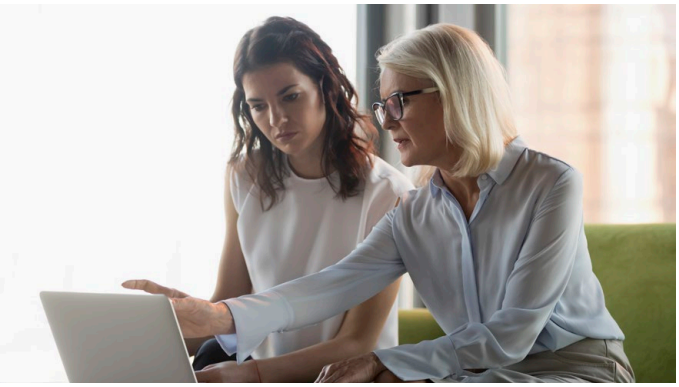
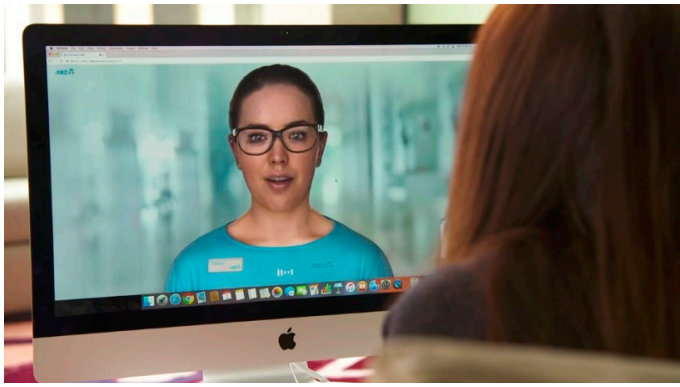
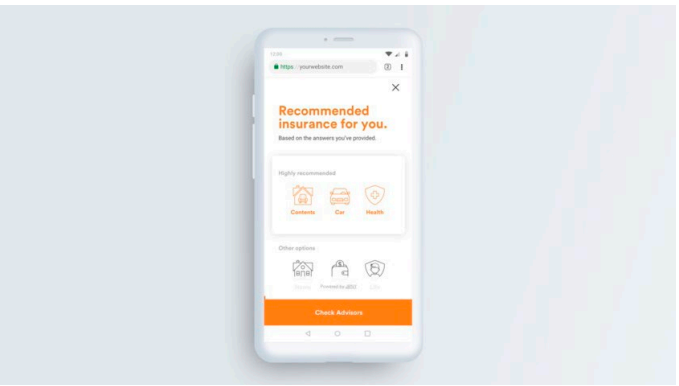
Artificial Intelligence for Financial and Insurance Services in New Zealand

Ahumoni me te Inihua i te Atamai Iahiko







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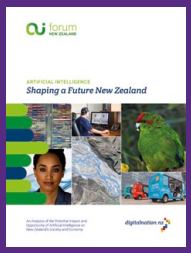
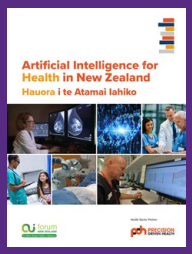


ARTIFICIAL INTELLIGENCE
Shaping a Future New Zealand
(May 2018)

This report examines the New Zealand and international AI industry landscapes, investigating AI's potential impacts on New Zealand's economy and society. The report identifies key AI opportunities, in the public, private and education sectors, that New Zealand can invest in to actively shape the effects on our collective future.



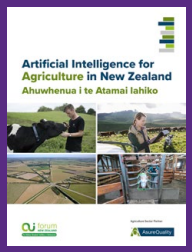
ARTIFICIAL INTELLIGENCE FOR HEALTH IN NEW ZEALAND
Hauora i te Atamai Iahiko
(October 2019)

The AI Forum's latest research report describes how AI promises to bring significant clinical, workforce and cost benefits to the health sector, as well as personalise medical care. It can help with predicting disease and injury; and mine vast quantities of literature for research insights.

TOWARDS OUR INTELLIGENT FUTURE
An AI Roadmap for New Zealand

TE ARA MŌ TĀTOU ATAMAI O ĀPŌPŌ
Te Huarahi Atamai Iahiko ō Aotearoa
(September 2019)

This report identifies that New Zealand urgently needs to increase its focus on the core foundations needed to operate in an AI enabled future – particularly investment, skills and talent, research, trusted data, ethics and regulation.
The report also shows how AI enabled solutions can be used to improve New Zealand's wellbeing, productivity and sustainability.



ARTIFICIAL INTELLIGENCE FOR AGRICULTURE IN NEW ZEALAND
Ahuwhenua i te Atamai Iahiko
(October 2019)

This report examines the New Zealand and international AI industry landscapes for agriculture and investigates AI's potential impacts for New Zealand's place in the global food value chain.

Download our reports at
https://aiforum.org.nz/our-work/publications/

About the AI Forum of New Zealand

THE ARTIFICIAL INTELLIGENCE FORUM OF NEW ZEALAND IS A NON-GOVERNMENT ASSOCIATION WITH A MISSION TO HARNESS THE POTENTIAL OF ARTIFICIAL INTELLIGENCE (AI) TO HELP BRING ABOUT A PROSPEROUS AND INCLUSIVE FUTURE NEW ZEALAND.

The rapid development of AI technologies presents major opportunities and challenges for our country: from creating world leading AI businesses, nurturing a pool of talented AI engineers and applying AI technologies to our agriculture, government, manufacturing and service industries to holding a meaningful national debate on the broader implications for society, New Zealand needs to actively engage with AI now in order to secure our future prosperity.

The Forum brings together citizens, business, academia and the government to connect, promote and advance the AI ecosystem to help ensure a prosperous New Zealand.

