number of drivers contributing to the severity of this risk. Firstly, the sources of cyber-attacks are diverse and evolving quickly. Banks may be the target of a number of attackers ranging from opportunistic hackers to sophisticated criminal syndicates to

state-sponsored agents with the intention of compromising the integrity of the financial system. The methods used by different attackers vary and evolve quickly, making it difficult for banks to know what they need to protect against.

Secondly, banks have a number of fronts they need to protect. The digitisation of bank channels and underlying processes create multiple avenues through which virtual attacks can take place, notwithstanding the need to protect banks' physical premises and systems from intrusion. In addition to banks' internal systems and processes, the increasing use of outsourced service providers and the integration of banks' systems with external vendors adds another layer of vulnerability. It is difficult for banks to cover all of these fronts comprehensively.

Thirdly, banks' cyber defences are only as strong as their weakest links, and the behaviour of both customers and employees represents

¹¹⁴ Norton, (2016), *Norton Cybersecurity Insights Report*

¹¹⁵ Centre for Strategic and International Studies, (2014), *Net Losses: Estimating the Global Cost of Cybercrime*

¹¹⁶ Steyn, (2016), Standard Bank scam: R300-million ATM heist ups the ante. *Mail & Guardian*

a weak point that is challenging to protect against. Banks invest significantly in educating customers and employees on cyber security but have limited-to-no control over their behaviour. For example, banks have no control over the devices customers use to access banking services. Customers may be using other less secure applications which provide criminals with a “back door” to the customer’s banking app, and customers often choose not to make use of software protection programmes due to the mobile data required to update them.

Lastly, banks’ customers are becoming more concerned about how their personal data is stored, managed and protected. This is being driven by regulatory developments, such as the Protection of Personal Information Act in South Africa, which places the ownership of private data in the hands of individuals and provides them with the right to dictate how it is used and by whom.

All of these drivers require banks to develop comprehensive

cyber and data resilience strategies. While cyber defences are important to prevent attacks, they are no longer sufficient in isolation. The pervasiveness of cybercrime means that the real challenge for banks is being adequately prepared when a cyber-attack does occur. Beyond identifying critical systems and applying adequate protection, banks need to be able to detect cyber-attacks quickly and then contain and recover their systems as fast as possible. This requires banks to undertake extensive planning and testing of their contingency and recovery capabilities. Tying all of this together is the need for a strong governance framework which outlines the bank’s cyber resilience strategy and creates accountability for its enforcement at the board level. In 2016 the Bank for International Settlement (BIS) Committee on Payments and Market Infrastructure (CPMI) and the International Organisation of Securities Commissions (IOSCO) released the first internationally-agreed principles for cyber resilience among

financial institutions which detail all these aspects.¹¹⁷

Banks in South Africa are taking cyber security seriously and, due to the non-competitive nature of developing cyber resilience, have collaborated together to share information on emerging threats. This has been encouraged by the SARB prioritising cyber security as a key bank supervision issue during 2016.¹¹⁸ In 2017 the SARB issued a guidance note on cyber resilience which requires banks to assess the adequacy and robustness of their current cyber security policies against the CPMI-IOSCO guidelines for cyber resilience.¹¹⁹

However, South African banks still have some way to go before actualising the comprehensive cyber resilience strategy envisaged in these guidelines. There are two key issues which will be critical for banks to address going forward.

The first is the need for real-time risk management in order for

banks to pick up anomalous activity indicating a security breach or unauthorised use of a customer's account quickly. Banks are not short on the data required to do this, but making sense of the enormous volume of data that banks collect in near real time is difficult. The current wave of interest in artificial intelligence tools such as machine learning has great application in processing enormous data sets and picking up anomalies. However, while AI tools help, banks still need to know what they are looking for in the data for this to work and therefore require security employees who understand the threat landscape well.

The second relates to the use of biometrics to verify customers' identity when transacting with banks. This is a development that seeks to replace the current use of passwords which have proven an unsecure means of proving identity – over one in three South Africans admit to password sharing and only

¹¹⁷ BIS and IOSCO, (2016), *Guidance on cyber resilience for financial market infrastructures*

¹¹⁸ South African Reserve Bank, (2016), *Bank Supervision Department Annual Report 2016*

¹¹⁹ South African Reserve Bank, (2017), *Guidance note on cyber resilience. Guidance Note G4/2017*

seven in ten change their password after it has been compromised.¹²⁰ While a number of South African banks are making use of fingerprint readers for their smartphone apps or cards, the future of biometrics in security will extend to behavioural features such as voice patterns, handwriting and touchscreen keystroke dynamics. This combination of physiological and behavioural verification is the best way to mitigate unsecure customer behaviour and prevent fraud going forward.

13.2 Technology resilience

Banks are under pressure to adopt new technology and process innovations in order to remain current and compete with fintechs. This process can introduce significant risk into the bank through a number of fronts if the technology fails or is not resilient when combined with the banks other IT systems.

The drive towards operational efficiency through process automation can leave customers unable to transact in cases of loss of service or technical problems around delivery. The use of artificial intelligence and algorithmic software can lead to sub-optimal decisions or trading outcomes if banks do not have sufficient human capital to monitor the integrity of algorithms and the underlying data. The use of distributed ledger technology remains far from being mainstreamed and is therefore untried and untested.

An additional concern for traditional banks is how the adoption of new technology will impact their existing IT systems. Unlike fintechs which tend to focus on one type of service using a relatively small stack of technology, most banks have complicated IT systems including legacy core banking systems which are fragile and difficult to integrate with other systems. As traditional banks adopt new technologies they may experience security or

¹²⁰ Norton, (2016), *Norton Cybersecurity Insights Report*

structural weaknesses and increased outages.

This can have a significant impact on the bank's reputation among its customers and impact trust in the financial system more generally. As such regulators are increasingly viewing technology failure as a systemic risk and are looking to bank boards to ensure that banks have adequate technology resilience measures in place.

However elevating technology failure risk to the board level will not be achieved by appointing one or two technology experts to the board – the challenge is to change boardroom culture so that technology risk takes a higher priority in the boardroom agenda. Driving this issue is the massive shortage of technology expertise at the senior level – only 6% of the world's largest banks have adequate technology expertise represented on their boards.¹²¹ Boards also need to have technology sub-committees to report to and advise the board in the same way

that they have audit and risk committees. Only 11% of leading banks have a technology board sub-committee in place.¹²²

Part of the board's challenge in managing technology failure risk is ensuring that the bank has adequate resilience standards in place. This involves identifying the technology that supports the bank's most critical business processes and channelling sufficient capabilities towards testing and maintaining its resilience. Often banks only perform one-off testing of a particular technology application rather than comprehensively testing all the technology required to perform end-to-end processes such as clearing or settlement. Banks also need to engage in crisis simulations to ensure they are adequately prepared to deal with a technology crisis. Lastly banks need to ensure that any third party technology service provider has the same resilience standards in place. This is discussed more fully in the following section.

¹²¹ Accenture, (2016), *Bridging the technology gap in the financial services boardroom*

¹²² *Ibid*

13.3 Collaboration with third parties

As technology becomes core to the provision of financial services, banks are often unable to find the required technology skills and solutions in-house. Traditional banks in particular are increasingly making use of external technology vendors and fintech partners to fill this technology gap. In addition, the modularisation of financial services and emergence of “banking as a platform” means that banks are increasingly making use of third party service providers to provide value-added services to their clients.

