

Horizon Scanning Series

The Effective and Ethical Development of Artificial Intelligence: An Opportunity to Improve Our Wellbeing

FinTech

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CASE STUDY: AI FinTech in New Zealand Financial Services

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Introduction

Technology is creating change in pursuit of simplicity, efficiency, better services, competition (between nations and businesses) and social well-being. Artificial intelligence (AI) is a leading agent of technological change. This paper tells the story of AI; its relationship to 'digital', the evolution of FinTech and the re-shaping of lending and payments, through to how AI FinTech has been adopted by banks. The paper calls out barriers to AI adoption, balanced by AI opportunities, before concluding with AI considerations on the horizon for New Zealand Financial Services.

AI and Digital Ready New Zealand

Today, AI is more widely proliferated than most people realise. If we consider a cycle, Digital progression creates more data, giving more insight to AI, and AI further enables digitisation. New Zealand is a well-equipped member of the Digital Planet, as evidenced in the Tufts University Digital Evolution Index, where New Zealand is listed as a 'stand-out' country'. The Digital Evolution Index traces the emergence of a 'digital planet' – how physical interactions, social and political exchange, commerce, media and entertainment – are being displaced by digitally mediated onesⁱ. The Technology Industry Association of New Zealand (NZ Tech) has supported the establishment of two enabling associations; FinTech New Zealand (NZ), and the AI Forum of New Zealand (AIFNZ). The New Zealand Government is a member of the D7 Group of Digital Nationsⁱⁱ. As at March 2018, the AIFNZ identified over 100 AI companies in New Zealandⁱⁱⁱ. New Zealand is technologically savvy and digitally progressive.

Evolving FinTech and Banks in New Zealand

FinTech is an abbreviation for Financial Technology, and has been consumed by financial service providers for decades in ways most people may take for granted. Examples of adoption are plentiful – credit cards, Automatic Teller Machines (ATMs), the Society for Worldwide Financial Telecommunication (SWIFT), electronic trading, mainframes, online banking, applications and

mobile wallets. Adoption of technology is a habit for New Zealand banks. The four largest banks, ANZ New Zealand, Westpac, BNZ and ASB have national history reaching back to the 1840s.

Adoption of FinTech has seen the banks not just remain relevant, but thrive. As at April 2018 New Zealand has 26 registered banks^{iv} contributing to New Zealand's financial services sector, a sector which (combined with insurance) is a significant player in New Zealand's economy, contributing \$13.4 billion to GDP in the year ending March 2017^v. At the period ended March 2016, Figure.nz, using New Zealand Government data, registered the Financial and Insurance services as the 6th largest contributor to GDP^{vi}. The Reserve Bank of New Zealand noted a combined after-tax income in the year to December 31, 2017 of \$4.9 billion across the four big banks – an increase of 75 per cent on the group's combined after tax profit ten years earlier, a growth rate much higher than that achieved by New Zealand GDP for the same period^{vii}. Adoption of technology continues to enable banks.

FinTech has evolved into an industry in its own right. FinTech of the past 5 – 10 years is not automatically consumable for, or designed for use of financial service incumbents. Instead, a number of challenger FinTech companies are arriving, eroding traditional services and creating new market places, thriving on new technologies and innovative approaches to traditional products and services. Competition exists in new, disruptive ways, as do newly formed unconventional and previously untapped eco-systems. The consolidated focus and support of FinTech NZ, establishment of Innovation hubs (such as Auckland Council's \$30 million innovation hub at Wynyard Quarter^{viii}), and development of incubators and FinTech Accelerators sponsored by Kiwibank^{ix} and Lighting Labs^x are nourishing a creative and productive set of next-generation companies which have internationally viable products and services. Xero, a cloud-based accounting software company, listed in KPMG's Top100 global FinTech innovators for 2017^{xi}, is using Machine Learning to automate accounting administration, and is an excellent example of exported New Zealand FinTech.