Acknowledgments

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Partners

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Please download a free digital copy of the e-report from the AI Forum website, **www.aiforum.org.nz**

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AI FOR FINANCIAL AND INSURANCE SERVICES IN NEW ZEALAND
AHUMONI ME TE INIHUA I TE ATAMAI IAHIKO Ō AOTEAROA

The AI Forum of New Zealand would like to extend our sincere gratitude for the generosity of all the Programme Partners and Supporters who have made this report possible.

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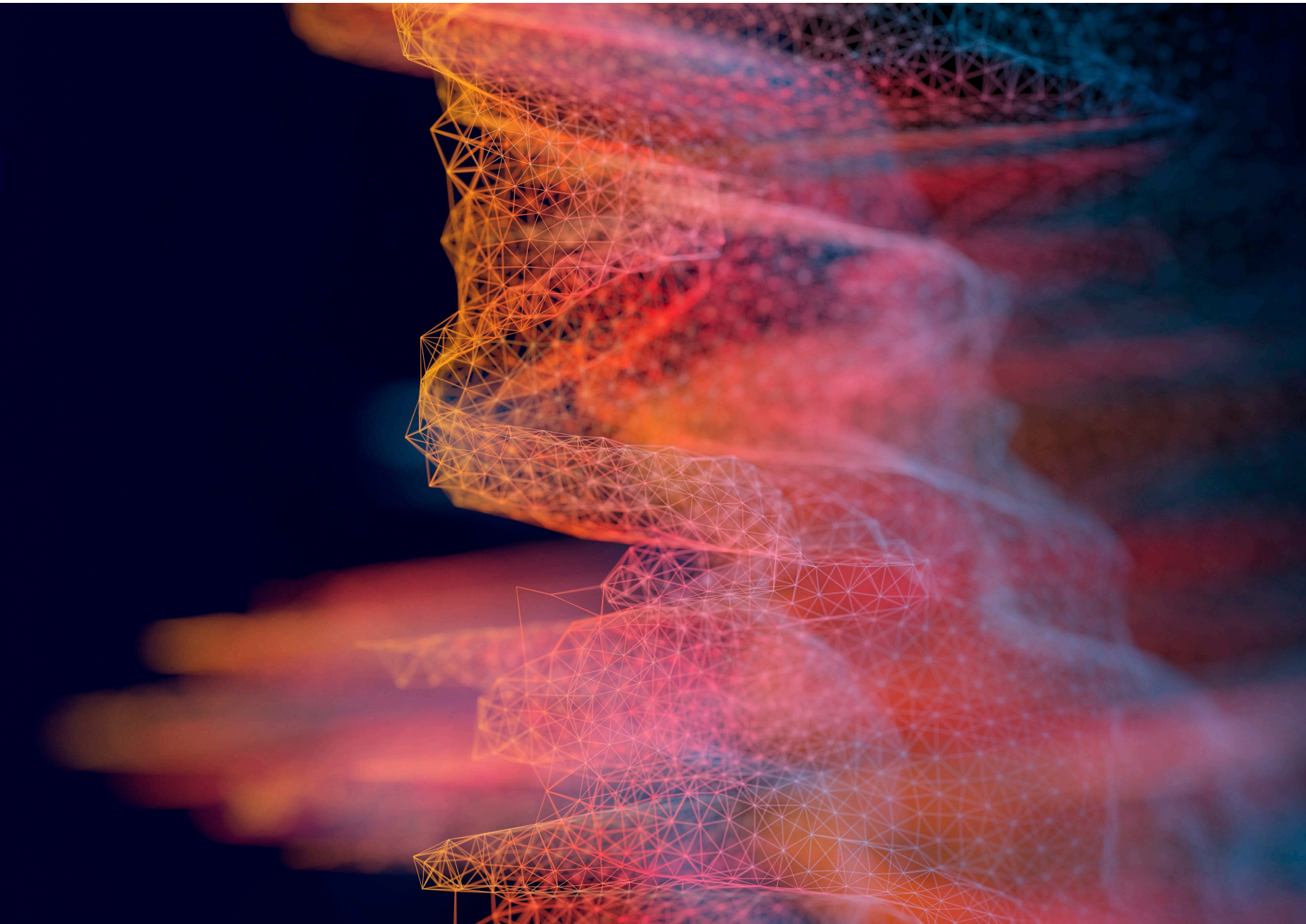


Foreword

ANZ

ANZ IS PROUD TO BE ASSOCIATED WITH THE NZAI FORUM AND THE INTELLIGENT FUTURES RESEARCH REPORT TO RAISE AWARENESS OF THE OPPORTUNITIES AND CHALLENGES FOR INDUSTRY ADOPTION.

We increasingly see the evolution of technology playing a critical part in helping us be successful in achieving our purpose at ANZ – helping shape a world where people and communities thrive. New Zealand and specifically the financial sector has a proud history of innovation and adoption of new technologies and the speed at which they are becoming available to us emphasises the importance of focusing on the practical adoption of AI implementation.

If we are to compete in a global market it is essential to accelerate our implementation of AI solutions and take ownership of growing New Zealand's AI capability, investing in AI training to grow our talent pool and further strengthen our innovative abilities. Advanced data capabilities are in hot demand as is the ability to invent new business models to take advantage of such capabilities. There are foundational capabilities like Cloud already on the market to assist a more rapid adoption and whilst financial disruptors, such as the Fintech revolution, have had little impact on the New Zealand financial sector to date, with open banking on the horizon Fintech's and new AI technologies will change the way we not only provide services but significantly change our service model.

We have a real opportunity to embrace AI technologies for the benefit of all and this requires a high-level understanding of AI technology and AI expertise. The report that the AI Forum New Zealand has produced is a cornerstone for New Zealand in helping guide us to AI future we are trying to build.