This incorporation of third parties into the bank’s operating model introduces a new level of collaboration risk with a number of dimensions. The first relates to cyber and data security – banks have to ensure that any third party that integrates with their systems or handles their data has the same level of cyber and data resilience as that applied to the bank. The second relates to continuity – as the bank

focuses on its core competencies and outsources non-core services, it has to ensure that that these providers are reliable and apply the same technology resilience standards as the bank does. The last relates to customer engagement – as the bank’s service offering becomes increasingly reliant on third parties, with the possibility that these third parties engage with customers, it has to ensure that the bank’s customer experience and brand promise is not impacted negatively.

Collaborating with fintech startups can be particularly risky for banks. The availability of investment capital during the fintech hype has allowed some startups to grow quickly without a proven business model. If the fintech bubble bursts, as was the case with the dotcom boom in 2001, a number of fintechs will exit the market and leave their bank partners exposed. Furthermore, startup vendors are not likely to have significant risk controls in place and have very little

experience with customer engagement.¹²³

Regulations in most markets place the responsibility for managing this collaboration risk squarely on banks. In South Africa the SARB issued a guidance note in 2014 requiring banks to have a board-approved outsourcing policy in place that manages the due diligence, contracting, monitoring and contingency planning for the outsourcing of material business activities, including IT.¹²⁴ Later in 2016 the SARB issued a directive requiring banks to report the details of their top 15 outsourced material activity providers and critical third party service providers annually.¹²⁵ But banks have good reason to self-regulate anyway as they realise that protecting their customers is an

essential part of the service they provide.

As such banks are faced with the comprehensive task of appropriating selecting partners, creating clear contracts and service-level agreements, conducting due diligence and regular assessments, and putting together contingency protocols. This is a difficult and arduous process for banks which may not have the adequate human capital to judge technology resilience, the resources to perform regular reviews or audits, or the power to enforce changes to a service provider's systems, policies, procedures and controls. As such the process may act as a barrier for banks incorporating innovation or new technology into their operations.

¹²³ EY, (2016), *Managing change and risk in the age of digital transformation*

¹²⁴ South African Reserve Bank, (2014), Guidance note on outsourcing of functions within the bank. *Guidance note 5/2014*

¹²⁵ South African Reserve Bank, (2016), Reporting requirements relating to material outsourced service providers and critical third-party service providers, *Directive 8/2016*

CHAPTER 4

The regulatory response

Fintechs have the potential to revolutionise banking, making it more customer focused, and accessible. A digital infrastructure means fintech entrepreneurs face lower barriers to entering the market than large banks. They can therefore be more cost effective which could ultimately lead to a positive impact on the cost of financial services across all financial service providers. But as the sector evolves, many of these start-ups and innovators could introduce risks into the system. Given the rate at which technology evolves it is possible that digital innovation in the financial services industry has the potential to be competitively disruptive as well as systemically destabilising.

For this reason, regulators must be aware of the issues and risks associated with digital innovation and balance this against the positive

impacts that it can have on financial services.

A lack of supervision puts participants and users of fintech solutions at risk, for example investors and savers on crowdfunding platforms may not appreciate that higher rates of return on their deposits means they are exposed to higher rates of default risk.

Many unregulated start-ups will not be obliged to invest in the same levels of cyber security and other fraud prevention systems that banks are required to invest in and could therefore become attractive targets for cybercrime and fraud, again putting participants at risk.

The investment that banks make in compliance capabilities, risk controls, capital and liquidity buffers and fraud systems, among others, all provide their customers with security



that their deposits are safe and payments secure; an implicit guarantee that customers pay for. If fintechs are not obliged by these same requirements and this uneven regulatory playing-field allows them to attract enough customers away from traditional institutions, this could undermine the profitability and thus the stability of the regulated banking sector.

The consequences of social investing or making financial decisions based on social trends, for example, have not been tested in an economic downturn. The stability of a lending platform, should investors withdraw their funds en-masse, could be damaging for participants on that platform. Likewise, stock prices could be negatively impacted by herd behaviour as channels such as social media facilitate widespread access to information.

Regulators are right to be cautious about the growth of fintechs and should be aware of the trade-off between innovation and inclusion and financial stability.¹²⁶

This chapter investigates how regulators are approaching this regulatory dilemma. Section 14 describes the regulatory approaches to fintech and digital innovation that have been adopted in different markets and analyses the trade-offs between them. Section 15 then looks at the regulatory responses that have been adopted in South Africa and how this may need to evolve going forward. The final section reviews international regulators' need to adapt to the emerging risks and opportunities associated with a growing fintech industry.

¹²⁶ Bank of England, (2017), The Promise of FinTech – Something New Under the Sun? *Governor's Speech January 2017*

14 A spectrum of regulatory approaches

Regulators across the globe have approached the oversight of fintech in a number of different ways. At a high level these responses can be mapped along a spectrum between proactive and reactive.

Proactive regulation

Proactive regulators work closely with innovators to understand new fintech developments and regulatory obstacles to innovation and support start-ups in addressing these challenges. This is most often observed in developed markets with a significant degree of technological innovation.

In a proactive framework a government agency has usually been identified as a champion for fintech engagement and development within the country. This agency often seeks to establish innovation hubs and regulatory sandboxes and frequently enter into international cooperation agreements with foreign regulators. These structures are designed to

nurture the fintech industry by providing fintechs with technical support, regulatory guidance, a means of testing new products and the opportunity to work in foreign markets. Regulators are given the opportunity to develop a functional understanding of fintech innovation and craft a regulatory response where necessary. These structures are discussed in more detail in Section 14.1 below.

The United Kingdom is largely considered the global standard for proactive fintech regulation. The Financial Conduct Authority (FCA) spearheads the government's support for and engagement with the fintech community. Project Innovate – the cornerstone of its fintech strategy – provides a regulatory sandbox, innovation hubs and innovation advice units for certain financial products and services. The Australian Securities and Investments Commission (ASIC) has taken a similar approach by deploying a regulatory sandbox and

an innovation hub and pursuing international collaboration.

The benefits of a proactive regulatory approach is in providing regulatory certainty as well as confidence to investors, innovators and consumers. By openly supporting the industry, innovation is encouraged and a more dynamic and competitive financial ecosystem is supported. This direct engagement also provides a platform for the regulator to keep pace with, be involved in and monitor innovation. Regulators are therefore better able to keep track of innovation in their market and take measures to address the risk it presents.

The drawbacks of this approach is that regulators may be at risk of being overloaded and have their attention and resources diverted away from other policy mandates that do not relate to fintech. The proactive approach is resource-intensive and carries the risk of regulatory capture whereby the specific interests of certain members of the industry are placed ahead of public interests.

Reactive regulation

In contrast, reactive regulators do not take an active role in trying to make fintechs succeed but do not actively stand in the way of their development and adjust regulation when necessary.