AI FinTech Re-Shaping Lending and Payments

New ways of conducting lending and payments have been created. Harmony, a New Zealand FinTech which facilitates digital peer-to-peer (P2) lending, has created its own digital marketplace of 15,000 members while using AI to increase the accuracy of credit risk predictive models and to decrease the time required to deploy predictive models (from 12 to 16 weeks, to minutes)^{xii}. ANZ New Zealand and BNZ have embraced potential disruption in payments by forming enabling

partnerships. ANZ New Zealand with ApplePay in 2016 (payments occur by swiping iPhones, Apple Watches or iPads over contactless terminals)^{xiii} and BNZ with Alipay in 2018 (offering a digital wallet allowing people to conduct transactions directly from their mobile phones^{xiv}). Alipay, owned by Chinese e-commerce giant Alibaba, is the parent company of the hugely successful and AI-fuelled Chinese Digital Bank – Ant Financial^{xv}. New ways of conducting lending and payments are giving New Zealand consumers more choice.

AI FinTech Adoption within New Zealand Banks

As FinTech grows, people have more choice about how they conduct their financial lives. Value can be acquired via distributed or centralised financial services. Most FinTech companies specialise in the provision of specific services. Banks have evolved their function of taking deposits and facilitating loans into sophisticated services across business types, industries and sectors. If a customer were to shift patronage from a bank they would likely need to create distributed financial relationships, where as a bank remains a trusted centralised means of financial management - regulated and accountable. Adoption of AI FinTech, particularly by New Zealand's Big Four, is providing customers the sophistication of FinTech with the assurance of a trusted and centralised provider. AI adoption by incumbents can be grouped into two categories:

1. *Enrichment of the customer experience.* Immersive experience and personalised customer interaction when, how and where people want. Tailoring of this nature is likely to assist customer attraction and retention.
2. *Efficiency and accuracy of a bank's core business.* Simplifying the many processes an incumbent uses to create transparency and accountability for assurance. More precise management of risk, be it capital, market or operational, helps incumbents balance diverse sources of risk for careful management of the bank's business.

AI adoption for the enrichment of the customer experience is well illustrated by ANZ New Zealand's July 2018 launch of "Jamie", a Digital Banking Assistant designed to answer 30 of the Bank's most frequently asked 'Help' questions^{xvi}. Jamie can interact via video or text and is publicly accessible on anz.co.nz. Similarly, in March ASB announced a Digital Assistant named "Josie", who helps New Zealanders in the early stage of setting up a business and is based at ASB's premises in Auckland, accessible via appointment^{xvii}. Westpac has released "Wes", the publicly available chatbot (text only) accessible via Westpac's website^{xviii}. BNZ has created two instances of chat bots – one for their

internal helpdesk, and another built in Microsoft Azure which is being trialled for KiwiSaver customers^{xix}. More insight is useful for personalising the customer experience; ASB has established AI powered ‘Connected Customer Conversations’ a multi-channel automated marketing program that aims to deliver timely and targeted customer conversations at scale^{xx}.

For the efficiency and accuracy of core business, including risk management, BNZ has partnered with Intel, using the Saffron Anti-Money Laundering Advisor^{xxi}. Westpac has adopted ACI’s Up Payments Risk Management Solution, which uses adaptive machine learning. Balancing personalisation with risk management, ANZ uses voice biometrics, powered by AI, to identify a person using the characteristics of their speech while being designed to improve security on mobile devices^{xxii}.

Acknowledging the sophistication of these AI use cases, it is not uncommon for incumbent financial service providers to operate technology landscapes splicing cutting edge with heritage, reflecting organisational legacy, commonly through mergers and acquisitions.

Barriers to AI Adoption

New Zealand has a strong digital economy, and is adopting AI rapidly in Financial Services, but there are constraints, and these apply across industries. AI has reached the “Peak of Inflated Expectations” in Gartner’s Emerging Technology Hype Cycle^{xxiii} and is transitioning from emergence to broad usage. To be adopted at scale, proliferating products, services and experiences, AI must be made accessible and explainable. Having been birthed conceptually in 1950 by Alan Turing, AI has had time to dwell in science fiction and pop culture. Grounding popular notions and awareness in AI facts is an important step to adoption, busting myths along the way. Particularly, emphasising AI’s narrow (or weak AI) capability – AI is very good at specific tasks, not general ones which more closely replicate the breadth of human abilities. After making AI accessible and explainable comes the need to demonstrate fairness, transparency and accountability in AI – in learning algorithms, in contextual usage and in consequences. The ethics of AI require continued consideration. The World Economic Forum succinctly lists AI ethical issues for people and the application of AI^{xxiv} which are not yet comprehensively resolved – all of which are likely to apply to Financial Services, and to New Zealand. Copyright law in New Zealand places restrictions on text and data mining technologies which frequently support automated searches to identify patterns, trends and other information^{xxv}.