Ngā Mihi

Craig Bunyan,
GM Technology New Zealand
ANZ

Executive Summary

Financial and Insurance Services – Sectors Primed for AI

The New Zealand financial services and insurance sectors are undergoing a period of significant change. Customer and partner expectations are changing. There are technology innovations, regulatory demands, and sociopolitical and economic disruptions. It is a challenging time for the sector and digitisation is a key trend banks and insurers must address. Challengers, offering new business models, are pushing on to the financial and insurance services scene.

The AI Forum NZ's 2019 report *Towards Our Intelligent Future: An AI Roadmap For New Zealand* identified that increasing computing power, increased accessibility to mass data, and growing interest in conversational based digital interfaces mean there is growing interest in AI as a business solution. AI promises to provide those businesses that have embraced digitisation with a new tool to leverage data and drive productivity, efficiency and innovation. Economic modeling in the AI Forum's 2018 report Artificial Intelligence: Shaping a Future New Zealand singled out Financial and Insurance Services as having the largest potential economic benefits from AI-driven labour efficiencies of any sector, delivering up to $6.4Bn in 2035.

AI is a catch-all term for a range of automation technologies that most often use "machine learning" to make predictions and automate decisions using data. We include within our definition a range of computational techniques which can be applied to problems in healthcare including: robotic process automation, computer vision, natural language processing, reinforcement learning and generalised deep learning. For a fuller explanation of AI and machine learning, see the AI Forum's recent report *Towards Our Intelligent Future*.

It is important to note that AI, and more specifically machine learning, is just one of the sets of emerging technologies that are enabling the growing Kiwi FinTech and InsurTech ecosystem. Other key technologies and advances include Blockchain and Distributed Ledger Technology (DLT), Cryptocurrencies, Application Programming Interfaces (APIs), and Peer-to-Peer (P2P) digital platforms.[1] AI will often be used alongside these other technologies to enable the transformation of banking services. Change is happening in both in the front and back offices of incumbents as well as through an increase of new services by start-ups and emerging players in the market.

AI FOR FINANCIAL SERVICES

AI for financial services is a major opportunity area for New Zealand, driven by the country's relative openness to new technology and digital innovation. Despite regulatory hurdles and challenges around hiring and industry maturity, AI-enabled improvements at legacy banks and FinTech startups alike are already proving valuable and creating relatively rapid returns on investment.

The future of AI in the financial services sector is tied up with wider trends. The industry is already undergoing major changes and disruption, with some commentators believing that this is just the beginning of significant changes to the way we bank.

There are many opportunities for AI to change the face of financial services in the future. Many companies are already experimenting with the possibilities all across banking operations:

- **Automated customer service agents** that aid in understanding customers' needs, reducing time and resources spent in resolution.
- **Robo-advisors that provide automated,** often AI-driven financial planning services and individualised investment plans for customers with little to no human interaction.
- **AI fraud detection** that uses deep learning techniques to more quickly and accurately detect fraud.
- **AI market abuse detection** to spot abnormal behaviour to detect market abuse and rogue trading.
- **Robotic process automation** for automating ledger reconciliations and other processes.

- **IT automation** that links systems to become self-acting and self-regulating, automating mundane software maintenance activities.
- **Advice and recommendation systems** to match a consumer's needs with the correct banking or finance product.
- **Automated threat intelligence and prevention** systems to identify threat to databases, websites and other systems.
- **Intelligent processing automation** that automates processes previously carried out by knowledge workers.
- **Robo-regulators** that use machine-readable and machine-executable rule handbooks to interpret and implement regulation.

Corporate investment in AI is beginning to pay off for some large Australian and New Zealand banks who are early adopters. For example, ANZ New Zealand's parent announced its half year results and told shareholders that a highlight was improvements it made in automation in its institutional business, through robotics and machine learning. ANZ said it has reduced turnaround times by up to 40 percent in trade, credit and customer service.

However, growing adoption is facing challenges with a limited pool of local machine learning and AI talent to design and implement the technologies.

AI FOR INSURANCE SERVICES

AI is one of the most disruptive forces for the insurance trade today. The recent intense interest in AI is a result of factors such as increasing computing power, increased accessibility to mass data, and burgeoning interest in conversational based digital interfaces.The manual, transactional nature of insurance means high potential for benefits of automation and precision.

There is an evolution towards autonomous vehicles, connected vehicles and homes, sharing and on-demand economies, and peer-to-peer insurance models. These changes are adding a new dimension to the competitive landscape.

Insurers need to reinvent and redefine their business to respond to the changing marketplace. Insurers face pressure to cut costs and become more customer centric to remain competitive and relevant. The industry must transform from a product-centric mindset to a customer-centric mindset. Companies should look to deliver contextual and personalised sales and service through customers' channels of choice.

The digital mission in the insurance industry is to create simple, transparent, and unique experiences. Digital technologies and the power of data and analytics enable this transformation.

AI can enable change and disruption across the insurer's enterprise. It can deliver product recommendations and automate the application process. AI solutions can improve risk assessment accuracy and automate underwriting. AI can automate the claims process. This same technology can assist insurers to identify claims fraud. Cross-industry use cases play well into the insurance sector. For example, AI for customer service, process automation, IT automation and threat intelligence.

AI assists customers to research, buy, manage, renew and claim on their policies at a time and place that suits them. This is increasingly important as the digital native generation reach an age where insurance becomes a priority. By leveraging machine learning, insurers are finding they can gain a competitive edge over their competitors by developing real time actions based on behavioural and demographic data.

In New Zealand insurers are focussing on their digital experience. There is growing interest in how AI can solve business problems. Some incumbents are identifying use cases and experimenting with small scale AI pilots and proofs-of-concepts. These are siloed, tactical deployments, solving a discrete business problem. The deployments are usually not yet part of the overall enterprise strategy.