In a reactive approach there is no single agency identified as a fintech champion, although financial regulators and government departments often have internal working groups on fintech. Financial regulation tends to follow innovation and advanced guidance is not actively provided for new and emerging technologies. Innovation hubs are largely led by the private sector with varying degrees of government involvement.

This model is largely pursued by regulators who do not observe a large amount of disruptive innovation in their markets. This reduces the risk posed by innovation, leaving regulators less pressured to develop an agile and supportive regulatory framework. Brazil and India provide examples of this



approach. Regulators in Brazil have established internal working groups to study digital innovation and its impacts on the market and are engaging in discussions with fintech stakeholder organisations, but no dedicated structures have been established among regulators to support fintech development.¹²⁷ Similarly financial regulators in India have been cautious and slow to react to the fintech surge.^{128,129} Financial regulators in India have established an inter-regulatory working group to investigate the impact of fintech and the appropriate regulatory response.¹³⁰ Historically, the Reserve Bank of India (**RBI**) has been cited as cautious in its approach to fintech regulation, but is now focusing efforts on easing the regulatory challenges faced by fintech providers.¹³¹

A reactive approach may also be driven by high levels of bureaucracy which inhibits regulatory dynamism. This is true in

markets such as the United States where financial regulation at the state level has made it difficult for federal regulators to develop a nationally uniform and supportive regulatory environment for fintech.

In countries where regulators struggle with resources, pursuing a reactionary approach may allow them to focus on more pressing issues. But in an increasingly global environment enabled by digital innovation, they run the risk of creating a large gap in their technical understanding of innovation. This will make it more difficult to catch up when their markets reach critical scale in the adoption of new technologies. Furthermore, the domestic pace of innovation may be outstripped by foreign financial markets where a more proactive regulatory approach is taken.

The proactive-reactive spectrum is not binary - a regulator's approach could fall anywhere on the spectrum, potentially combining

¹²⁷ ICLG, (2017), *Fintech Regulation in Brazil*

¹²⁸ KPMG, (2016), *Fintech in India – a Global Growth Story*

¹²⁹ Bagchi, (2017), Can Regulatory Sandbox Nurture India's FinTech Innovation, *CXOToday*

¹³⁰ Reserve Bank of India, (2016), Inter-regulatory Working Group on Fin Tech and Digital Banking, Press Release

¹³¹ Swami, (2016), The Evolution of Fintech Regulation in India, *Medium*

features of both. Regulators must consider the circumstances of their particular market to develop a framework that supports broader objectives while not distracting regulators from other critical functions. This requires weighing the advantages of a thriving fintech industry against broader financial stability objectives. The next two sub-sections further explore what a supportive regulatory environment for innovation looks like.

14.1 Mechanisms for proactive regulation

With a clear mandate, regulators championing the fintech agenda are visible to market participants and can leverage their authority to co-create a supportive regulatory environment for innovation. The most common identifiers of a proactive regulatory approach are discussed below.

Regulatory sandbox

Regulatory sandboxes provide fintechs with live environments to test new products and services that

they are looking to bring to market. During this process fintechs are exempt from certain legal or regulatory requirements that might otherwise impede their development. Businesses are permitted to operate with these regulatory exemptions for a finite period of time, following which the fintech is subject to existing regulation.

A sandbox is manned by regulatory personnel who have line of sight of the technology's development and testing. The regulator is therefore able to supervise the process while learning about the fintech's business model and technology. The regulator is witness to emerging risks or threats and can respond by adjusting regulation without necessarily stifling innovation.

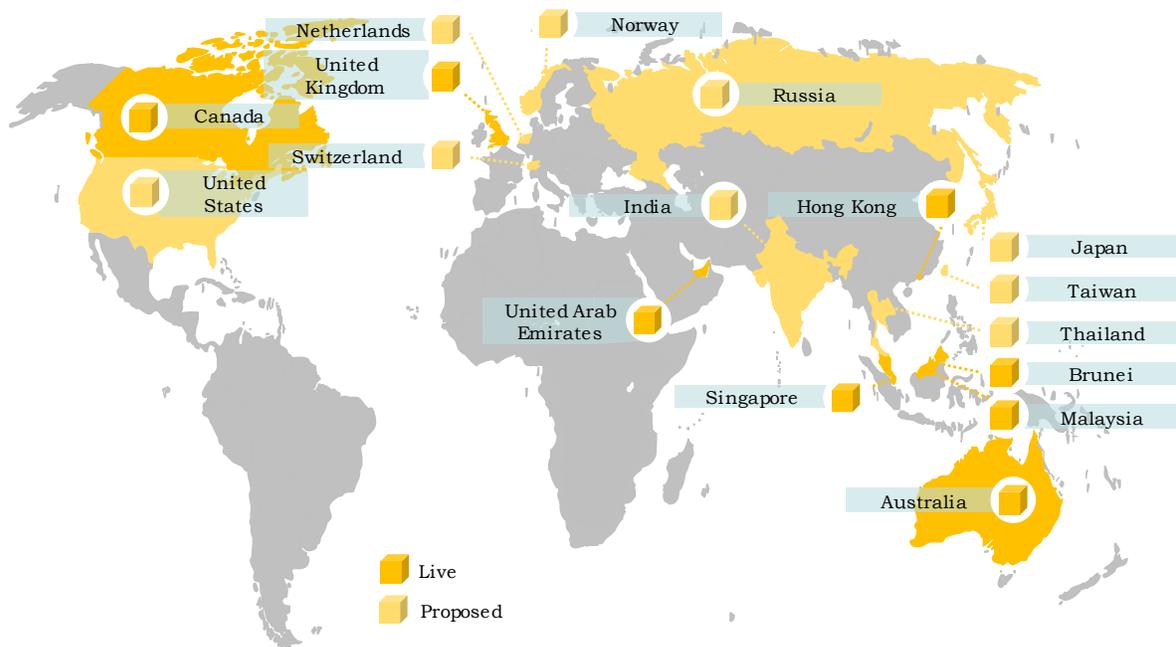
In this way the regulatory sandbox minimises uncertainty for developers and gives confidence to consumers that products that they have access to are permitted and are likely secure - the test and learn environment ensures that regulation reflects the emerging risks associated

with technological change. Restricting access to the sandbox subject to a set of eligibility criteria may help to further reduce risk while ensuring that the sandbox’s outputs, products and services are reflective of the regulator’s mandate. Finally, a sandbox increases the visibility of start-ups as targets for investment and venture capital by allowing them to showcase products.

The United Kingdom was the first market to introduce a sandbox in 2015, overseen by the FCA. A cohort of companies are approved twice a year by the FCA for testing.

To qualify for participation businesses must offer a novel product or service and provide a tangible benefit to customers. This is in accordance with the FCA’s mandate to protect customers and foster competition in the financial services market. A supplementary ‘virtual sandbox’ has been proposed. This structure has lower eligibility criteria and offers a secure space to test software in a simulated environment. Instead of customers, industry relevant datasets and an API portal are accessible to innovators. The foundational testing

Live and Proposed Regulatory Sandboxes – 2017



Source: Innovate Finance (nd), Comparing the industry and regulatory sandbox, Industrysandbox.com

conducted in the virtual sandbox may spring-board a fintech giving them access to the regulatory sandbox.