Quality and comprehensive datasets are required, in an accessible and useable format for learning algorithms^{xxvi}. Data in raw form is often dispersed, unlinked and of inconsistent quality. This creates

difficulties when attempting to apply learning algorithms and a barrier to entry for AI adoption. Many learning algorithms are publicly available removing the strain of problem solving or engineering datasets at scale. Computing power is required to process massive data sets at pace, usually with multiple instances i.e. Training, Development and Test sets of data. Cloud can provide processing power and elasticity of environment. Skills and role types are evolving and new roles are being created to support and extend the development of AI, but demand is outstripping skill set availability. Tertiary providers in New Zealand are rapidly growing AI research and learning capabilities, as can be seen at the University of Auckland, AUT, Victoria University of Wellington and the University of Canterbury. Massive Open Online Courses (MOOCs) are readily available, as are free learning resources from Amazon (Web Services), Google, and Microsoft, paving the way for self-directed learning and reskilling. Organisations may manage the aforementioned hurdles but fail to turn potential into practical benefit by confusing AI's benefit. AI is a tool (a means), not an end in itself. Specifically, financial service providers will need to be clear on the utility of the AI use case based on customer needs and organisational goals – rather than adopting AI for the sake of being able to say they use AI.

What to Expect

Acknowledging issues identified, a raft of opportunity awaits AI in Financial Services in New Zealand. A large enough sub-group of New Zealanders are quick adopters of technology so as to enable a range of new AI-powered financial service trials and offerings. While not on the scale of Silicon Valley, venture capital and other funding sources are available to support FinTech ventures and innovation. Foreseeable instances of AI we can expect in New Zealand include AI-powered trading, already well established in the US, robo advisors, sentiment analysis, use of facial recognition in smart branches, more bots either as avatars or text based interactors (within organisations and customer-facing). We can also expect to see the growth of AI-integrated systems designed for organisational efficiency, and prediction to enable financial services to understand better what the next best action may be.

On the Horizon

New Zealand financial services will need to ready themselves for disruption through partnerships of depth and breadth, and by fostering innovation coupled with the discipline to see ideas practically

realised. Keeping pace with aggregated change will in itself become a success criterion, demanding organisations be 'Learning Organisations', continually improving and adapting.

Countries thriving in AI FinTech are commonly nurtured and enabled by regulators through sandboxed initiatives (Hong Kong)^{xxvii}, grant schemes (Singapore^{xxviii}), investment in strategy and internal 'readiness' (Canada^{xxix}) including formation of a 'national (AI) team' (China^{xxx}). Finding a way to turn the 'burden' of compliance into a boon could support financial service incumbents – compliance being a source of Trust. A challenge for the New Zealand community is continued innovative collaboration in a multi-stakeholder environment – a challenge the AIFNZ is well positioned to facilitate.

New Zealand remains somewhat sheltered having experienced no disruptive financial service competition or whole of business influencing partnerships from global technology giants – US (Google, Apple, Facebook, Microsoft and Amazon (GAFMA)) or Chinese (Baidu, Alibaba and Tencent (BATX)) – with their massive AI-powered technological capabilities. Certainly, the growth of Messenger apps as payment providers is a factor to monitor, owing to the high volume of active users maintained by global market leaders, the highly trusted relationship as private conversations are shared, and dopamine hits people receive as they send and receive messages.

Incorporating fairness, transparency and accountability of systems utilising emerging technology is essential, as is good conduct, ethics, and a healthy culture amongst those administering financial services and products. Trust must be maintained. Fairness issues can arise from biased or unrepresentative datasets and correcting them can be challenging as there is no consensus view on what constitutes a fair AI system, and a system that is fair in one context may not be in another. Presently, there is more agreement on what is unfair, rather than what is fair.

Final Remarks

Considering the pace and range of changes generated by AI, it is possible within five – ten years financial customers in New Zealand could be talking with their own personal digital humans whenever they want, how they want receiving more aggregated insights about their financial health, where they want. Organisations may be able to manage risk with pinpoint accuracy and complete transparency from executive decision to originating data sources (and algorithmic processing). Certainly, the further AI advances, the clearer the demand for human-centred design becomes, and for the careful consideration of what is possible, profitable and permissible.

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