Some New Zealand insurers are already deploying scaled AI solutions. Tower Insurance has a conversational AI chatbot that answers car insurance claims queries. Southern Cross has recently launched a digital assistant called Aimee, to help consumers understand health insurance.

A recent report by EY New Zealand and InsurTechNZ illustrates the rapid growth in the

number of InsurTech companies in New Zealand.[2] These startups deliver technology solutions for insurers or offer tech-based insurance products themselves. For example, Cove Insurance offers chatbot style policy applications for car and phone insurance. JRNY and Ambit offer insurance focused conversational AI. IntelligentLife provides an AI powered underwriting solution. Cove is a potential alternative and challenger proposition to incumbents. JRNY, Ambit and IntelligentLife offer AI based solutions to the insurance industry.

New Zealand organisations say the biggest AI adoption barriers are cost and concerns about governance and regulatory implications. As we explain in the Towards Our Intelligent Future report, data is the core foundation of AI solutions. For financial institutions, governance, regulatory matters and compliance lead to challenges deploying AI. Enabling AI data to be secure by design but usable at scale can be a barrier to adoption.

Within the insurance industry, conservatism can be a barrier to engaging key stakeholders. There is industry concern that implementing new AI based solutions could lead to a loss of consumer trust. Anecdotally, there is a lack of willingness to experiment, or be comfortable with failure. Insurers may fall back into known patterns they believe are secure and compliant and will bring returns. There's a lack of leadership roles in AI. A single team may own AI and will struggle to gain enterprise-wide engagement.

A lack of industry collaboration is another barrier. Incumbents and InsurTechs need closer collaboration to produce appropriate innovative AI solutions. This is a challenge for a sector that is in the early stages of learning how to operate in a collaborative ecosystem environment.

Despite the barriers, research firm IDC expects global spending on all AI systems to increase by over 30% (CAGR) by 2022 to US$75 billion. AI adoption is increasing across all sectors. Banking and retail sectors lead.

Within the global insurance sector, AI-penetration is at early stages and increasing. IDC estimates spending within the insurance sector to triple by 2023.

To increase the rate of AI adoption insurers need an executable single strategy that incorporates AI. Culture shifts need to come from the top down as well as the bottom up. Insurers must foster a culture of experimentation and innovation, that is comfortable with failure. Engagement needs a multipronged approach as employees attitudes towards AI will differ depending on their role and experiences. Insurers should seek to partner and collaborate with the vendor community. The industry needs a connected ecosystem with diverse stakeholders including InsurTechs. These parties must collaborate to bring innovative new solutions into the industry.

Call to action

This report recommends that:

- Government accelerate its industry transformation plans and consider a specific government-supported focus on the future of the financial services sector, including the role that AI has to play.
- New Zealand FinTech companies focus on developing and exporting AI-driven financial services products to large markets like the UK where there is larger sales potential.
- Large banks and insurers should seek to partner with the local Fintech and Insurtech vendor community to foster AI innovation.
- Financial sector organisations seize the opportunity to work together across the ecosystem (including regulators) on collective solutions to shared problems – for example anti-money laundering controls and fraud prevention.
- There is an increase in New Zealand investment in AI research for financial and insurance use cases.
- Financial organisations focus on talent development, including technical and AI savvy management.

With increased levels of investment and effective regulation, AI-driven innovation can help make the New Zealand financial and insurance services sectors become more nimble, customer driven, and effective.

Key Highlights

FINANCIAL AND INSURANCE SERVICES SECTOR HAS THE LARGEST PREDICTED ECONOMIC BENEFITS FROM AI-DRIVEN LABOUR EFFICIENCIES. **UP TO $6.4B IN 2035.**

Trends within the Insurance Sector Driving AI Adoption:

- Shared Economy
- Cybersecurity
- On-Demand Economy
- Automation
- Autonomous / Semi-Autonomous Vehicles

AI WILL BE CRITICAL FOR COMPETITIVE ADVANTAGE: Agree **52.5%**

The ability for financial institutions in New Zealand to quickly adopt AI is limited in part by the shortage of skilled workers.

DESPITE REGULATORY HURDLES AND CHALLENGES, **AI-ENABLED IMPROVEMENTS** AT LEGACY BANKS AND FINTECH STARTUPS ALIKE ARE ALREADY **PROVING VALUABLE AND CREATING RETURNS ON INVESTMENT.**

New Zealand FinTech

companies must focus on developing and exporting

AI-driven financial services

products to large markets with larger sales opportunities.

Reccomendations to accelerate AI adoption:

- Create a government-supported industry AI strategy
- Increasing export of ai-driven services
- More collaboration
- Enabling experimentation friendly culture

With a strong history of analytics, the financial sector is better prepared to **incorporate and reap rewards from AI implementation.**

AI should be an organisational capability, rather than something the "AI department" comes up with.

AI NEEDS GOOD DATA. BANKS HAVE HUGE REPOSITORIES OF GOOD DATA, BUT MOST INCUMBENT BANKS TEND TO HAVE SILOED DATA ASSETS THAT ARE NOT EASILY ACCESSIBLE.

Spending on AI in insurance is set to triple by 2023. New Zealand businesses can increase their rate of AI adoption by formulating an **executable AI strategy.**

Great potential exists for businesses to leverage **AI to respond to the changing marketplace** and become more customer centric to remain competitive and relevant.

BANKS AND INSURERS SHOULD PARTNER WITH LOCAL FINTECH AND INSURTECH CREATORS TO FOSTER **AI INNOVATION IN NEW ZEALAND.**

PART A:

AI for Financial Services

Section 1: Financial Services and Banking

Context

This is an exciting and uncertain moment for the financial services sector, with technological shifts creating new opportunities and new challenges, especially for incumbent banks. Gartner has predicted that at the current rate of change, up to 80 percent of traditional banks risk going out of business or becoming uncompetitive by 2030.[3]

From AI to cryptocurrency, new financial technology is driving change in the pursuit of simplicity, efficiency, better services, competition, and social wellbeing. Banks and other financial institutions that understand the current landscape and the opportunities that AI presents will be best equipped to capitalise on this new wave.