The sandbox governed by the Australian Securities and Investment Commission illustrates how eligibility criteria may serve to reduce risk. A business may access the sandbox for a maximum of 12 months and must have less than 100 customers and AUS \$5 million in exposure. By limiting scale, these criteria would reduce the extent of potential consequences of a business failure during testing.

Regulators are not the only participants able to facilitate a sandbox environment. Industry sandboxes are led and funded by industry stakeholders and provide similar opportunities for product testing albeit in a simulated market environment.¹³² Fintechs in an industry sandbox are not exempt from regulation, however as products are not tested on actual consumers there are no regulatory implications.

By observing testing in this space, regulators are provided with insights into the possible implications of new products and technology without having to establish a regulatory sandbox.

Cooperation agreements

Agencies championing the fintech regulation process frequently enter into cooperation agreements with regulators in other markets. For instance, the UK has agreements with China, Singapore, Korea, Australia, Hong Kong, Canada and Japan.¹³³ This process helps foster innovation and competition by supporting fintech firms seeking to operate in overseas jurisdictions. In the case of the UK, a foreign fintech that has been referred by a collaborating regulator is allocated a dedicated contact person to facilitate their movement to the UK, assisting the firm to navigate the UK's regulatory environment and overseeing the entire process of authorization to enter the market.

¹³² Innovated Finance, (2017), Comparing Industry and Regulatory sandboxes, *Industrysandbox.com*

¹³³ Deloitte, (2017), *A tale of 44 cities – Connecting global fintech: Interim hub review 2017*

The agreements provide similar support among foreign regulators for UK fintechs looking to operate overseas.¹³⁴

Cooperation agreements additionally facilitate knowledge sharing of market innovations and trends as well as instituting collaboration that may help establish regulatory and enforcement best practices. As harmonization in fintech regulation occurs, passporting agreements that allow fintechs to seamlessly operate in foreign jurisdictions may be more feasible. This option is being considered for the EU.

Innovation hubs

Innovation hubs provide support to fintech start-ups by offering fintechs direct access to regulatory personnel who help the business understand how best to navigate current regulation applicable to their product or service. In the case of the FCA, dedicated teams are allocated to innovative businesses to guide them

through the regulatory application process.¹³⁵ This guidance is particularly helpful for start-ups which do not have the funding to employ expensive legal or regulatory consulting services.

Start-ups may have access to further resources such as communal working spaces, datasets and expertise in business and entrepreneurship. These hubs help facilitate the growth of fintech start-ups by guiding the business towards commercial funding opportunities and applicable tax incentives.

In a proactive environment, these hubs are established and managed by regulators. But as with sandboxes, these can be funded by private business and shareholders.

14.2 Supplementing proactive regulation

Developing a supportive environment for fintech goes beyond proactive financial regulation – it also requires more general government programs,

¹³⁴ Financial Conduct Authority, (2017), Innovate and Innovation Hub, www.fca.org.uk

¹³⁵ *Ibid*

taxation policies and the availability of capital and talent.¹³⁶

These factors underpin a proactive regulatory approach by providing a supportive business environment. While tax exemptions for small business, government led start-up funding for R&D firms and educational initiatives in key skills might be out of scope for financial regulators, funnelling these benefits through innovation hubs and sandboxes is a proactive decision.

The interplay between fintech-specific support structures and the broader business ecosystem illustrates that innovation is best fostered in a holistic and supportive environment. The UK and Australia provide examples of the marriage between proactive regulation and supportive business environments.

The UK's Project Innovate for example is supplemented by government incentives including tax relief for investors in high-risk companies and start-ups,

entrepreneurial tax relief and tax credit for R&D. The Australian regulator's proactive approach has been supplemented by a government-backed fintech committee as well as a Digital Finance Advisory Committee with membership from industry and academia to assist the regulator in oversight of the hub. Fintechs also have access to funding and tax incentives outlined in the National Innovation and Science Agenda.¹³⁷

A recent study gives credence to this interplay between business environments and fintech regulation in its evaluation of 44 public and private sector led fintech hubs.¹³⁸ Each hub was allocated a composite score based on the Global Financial Centre Index (2016), the Doing Business Index (2017) and the Global Innovation Index (2016). Johannesburg ranked relatively poorly at 38 of 44. In contrast the London hub ranked 1st and Australia 8th.

¹³⁶ EY, (2016), *UK FinTech: on the cutting edge*

¹³⁷ *Ibid.*

¹³⁸ Deloitte, (2017), *A tale of 44 cities – Connecting global fintech: Interim hub review 2017*



In addition, qualitative assessments of these hubs were provided by hub representatives. These detailed six key areas:

SUPPORTIVE regulatory environment(s) for fintech

EXTENT of foreign start-up representation in the hub

SIZE of the customer market and rate of adoption of fintech solutions

AVAILABILITY of financial service, technological and entrepreneurial expertise in the hub

INNOVATIVE culture in the hub, and

DEPTH of support by government for start-ups.

Johannesburg scored well on innovation culture and foreign

fintech presence, moderately on expertise and customer proximity, and relatively poorly on government support and regulation. The London hub ranked near perfectly on all qualitative assessments with the exception of innovation culture and foreign start-ups. The Sydney hub also ranked very highly on these qualitative measures but had poorer regulation and government and support metrics than London.

These rankings are reflective of the contribution that regulation can make to a conducive business environment alongside broader government policy and the network effect of attracting a pool of investors and support service providers. Both markets have managed to achieve a globally competitive status, driving relevant innovation and investment into the sector.

15 Regulatory response in South Africa

Regulators in South Africa have primarily taken a reactionary approach to fintech and digital innovation. South Africa does not have a regulatory framework for fintech and innovation within the market is subject to South Africa's prevailing sectoral financial regulation. Regulators have thus far decided not to specifically regulate fintechs beyond how they may fall within existing regulation, but reserve the right to do so in the future.

South Africa's financial regulators do not regulate specific technologies but rather focus on activities within financial services such as deposits, lending, advisory services, payments, etc. As such regulators are monitoring new technologies to understand the way in which they may impact the underlying economic activities, and will change or adapt regulations when deemed necessary. For example, the FSB has created draft amendments to the Financial

Advisors and Intermediary Services Act which recognises additional requirements on firms providing automated investment advice.

Although regulators do not have any dedicated structures for fintech engagement, such as innovation hubs or regulatory sandboxes, they have adopted an open door policy where they are willing to discuss the regulatory implications of fintech innovation with any interested parties. Regulators have also been actively monitoring fintech activity in the country since 2013 when an inter-governmental working group on fintech was established between National Treasury, the SARB, the FIC, and the FSB. The SARB later established an internal working group on virtual currencies and distributed ledger technologies which lead to the release of a virtual currencies position paper and has facilitated the SARB's participation in the South African Financial Blockchain Consortium.



Thus far this approach has been appropriate as the extent of fintech and digital innovation in South Africa has not been particularly disruptive to the underlying activities and risks present in the financial system. However, regulators have recognised that current regulatory arrangements may not provide a sufficiently supportive environment and hampers innovation. To address this, they are implementing a number of changes which signal a shift towards a more proactive regulatory stance.

The SARB for example has recently established a fintech unit within the bank with dedicated staff to actively investigate emerging technologies and their use cases in financial services. The SARB has indicated that this unit, together with the inter-governmental fintech working group, will determine the appropriate fintech regulatory framework in South Africa and take into consideration the experience and models of foreign central banks in establishing innovation hubs and

regulatory sandboxes.¹³⁹ As the FSB transitions into the Financial Services Conduct Authority under the Twin Peaks regulatory model, its strategy will be to focus on creating a forward-looking, proactive regulatory framework. Fintech and innovation have been identified as key areas for focus in the next three years.

This shift towards a proactive regulatory response to fintech will become increasingly important in the South African market for three reasons. Firstly, the current regulatory environment is comprehensive and complex with the potential to significantly stifle innovation. Adopting a more proactive regulatory stance will allow regulators to identify where this applies and to take remedial action. Secondly, fostering innovation in financial services through proactive regulation is important for South Africa's development, contributing to national objectives and preserving the country's status as a world-class financial hub. These first two

¹³⁹ Naidoo, (2017), SARB outlines fintech regulatory approach, *Moneyweb.co.za*

reasons are discussed in greater depth in the following sub-sections.

Lastly, the design of an appropriate regulatory framework need also reflect that as the pace of fintech and digital innovation increases, the emerging risks and opportunities associated with the use of technology in financial services will increase. Proactive regulation allows regulators to better identify and react to these risks and opportunities. The final section will investigate how a number of regulators globally are approaching this.

15.1 Current regulatory environment limiting innovation

South Africa has a comprehensive and wide-reaching regulatory framework. This is important to maintain the financial system's stability, protect consumers, and contribute to the sector's world class status. Participants in the system are covered by legislation that spans activities across the entire financial ecosystem, as shown in the diagram

on the following page. Without explicit guidance, fintechs find this regulatory network difficult to navigate. This is compounded by the fact that fintechs performing certain financial functions may be subject to multiple bodies of legislation overseen by a number of different regulators, also evidenced in the diagram on the following page. As a result, fintechs often have to resort to expensive legal and regulatory consulting services which acts as a major barrier to setting up operations, particularly given the difficulty in securing start-up funding.

These regulatory overlaps are driven by a lack of clarity regarding how new fintech business models – such as P2P lending, crowdfunding and digital payment innovations – fit into the existing regulatory framework. The lack of advanced guidance among regulators specifying how these new business models will be regulated creates uncertainty and requires fintech firms to either operate at risk of running foul of a number of existing

regulations, or to comply with unreasonable regulatory obligations that may not be matched to the level of risk they introduce. This is evidenced in the table on the following page.

This situation is worsened because workarounds to prevent a fintech business meeting the definition of one regulated financial activity often means that it would be

subject to another piece of financial regulation. Examples of P2P lending and crowdfunding illustrate how complex this landscape can be.

The National Credit Act governs all lending activities including credit and affordability checks as well as lending fees and interest rates. All credit providers as defined by the act must be registered. The act was amended to include any

Coverage of South Africa’s financial regulation

Banking Activity	Regulatory Implications	All activities are subject to:
Deposits	<ul style="list-style-type: none"> • Banks Act - governs deposit taking institutions and applies fairly onerous obligations concerning capital and liquidity ratios and reserve requirements. • Financial Advisory and Intermediary Services (FAIS) Act – governs insurance, investment and deposit taking FSPs that provide financial advice and intermediary services. The act enforces good conduct to guard consumers - governed institutions must provide customers with sufficient relevant and accurate information regarding product dynamics and their implications. • Any fintech considered a deposit taker may fall under these requirements. 	<p>Financial Intelligence Centre Act & Amendment Bill – The act governs KYC regulation to monitor money flows to prevent money laundering and the financing of terrorism and organised crime.</p>
Lending	<ul style="list-style-type: none"> • National Credit Act (NCA) – governs lending activities - all lending entities must register as a credit provider regardless of the value or volume of funds lent. As such all participants on a P2P platform will be required to register. • Banks Act - should a P2P platform register itself as the credit provider and agree to pay back lenders at a later stage, this may be considered deposit taking and the P2P platform may be subject to the requirements of the Banks Act 	<p>Consumer Protection Act – The act establishes the rights of consumers and the responsibilities of product and service providers. The structure of the act is similar to those observed in the EU.</p>
Capital Markets	<ul style="list-style-type: none"> • Collective Investment Schemes Control Act (CISCA) – governs investment products that pool the funds of different investors into a portfolio. Crowdfunding platforms serving as a portfolio investment vehicle may be subject to the act requiring licensing obligations under the FSB. • Financial Markets Act - governs capital market activities and institutions. A platform connecting buyers and sellers of equity may be considered an exchange and need to be licensed with the FSB. Licensing requirements are onerous and the application process does not guarantee the approval of a license. • Banks & FAIS Acts - crowdfunding activity could be understood as deposit-taking which falls within the Banks Act. The FAIS act may also apply if due diligence and risk rating services are interpreted as intermediary services. • Loan-based crowdfunding will face similar regulatory issues to lending. 	<p>Protection of Personal Information Act – The act codifies the manner in which organisations can source and use entities’ personal information.</p>
Investment Management	<ul style="list-style-type: none"> • FAIS Act - services are defined as financial advice when they guide decisions within a set of alternative financial products. The act is being amended to include additional requirements for robo-advisors. 	
Payments	<ul style="list-style-type: none"> • National Payments Systems Act (NPSA)– governs the settlement, clearing and payment services functions within the payment system. Participants are subject to varying degrees of regulation and PASA oversight depending on their function. • Banks Act - providers of digital wallets and e-money solutions may fall within the definition of deposit-taking and be subject to the requirements of the Banks Act. 	

Source: ICLG, (2017), *Fintech Regulation in South Africa*, ENSAfrica, ENSAfrica, (2017), *Fintech Regulation in South Africa – Seminar*; Clarke, (2016), *New Stock Exchanges Enter the South African Market*, SA Financial Markets Journal; FSB, (2008), *What Constitutes Advice in terms of the FAIS Act?*

entity that lends, regardless of the value or quantity of loans provided. By this definition, individual lenders on P2P platforms may be considered credit providers. This creates a heavy administrative burden for P2P platforms as registering each participant as a credit provider would be inefficient and costly.

Three work-around solutions exist, each with their own drawbacks. Firstly, the platform itself registers as a credit provider and pools resources from individuals to on-lend to borrowers. The platform guarantees the return of these funds in addition to a premium at a later date. In this situation, the platform is performing a deposit taking and intermediating function and could be construed as undertaking the business of a bank, requiring a banking license. The second solution structures the platform to serve as a point for which individuals pool their funds for investment through the purchase of individual debt. This structure may be subject to the

Collective Investment Schemes Control Act (CISCA). Finally, platforms can funnel lenders' funds towards businesses with an annual turnover or asset value in excess of R1 million. Individuals that lend to these companies are exempt from registering as credit providers.

However, this removes the platform's ability to finance individuals and start-ups, seriously limiting P2P lending's contribution to consumer and small business credit.¹⁴⁰

Loan-based crowdfunding would be subject to a similar regulatory dilemma. Investment-based crowdfunding (offering investors equity or securitized debt) may be construed as falling under the activity of a number of additional regulations. If the platform's due diligence and risk-rating services are interpreted as an intermediary service connecting investors and entrepreneurs, the platform may be subject to the Financial Advisory and Intermediary Services Act.