Given these changes, it is clear that financial institutions will need to continue to adapt and change if they are to thrive in an increasingly digital world and a changing marketplace. We expect to see banks apply an increasingly diverse range of AI-enabled tools to a broader array of services, unleashing efficiency gains[4] and customer-focused improvements. The New Zealand context provides a specific set of challenges regarding scale, regulation, and social context, but with appropriate investment and a focus on increasing the AI-readiness of the sector, New Zealand financial services legacy institutions and startups alike will be poised to take advantage of the benefits of AI.

THE NEW ZEALAND FINANCIAL SERVICES SECTOR

In New Zealand, the meaning of financial services is set out in section 5 of the Financial Service Providers (Registration and Dispute Resolution) Act 2008.[5] The sector is broad, and covers a range of services including: banks, financial advisory services, credit card issuers, money exchangers, investment brokers, and insurance companies. In Part B of this report we will cover applications of AI specific to the insurance sector.

The financial services industry is a major employer and economic driver in New Zealand. To give an idea of the size of the sector, the Ministry of Business, Innovation and Employment's 2018 short-term labour market estimates showed 70,900 people employed in the finance and insurance sector in 2017, with an expected increase to 76,000 in 2020.[6] As of April 2018 there were 26 registered banks in New Zealand, 15 of which are incorporated in New Zealand, the remaining 11 are international banks with branches in New Zealand.[7] The overall financial services sector (including insurance) contributed $13.4 billion to GDP in the year ending March 2017.[8]

WHAT MAKES NEW ZEALAND'S FINANCIAL SERVICES SECTOR UNIQUE?

As a geographically isolated, developed nation with a small population and internationally high levels of technological uptake, New Zealand is often seen as a perfect testing ground for new technologies. New Zealand's early-adopter status is frequently illustrated with the early success and wide uptake of EFTPOS, which was introduced in the mid-1980s.[9] Since then, many major companies including Facebook and Google have used New Zealand to test out products before launching more widely in order to minimise risk and indicate the product's chance of success.[10]

New Zealand has relatively high uptake of digital banking, with the World Bank reporting in 2015 that 83 percent of New Zealand adults were using electronic payment methods (e.g. electronic cards and internet banking). This made New Zealand the fourth most intensive electronic payment user out of 164 countries.[11]

Recent Changes in the Sector: the FinTech Boom

Traditionally it has been difficult for new businesses to break into the financial services industry. Large, established institutions had advantages of size, large client bases, and the ability to manage ever-increasing regulation.[12] However, there has been considerable innovation in the financial services sector over the past two decades, coming in the form of fast-moving companies — often startups – focused on a single and specific technology or process, be it mobile payments or insurance.[13] Examples include Alipay, the world's largest mobile payments platform which offers a range of

functionality from bus pass purchasing to peer-to-peer payments; TransferWise, which offers low-fees transfers of payments internationally; and others such as Ant Financial and WeChat Pay.

These new companies are part of a wider boom in FinTech. FinTech is defined as "technology-enabled innovation in financial services that could result in new business models, applications, processes or products with associated material effect on provision of financial services."[14] The FinTech industry is broad, and includes established banks offering technology-enabled solutions for their customers as well as a large number of startups and global technology companies.

In a 2016 environmental scan, McKinsey found over 2000 FinTech startups in the space, up from 800 in 2015.[15] Global FinTech investments reached US$12 billion in 2014.[16] These new companies are eroding traditional services and creating new marketplaces, thriving on new technologies and innovative approaches to traditional products and services.[17] In its report *Financial Services Technology 2020 and Beyond: Embracing disruption*, PwC noted that "successful disruptors typically offer a better customer experience and greater convenience at a much lower price."[18]

However, startups and digital native companies aren't the only groups making the most of the FinTech boom. FinTech has been incorporated 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 FinTech has seen banks — including the Big Four in New Zealand (ANZ, BNZ, ASB, Westpac) — not just remain relevant, but thrive. However, new digital-native startups that incorporate AI and other innovations from the ground up do threaten to eclipse incumbent banks in some areas, with user-focused interfaces and new services that are attracting customers at an increasing rate.

As older models of differentiation — like speed and cost — for financial institutions are eroding, there is a growing push towards personalised, contextual, and customer-centric products and services. FinTech, which includes big data solutions and AI, is part of the solution to these changing needs.

Trending changes in the financial services landscape include:

- **Cryptocurrencies:** digital or virtual currencies that operate independently of a central bank or authority, where every transaction is encrypted and verifiable. This independence is usually enabled by blockchain, which provides a sense of "digital trust" between parties. Bitcoin is perhaps the most 'famous' cryptocurrency, with others including Ripple, Ethereum and Tether.
- In June 2019, Facebook announced a new cryptocurrency protocol called Libra, which is slated for likely launch in 2020.[19] In addition to Facebook, a range of other companies and venture capital firms are investing in Libra, and will be members of the currency's governing body, the Libra Association.[20] Libra differs from other cryptocurrencies in that it was designed to be global and scalable. Unlike Bitcoin, Libra is a centralised protocol. It is also asset-backed, so will likely stay relatively stable to local currencies.[21] Fees are likely to be low for users, and founding members of the Libra Association will make a profit through the interest earned on the balance of users' accounts.
- **Blockchain:** a digital record keeping system for trades and transactions, in which an ever-growing list of records is stored simultaneously on lots of computers in a network — it is not controlled by any one person or company. Every record is connected to the one before it and the one after it, so once an entry is added it can't be altered. It's often discussed in the same breath as Bitcoin or other cryptocurrencies, but there are many more applications in the finance sector, including enabling financial transactions to automate contractual agreements. In 2015, 13 blockchain companies obtained over $365 million in funding.[22]
- **Social Payments:** banking through social media, peer-to-peer (P2P) lending or the development of online financial communities. The trend was first popularized by PayPal, and other