¹⁴⁰ Timm, (20 June 2017), Consumer lending has dropped to 'almost zero' under new regulation – Rainfin CEO, *Ventureburn.com*

Additionally, if the act of connecting the buyers and issuers of securities together are considered to meet the definition of an over-the-counter exchange, the platform would be required under the Financial Markets Act to obtain a license as a registered exchange. By restructuring the platform as an investment vehicle, the platform would fall under CISCA. Furthermore, any startup raising capital on the platform may be considered as making a public equity offering, requiring compliance with the Companies Act which governs public companies and IPOs.¹⁴¹

These examples illustrate how daunting the currently regulatory environment can be for a fintech innovator. Proactive regulators can address this problem in two ways. The first is setting up dedicated structures within regulatory bodies that provide pragmatic guidance on how existing regulation can be navigated. The second is to alter the existing regulatory framework to

provide exemptions, lighter regulatory obligations or bespoke items of legislation that provide a clearer governance framework for new fintech business models. These options have been deployed by a number of regulators in other markets. The UK has a highly developed P2P lending market with several large lending platforms. The FCA requires that lending platforms be registered and comply with standard prudential rules.¹⁴² These platforms must additionally conform to specific crowdfunding requirements detailing certain minimum standards: capital requirements; consumer access to information, and; the consumer right to withdraw, amongst others.¹⁴³ This strategy has brought these institutions under a legitimate regulatory framework, allowing them to operate with clear regulatory guidelines and providing consumers with confidence

The ASIC in Australia introduced the Corporations

¹⁴¹ AlphaCode, (nd), The Realities of Crowdfunding in South Africa, *www.alphacode.club*

¹⁴² Clarke, C. & Rogers, C. (2017), 'Socially Useful' finance and the regulation of peer-to-peer lending in the United Kingdom

¹⁴³ Lending-Works, (nd), *FCA Regulation of the peer-to-peer Lending Industry*

Amendment (Crowd-sourced Funding) Act to provide regulatory oversight for crowd-funding platforms.¹⁴⁴ These platforms require an Australian Financial Services license to operate and must sufficiently vet offering companies. The Act has furthermore introduced upper bounds on the amount each investor is permitted to invest.

15.2 Contributing to national objectives

Innovation in financial services can play an important role in South Africa's development. In the National Treasury's 2017 budget review, fintech is listed as one of the factors that can support the country's objectives of having a transformed and transformative financial sector.¹⁴⁵ Encouraging innovation in the financial system has the potential to improve efficiency among providers, decrease costs in the market, and improve access to more sophisticated financial services among mass market consumers.

Innovation is also important for South Africa to maintain its status as a world-class financial sector and established financial hub for Africa, a status which contributes to the sector's growth and employment potential.

The regulatory and broader business environment is an important determinant of an innovators' decision of where to locate their operations. Without an adequately supportive regulatory environment for fintech and digital innovation, South Africa may see limited appetite to invest and innovate within the sector. This runs the risk of innovation in other markets outstripping the pace of innovation in South Africa. Larger South African banks, particularly those who already have operations in other jurisdictions, may decide to move innovation hubs to more developed markets like the UK where they are able to get more regulatory support and test new technology. This practice could result in key

¹⁴⁴ Australian Government, (2017), *Corporations Amendment (Crowd-sourced Funding) Act 2017*

¹⁴⁵ National Treasury, (2017), A financial sector that serves all South Africans, *Budget Review 2017*



skills and funding for innovation leaving the country.

Moving towards a more proactive regulatory approach to fintech and digital innovation would likely see increased confidence in the sector, attracting more funding and improving the availability of skills. It could also position South Africa as a favourable destination for regional fintech investment. As an established financial centre for Africa, there is potential to develop South Africa into a regional hub for fintech development. A number of South African fintechs are operating in other African markets, some exclusively so, and providing regulatory support and incentives could see other African banks and fintechs establishing themselves in South Africa to take advantage of these opportunities.

Proactive regulatory tools like innovation hubs and regulatory sandboxes also provide regulators with an additional means of achieving national objectives through the use of entry requirements. The UK FCA's regulatory sandbox, for example, is only open to firms that can demonstrate their innovation has a clear consumer benefit. If regulators in South Africa established similar structures they would be useful to encourage innovation that meets the regulatory mandate and national objectives of the country, such as transformation and deepening financial inclusion. South Africa can also benefit from a "late mover" advantage in implementing these tools by learning from the experiences of other regulators and adapting proactive regulatory tools to the South African context.

16 Regulating for emerging risks and opportunities

As the adoption of fintech and digital innovation increases, a more proactive regulatory approach will allow regulators to better monitor and address the risks associated with the use of technology in financial services. It also allows regulators to envisage the opportunities that digital disruption presents going forward and to be proactive in crafting regulation now, that brings those opportunities into being.

Cyber security

The severity of cyber threats within the financial services sector requires a holistic approach among regulators that extends beyond financial institution supervision towards developing a sound cyber security support industry. This includes ensuring the quality of cyber security service providers, the availability of cyber security skills, and facilitating information sharing on cyber-attacks and trends.

Regulators in the UK have made a concerted effort to develop the country's cyber security capabilities including stimulating cyber security innovation, developing certification standards for service providers and fostering information sharing within the industry. In response to the need for accurate penetration testing the UK Treasury, Bank of England and FCA developed CBEST – a network of threat intelligence providers and penetration testing providers specifically designed to provide bespoke, intelligence-led cyber security tests for UK banks. The partnership of threat intelligence analysts and cyber security test providers means that the security testing simulates the latest tools, techniques and practices used by sophisticated cyber criminals targeting the financial sector. This is critical as the accuracy of cyber resilience testing is strongly linked to the real-world threat faced by banks – whether they are being targeted by

nation states, activists, or crime syndicates – and penetration testing should reflect this.

CBEST's success is based on the partnership between regulators and the Council of Registered Ethical Security Testers (CREST) which provides an accreditation and certification programme for penetration testing and threat intelligence providers. CREST has developed a specific accreditation for these providers for the financial sector, meaning banks are provided with a guarantee of quality and safety when dealing with sensitive and critical systems. The reports developed as a result of CREST testing are owned by both the financial service provider and the regulators which provides regulators with constant oversight on both the nature of cyber threats in the financial system and the preparedness of financial institutions to deal with these threats.

The UK government is also investing a large amount in developing an innovative and well-

resourced security industry in recognition of the increasing pace of cyber-attack innovation. The Government Communications Headquarters (GCHQ) – an intelligence and security agency of the government – has established a cyber innovation centre where seven cyber security start-ups have already graduated from their cyber accelerator programme. The GCHQ also opened a National Cyber Security Centre in London which will work with the Bank of England to provide advice to financial institutions on cyber security threats.

The UK government is now planning to launch a cyber security innovation hub in London which will bring together large firms to work hand-in-hand with innovative startups and industry experts to develop new cyber security technologies that businesses in the UK need in order to protect themselves. The hub will provide start-ups with access to expert technical monitoring, advice and business support to help them grow.