- companies have since developed their own versions, including Venmo, Snapcash, Google Wallet, Apple Pay and Twitter Buy. These types of banking are often seen as part of a growing democratisation of finance, with startups and FinTech companies helping solve problems that the traditional banking system are less willing or able to deal with. Facebook Calibra, a digital wallet for using the (yet to be launched) Libra digital currency that will likely be integrated with its products such as Messenger and WhatsApp.
- **Open Banking:** involves making internal bank data and processes available to external parties via digital channels, such as APIs. Open Banking operates on the premise that customers, rather than banks, own their data, and should be free to share it with external parties as they wish.[23]
- In early 2018, the UK introduced the Second Payment Services Directive (PSD2), which requires the UK's largest nine banks to release data in a secure, standardised fashion (with the customer's consent). In Australia, banking is the first sector to be covered by the Consumer Data Right, which aims to make it easier for customers to share their data between organisations. The first phase of open banking was launched on 1 July 2019, with customer banking information required to be made available by the "big four banks" from February 2020.[24]
- New Zealand is currently taking an industry-led approach to open banking. Hon Kris Faafoi, Minister of Commerce and Consumer Affairs has indicated that while regulation for open banking is not off the table in the long-term he is "genuinely focused on giving industry-led open banking a real chance to succeed."[25] In May 2019, Payments NZ — the industry-owned organisation that governs New Zealand's payment system — opened its API Centre, which will lead the development and agreement of common API standards across the banking sector. This will mean that third parties do not need to make a bespoke solution for each API provider it wants to connect with.[26]

Many of these trends and changes are being incorporated into the operations of legacy finance institutions. In addition, a broad range of new startups, companies, and incubators have emerged, supporting and accelerating the diffusion of AI and other FinTech applications.

DIGITAL INCLUSION FOR BANKING SERVICES

As more New Zealanders go online to do their banking, there has been an increase in physical bank branch closures, especially in the regions. Stephen Parry, national finance sector organiser for First Union told the NZ Herald in August 2018 that "Over the last two years alone we have seen nearly 50 branch closures across ANZ, BNZ and Westpac. There has also been a trend towards reducing staffing levels and opening hours, most recently at BNZ."[27]

Despite overall high levels of digital capability, not all New Zealanders have the skills, or access to technology needed to do their banking online. The Government's Digital Inclusion Blueprint, Te Mahere mō te Whakaurunga Matihiko, released in May 2019, noted that there are a range of groups who are at increased risk of digital exclusion including seniors and people living in rural areas.[28] As banks become increasingly digital and continue to incorporate AI, it will be important to ramp up education and inclusion efforts to ensure all New Zealanders are equipped to engage with new banking technologies.

Section 2: Use Cases – How AI Can Enhance the Financial Services Sector

A Sector Primed for AI

The finance sector is already primed for AI. Creating and maintaining accurate data is mission critical for financial service providers, so the large digital data sets and robust data management systems required by many AI applications tend to be an existing asset at banks, going back many tens of years in some cases.

Banks and other financial organisations have been using complex analytics and predictive models for decades to predict risk, assess credit, and make investment decisions. These attributes mean that, compared with many other industries, the financial sector is likely better prepared to incorporate and reap rewards from AI implementation.

Unsurprisingly, financial institutions have been quick to capitalise on the promise of AI. Outside the tech industry, the financial services sector is a leading early adopter of AI in terms of spending.[29] Financial services and retail were among the first industries worldwide to adopt AI systems. Industry analyst IDC expects these industries to continue representing more than a quarter of AI spending.

Within financial services, banks are using AI to enable next-generation client experience. These systems' ability to extract information and insight from enterprise documents is maturing. Banks pair this insight with recommendation systems to match products and services. Chatbots, such as Bank of America's Erica, use AI to optimize the user's experience. This tool helps customers check balances, offers bill reminders, and answers banking-related questions. IDC expects investment companies to increasingly use machine learning for real-time trading decisions.

However, AI is just one set of technologies that make up the wider FinTech trend, and it can't be extracted from the wider shift to digitisation and explosion of FinTech. The elements that AI is dependent on — from well-managed big data to massive computing capacity — are already integral to the shifts currently happening in finance, both at large banks and smaller providers. So, while this section covers the way that AI can benefit the finance sector, it can be hard to parse out the effects of AI from the rest of the changes in the finance ecosystem. As a recent report from the World Economic Forum and Deloitte states, "focus on AI alone is not sufficient to understand the myriad ways in which it could be used within financial institutions".[30]

In the AI Forum's 2018 report *Artificial Intelligence: Shaping a Future New Zealand*, economic modeling singled out the Financial and Insurance Services sector as having the largest potential economic benefits from AI-driven labour efficiencies, delivering up to $6.4Bn in 2035.