In addition, the government has developed a cybersecurity skills training programme for 14-17 year olds and is piloting a similar programme to identify and train talented undergrads.

Regulators in South Africa have highlighted the importance of cybersecurity and are investigating the cyber resilience of financial institutions as part of their supervision activities. However, the ability for financial service providers to adequately defend themselves is constrained by a shortage of cyber security skills and access to up-to-date cyber threat intelligence and trusted resilience testing service providers locally. Proactive regulatory engagement goes beyond supervision to actively developing the financial sector's resilience and ability to protect itself from emerging risks.

Technology failure

As financial service providers make increasing use of technology in their operations, regulators have to keep a close watch on how they manage the

risk of technology failure. Regulators are increasingly viewing technology and IT failure as a systemic risk with the potential to impact consumer trust in the financial system. This was evidenced during the 2007 financial crisis by the run on Northern Rock where the immediate cause of the run was not the bank running out of cash but inadequate server capacity as desperate customers were unable to withdraw money online. As financial service providers' IT systems become more complex and integrated with new and untested technologies, this risk to the system will continue to increase and require regulatory attention. Furthermore, the outsourcing of key technology functions within financial service providers may present a concentration risk if one of the technology vendors commonly used by financial institutions fails.

Beyond the adequate supervision of financial institutions covering the governance, resilience and testing of IT systems and technology, proactive regulators have been providing advanced guidance

on how new technology may or may not be applied by financial service providers.

For example, the US Securities Exchange Commission adapted its investor protection framework of the Investment Advisors Act to include robo-advisors after forming a fintech working group to focus on automated investment advice. In 2017 the SEC published guidelines that identify three broad regulatory issues of robo-advisors – disclosure, suitability, and effective compliance – and provides guidance on how financial service providers can address them.

Also in the US, the Commodity Futures Trading Commission has proposed a set of rules governing algorithmic trading which includes codifying risk controls already in place, setting registration requirements, and potentially compelling firms to hand over their source code if requested. The rules are currently being debated with industry but represent significant management of the practice.

The application of distributed ledger technology remains in the proof of concept phase and most regulators have therefore not felt the need to explicitly regulate its uses yet. However, the UK FCA has released a position paper detailing its understanding of DLT use cases and what its regulatory implications could be once the technology reaches maturity.

Providing this guidance gives technology adopters confidence that the use of new technology will not run foul of existing regulation, and ensures that new technologies do not contribute unnecessarily to risks in the financial system.

Beyond covering IT and technology risk as part of financial institution supervision, regulators in South Africa have not been as proactive in providing advanced guidelines and principles on emerging technologies within financial services. The FSB has released draft amendments to the Financial Advisors and Intermediary Services Act (FAIS) covering additional requirements for FSPs

providing automated advice. The SARB has been relatively active in investigating the regulatory implications of DLT applications in the country and the possibility of regulating crypto-currencies. With the move towards creating dedicated fintech teams within these regulators, however, there may be more scope for regulators investigating new technologies and their impact on the financial system.

Data sharing

The digital revolution has drastically increased the volume of data being generated, the ease of transporting it across distances, and our ability to store, process and make meaning out of it. While this is allowing financial service providers to offer more customised, efficient and valuable products and services to customers, it generates significant risk as individual's personal information is exposed. Regulators therefore have a difficult job of making sure that data is shared among stakeholder in the financial system to promote innovation and efficiency while

protecting individual's right to privacy at the same time.

One controversial area where this is playing out is regulators mandating banks to share their customer data, with the customer's permission, with third parties to stimulate innovation and competition. With the emergence of digital technology the ability to create value from this data has increased exponentially and there are an increasing number of non-bank players interested in using this data to improve consumer's ability to manage their financial lives. This includes price comparison platforms for financial services as well as apps that provide individuals with a full view of their financial portfolio and advice on how it should be managed.

Regulators in the EU and UK have been the most proactive in promoting this kind of data sharing by mandating banks to share data with third parties using technological tools such as APIs. Other regulators are now looking to take similar action – the Consumer Financial Protection Bureau (CFPB) in the US recently

issued a request for information from banks, fintechs and data aggregators to determine how consumer data is being obtained, maintained and used. The CFPB is of the opinion that banks should be opening their data to third parties and that it has the ability to force banks to adopt open APIs to do so.

A broader issue of data sharing that extends beyond financial regulation relates to digital identity. Financial institutions are obliged to meet a high standard for identity verification when opening accounts for customers as a result of anti-money laundering and counter-terrorism financing regulations. As such there is increasing attention being paid to the role that financial institutions can play as the creator and administrator of an individual's digital identity using the personal and financial data they collect from their customers.

For example, the UK government's Verify project provides citizens with a single, consistent way

to prove their identity when logging in to a range of government services using external trusted parties. The project adopts a federated approach to digital identity by establishing a variety of non-government identity providers (one of which is a bank) that confirm an individual's identity using a variety of data sources and provides them with a digital identity they can use to access government services. The project is currently considering what role banks can play more generally by providing data that other identity providers can use to verify an individual's identity.¹⁴⁶ This includes bank account and credit card account ownership verification, knowledge-based verification based on banking transactions, and confirmation that a bank user is active over time.

In both cases of data sharing discussed above, regulators and policy makers have been proactive in conceptualising the great value that financial data can create in a digital ecosystem – and using regulation and engagement with the industry to

¹⁴⁶ Open Identity Exchange, (2015), *The use of bank data for identity verification*

realise this value. Financial regulators in South Africa have not yet shown any indication that they will be mandating data sharing among banks. While South Africa's national identity system has been "digitized" with the introduction of SmartID cards, this only involved banks by making use of their branch networks as access and distribution points and remains a centrally-issued form of digital identity. Federated identity verification models are only starting to be developed in the private sector and are not being used within public services.

Consumer protection

A number of market conduct issues are amplified by the provision of digital and innovative financial services. These include adequately disclosing key information, terms and conditions through digital channels, fraud and miss-selling of new forms of financial products, and access to complaint handling and

redress mechanisms among fintech start-ups.

Fraud and miss-selling is particularly problematic for emerging fintech businesses that consumers are not familiar with such as crowdfunding, P2P lending and cryptocurrencies. This is particularly so as digital businesses are able to scale quickly, attracting a large volume of customers. A notable example is the largest Chinese P2P lending platform Ezubao which collected 50 billion Yuan (\$7.6 billion) in less than two years. Investigations revealed that top executives of the platform operated the company as a Ponzi Scheme with fake investment opportunities.¹⁴⁷

More generally, technology is changing the way consumers interact with the financial system – confronting them directly with problematic market practices online or via mobile, encouraging risky behaviour, or playing on people's personal biases. Behavioural economics has shown how people are

¹⁴⁷ Gough, (2016), Online lender Ezubao Took \$7.6 Billion in Ponzi Scheme, China Says, *Nytimes.com*

responsive to the way information is presented and the digital provision of financial services can exploit this – encouraging impulsive single-click purchases and playing on inherent human biases like short-termism, self-control problems and herd behaviour.¹⁴⁸

Consumer education is therefore a critical component of consumer protection in the digital age and market conduct regulators need to understand how consumers behave and interact with financial service innovations. Proactive regulators can benefit significantly from regulatory and industry sandboxes in this regard. As discussed, the UK FCA’s regulatory sandbox specifically addresses issues of consumer benefit and protection and allows regulators and fintechs to test and learn how consumers engage with new types of financial service provision. The US Consumer Financial Protection Bureau’s *Project Catalyst* provides another example outside the

regulatory sandbox model – the project encourages and facilitates consumer-friendly innovation and allows the Bureau to monitor emerging consumer protection trends.