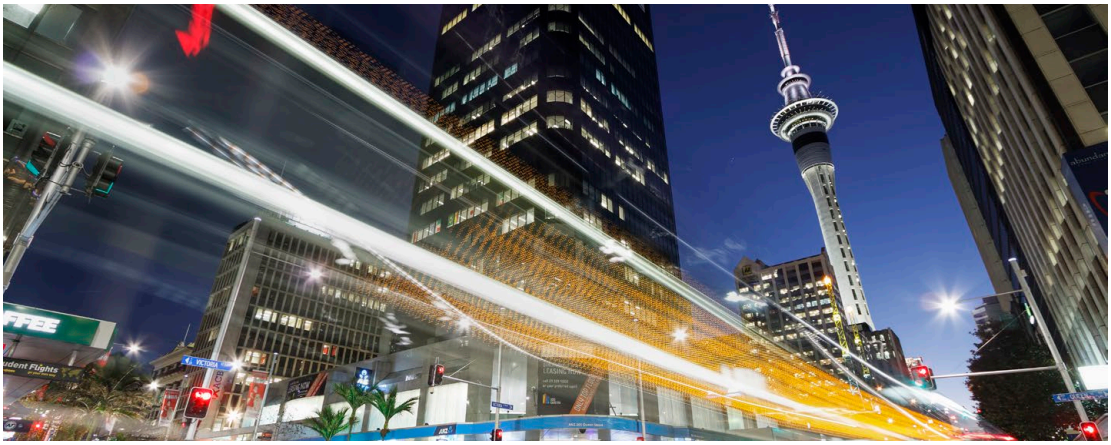
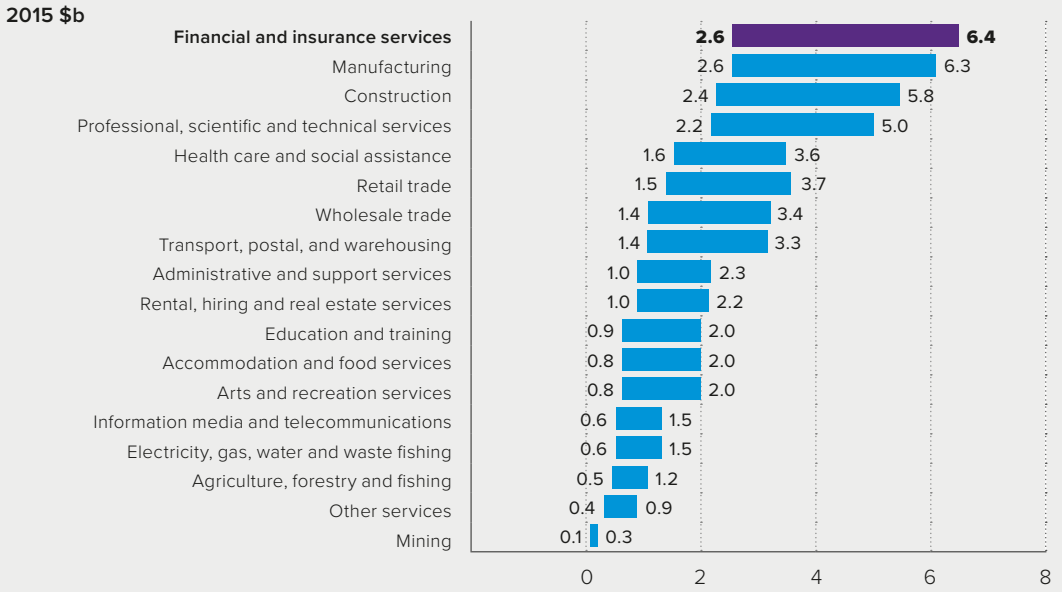


FIGURE 1: Estimated Ranges of Economic Benefits of Labour Efficiencies from AI in New Zealand Industries in 2035



SOURCE: Sapere and Schiff Analysis, 2018

AI Benefits for the Sector

The financial services sector needs to continue creating customer-centric services that anticipate user needs, allow customers to bank in a way that suits them — including on the go with mobile devices and touchless payment — and reduces risk and fraud. Digital transformation, FinTech, and data analysis play a big part of this necessary evolution. To achieve continued growth and align to the changing expectations of customers, partners, and markets, the industry needs to continue to invest in technology solutions.

AI has already been revealed as a critical part of this improvement and transformation. AI is a catch-all term for a range of technologies that most often use "machine learning" to make predictions using data. For a fuller explanation of AI and machine learning, see the *Towards Our Intelligent Future* report. In the financial services context, The US Federal Reserve notes that there is particular interest in at least five AI capabilities in the banking sector.[31] Citigroup notes six capability areas, and identifies three areas of the sector in which AI can provide value: customer engagement, operations, and risk and compliance.[32]

- In **customer engagement**, AI can help banks better serve customers by providing data-driven insights into user behavior, allowing them to provide custom recommendations. Chatbots and other AI-enabled customer service tools can help banks to answer customer queries more effectively and efficiently, while potentially cutting costs by automating some elements of customer service.[33] AI allows banks to offer robo-advisers for investment accounts, which can provide tailored investment advice that is more cost-effective for both banks and users.

FIGURE 2: Value from AI to Banking

	ENHANCE EFFICIENCY	SCALE NON-LINEARLY	ACCELERATE AND ENHANCE DECISION INSIGHTS
CUSTOMER ENGAGEMENT	Simplify and automate user engagement	Augment and enhance human effort in interactions	Increase speed and quality of insights to target and personalise
OPERATIONS	Automate and standardise process flows	Augment capacity to address variable demand and complexity	Reduce time to predictions and information retrievals
RISK AND COMPLIANCE	Reduce costs by automating manual tracking and reviews	Track risks in real time, at scale; while improving effectiveness	Reduce time to detection and mitigation

SOURCE: Citi analysis, 2018.