South Africa’s market conduct regulation is led by the FSB, the National Credit Regulator and the National Consumer Commission. This regulation will be consolidated once the country’s Twin Peaks regulatory framework, created by the Financial Sector Regulation Act (FSRA), has been implemented in 2017. Twin peaks will see the FSB dissolving and a dedicated market conduct regulator being created. The market conduct regulator will enforce the Treating Customers Fairly mandate – an outcome based regulatory approach that ensures that financial services firms service their customers in a fair manner. This seeks to prevent abusive practices such as misleading marketing, delayed pay-outs, opaque policies and high or

¹⁴⁸ OECD, (2017), *G20/OECD INFE Report on ensuring financial education and consumer protection for all in the digital age*

incomprehensible fees.^{149,150} The mandate empowers the regulator to oversee and influence the entire financial service product lifecycle from design to post-sales.

The FSRA also calls for an activities-based approach to regulation which will allow regulators to apply financial market conduct regulation to any entity providing financial services, even if it not a formal financial service provider. Once the market conduct authority

has been established it will have six months to publish its strategy which will be aided by the consolidation of all financial market conduct regulation in the Conduct of Financial Institutions Bill. This will assist the regulator in addressing any regulatory oversight gaps and ensuring that traditional and innovative models of providing financial services are subject to the requisite consumer protection checks.

¹⁴⁹ National Treasury, (2014), *Treating Customers Fairly in the Financial Sector: A Draft Market Conduct Policy Framework for South Africa*

¹⁵⁰ PWC, (2011), *Treating Customers Fairly – What to Expect*



Conclusion

South Africa's financial sector consistently ranks amongst the most robust and sophisticated in the world. With a high proportion of the adult population formally banked and rising adoption of smartphones across the market, the potential for digital disruption is significant.

Encouraging digital innovation through fintech is important because of the significant benefits it can bring. Fintech has the potential to increase access to financial services through digital channels and the use of alternative scoring models. The use of digital infrastructure lowers barriers to entry and can introduce competition to the market, reducing the cost of financial services. Technology has the capacity to improve the customer experience by offering continuous and convenient services with fast execution and highly personalised service offerings. Ultimately these benefits lead to broader social objectives as a wider

selection of financial products and services caters to broader segments of the market and lower-income individuals and SMEs have improved access to finance.

South Africa's fintech industry is small but growing. Local start-ups dominate the African Fintech Top 100 Awards and a handful have been recognised internationally. However, this growth is being impeded by a number of factors. South Africa's funding does not favour high-risk start-ups and there is a general shortage of entrepreneurial skills. The necessary skills for the development of sophisticated financial technologies are also in short supply, although this is not unique to South Africa. The country's comprehensive regulatory framework does not provide exemptions for smaller financial service providers and start-ups are therefore subject to stringent and costly regulatory requirements.

Unlike other African countries, South African fintechs are competing in a highly banked market with sophisticated banking infrastructure. However, the South African population scores poorly when it comes to financial literacy rates and income inequality means the vast majority lack the resources to take advantage of more complex financial services products or solutions that are available using smart phones and more advanced digital devices that require more data to run.

South Africa's fintech industry has therefore not been as disruptive to the structure of the financial market as has been seen in other countries. The bulk of innovation has been concentrated in the payments space increasing the efficiencies of card and online payment channels. With a few exceptions in the alternative lending space, much of the innovation thus far has originated from within banks or through bank/fintech collaboration rather than through standalone fintech businesses. Furthermore, the

focus of innovation within banks has largely been on digitizing existing services rather than generating new revenue streams.

Much of the impact of digital disruption is therefore being felt by incumbent financial institutions transforming their operations. South African banks are increasingly seeing digital as a way to become customer-centric organisations. Digital strategies are becoming business as usual and encompass the digitisation of customer-facing channels and back-office processes. Process automation is allowing banks to free up employees from time consuming administrative tasks, improving the quality of back-office operations, and streamline workflows and processes. Advanced technologies like AI in conjunction with real-time data flows are enabling the personalization of services and more modern IT infrastructure provides banks with agility and the potential to collaborate with fintechs and other third party service providers within a digital ecosystem.



The pace of technological innovation in the fourth industrial revolution means that this digital disruption will continue to evolve quickly, introducing change to the structure of the financial market. This report has detailed how this infusion of technology into financial services is presenting new risks to consumers and to the integrity of the financial system. By no means an exhaustive list, the risks of cyber security, technology failure, data integrity and privacy and increasing degrees of collaboration identified in this report are some of the biggest going forward.

Regulators therefore have the difficult position of protecting the system from these risks while allowing innovation to drive the industry forward. The regulatory approach taken in South Africa has thus far been reactive – fintech business models have to comply with South Africa’s extensive regulatory framework and regulators have been slow to adapt this to cater to new innovative providers. As such South Africa’s financial sector has been well

protected and consumers have largely been shielded from the destabilising and disruptive impact fintech can have on the financial system.

However, this approach has not focused on encouraging innovation to grow a dynamic sector that generates positive outcomes for consumers. Regulators in other markets have adopted a more proactive approach to capture the benefits fintech can provide and ensure that the regulatory framework keeps up-to-date with the latest technological innovations. This approach has included the use of tools like innovation hubs, regulatory sandboxes and international cooperation agreements to directly promote the growth of the fintech industry. In some cases, it has included advanced guidance on the use of new technologies in financial services and the crafting of fintech regulatory regimes to provide clarity on how innovative providers will be subject to regulation. It has also included the use of regulation to stimulate innovation among forward-



looking regulators that envisage how financial services will evolve in the future, such as the open banking regulations in the UK and EU.

Not supporting financial innovation would be a missed opportunity for South Africa. A thriving local fintech industry and innovative financial sector has the potential to contribute to employment and improve access to a sophisticated suite of financial services among a broader set of consumers. Regulators in South Africa have already indicated interest in shifting to a more proactive regulatory stance. This will assist regulators to direct the benefits of innovation to contribute toward national objectives.

However, financial regulators can only do so much to “future proof” the industry against the changes the fourth industrial revolution brings. Much of how the transformation of

production and consumption will play out rests on the state of the broader digital ecosystem.

Policymakers should consider investments in broad digital infrastructure to ensure access to high speed internet and affordable mobile data as well as the access to affordable and reliable electricity which underpins this. Developing the skillsets required by employees in this new world of work will be a critical requirement to South Africa keeping value-creation from technological innovation within the country. In the case of financial services this must combine technological skills with entrepreneurial skills so that individuals can convert technological innovation into viable business opportunities. Consumers also need to be up-skilled in terms of both digital and financial literacy to ensure that digital innovation can benefit the many rather than the few.



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