In New Zealand, the Financial Advisers Act 2008 required that financial advisers be natural persons, however in 2018 the Financial Markets Authority began issuing exemptions for a number of firms from the Financial Advisers Act, allowing the use of robo-advice for financial advice.[34]

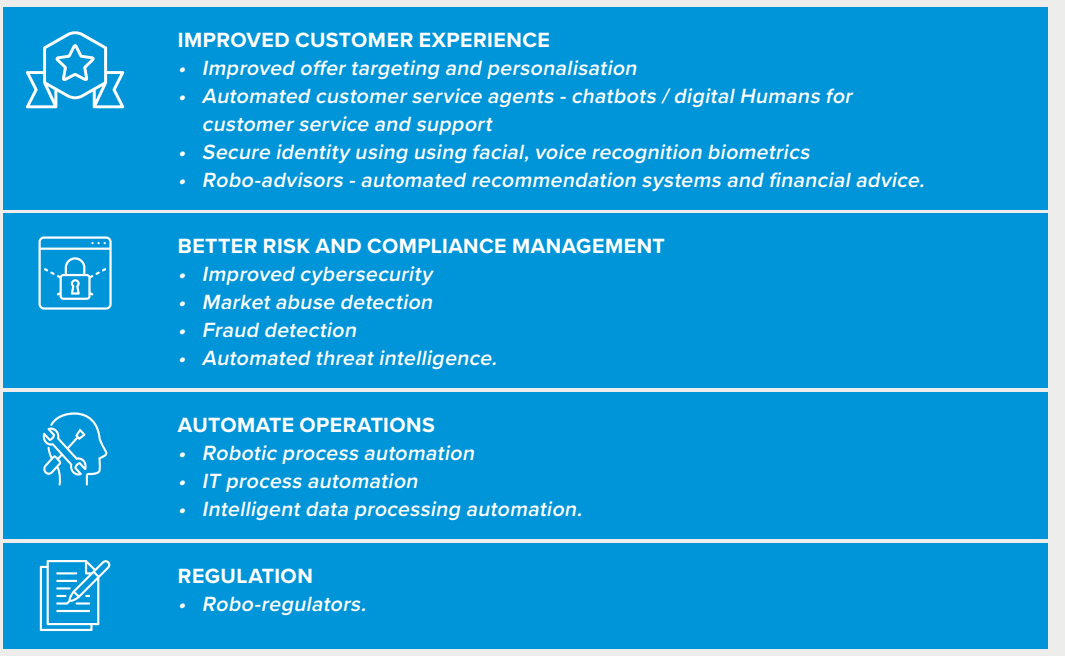
- In **operations**, AI provides opportunities for improving back-office operations, including advanced models for capital optimisation, model risk management, stress testing, and market impact analysis.[35] Robotic process automation help automate ledger reconciliations and streamline IT support, potentially resulting in cost savings of up to 40 percent.[36]
- In the realm of **risk and compliance**, AI can help automate processes and reduce costs of regulatory compliance. AI solutions are already being used by some firms in areas like fraud detection, capital optimisation, and portfolio management.[37] AI image recognition can be used to digitise compliance documents and extract key figures, anti-money laundering transaction monitoring software can monitor transactions for risk in real time, and automated reporting can source, sort, generate and store reporting requirements to maintain audit trails, risk logs and reports.[38]

As of 2018, Citigroup notes that most current bank investments in AI focus on risk management, fraud prevention, and compliance activities.[39] However, general operations and customer service improvement also offer major opportunity areas for AI. Within New Zealand, AI is anticipated to have significant impact in each of these three areas. “AI in the back office will dramatically impact banking and insurance operations, from credit decisions to investment advice,” says Deloitte New Zealand Partner and Banking Sector Lead Marco Ciobo.[40]

According to recent reports from Citigroup, IDC, and the World Economic Forum, top use cases for the finance sector include:

- **Automated customer service agents** that aid in understanding customers' needs, reducing time and resources spent in resolution.
- **Robo-advisors** that provide automated, often AI-driven financial planning services and individualised investment plans for customers with little to no human interaction.
- **AI fraud detection** that uses deep learning techniques to more quickly and accurately detect fraud.
- **AI market abuse detection** to spot abnormal behaviour to detect market abuse and rogue trading.
- **Robotic process automation** for automating ledger reconciliations and other processes.
- **IT automation** that links systems to become self-acting and self-regulating, automating mundane software maintenance activities.
- **Advice and recommendation systems** to match a consumer's needs with the correct banking or finance product.
- **Automated threat intelligence** and prevention systems to identify threat to databases, websites and other systems.
- **Intelligent processing automation** that automates processes previously carried out by knowledge workers.
- **Robo-regulators** that use machine-readable and machine-executable rule handbooks to interpret and implement regulation.

FIGURE 3: Artificial Intelligence Use Cases and Adoption in Banking



Section 3: Current State of AI Adoption in the New Zealand Financial Services Industry

IN NEW ZEALAND, A NUMBER OF FINANCIAL INSTITUTIONS ARE ALREADY USING AI TO PROVIDE SERVICES AND IMPROVE OPERATIONS. THE "BIG FOUR" INCUMBENT BANKS IN NEW ZEALAND HAVE STARTED TO ADOPT AI SOLUTIONS TO IMPROVE SERVICES TO CUSTOMERS, NOTABLY THROUGH CHATBOTS AND DIGITAL ASSISTANTS.

Corporate investment in AI is beginning to pay off for some large Australian and New Zealand banks who are early adopters. For example, ANZ New Zealand's parent announced its half year results and told shareholders that a highlight was improvements it made in automation in its institutional business, through robotics and machine learning. ANZ said it has reduced turnaround times by up to 40 percent in trade, credit and customer service.[41]

However, adoption is complicated and New Zealand financial services institutions must face both regulatory demands and a limited talent pool when it comes to implementing AI technologies in their organisation. Many of New Zealand's bigger banks have "innovation units" or funds, tasked with incubating or accelerating FinTech solutions and startups. For instance, Kiwibank's Kiwi FinTech Accelerator gives startup companies access to mentors, experts, regulators, and potential partners, and has incubated successful new companies like Sharesies. One startup in the latest intake is Stream RLP, which is developing a digital platform that leverages AI and machine learning "to enable lenders to provide an end-to-end, responsible lending experience to their customers".[42] This and other programs have had modest impact, but the field is still nascent.

The case studies section below provides expanded examples about key New Zealand financial organisations that are capitalising on AI opportunities.

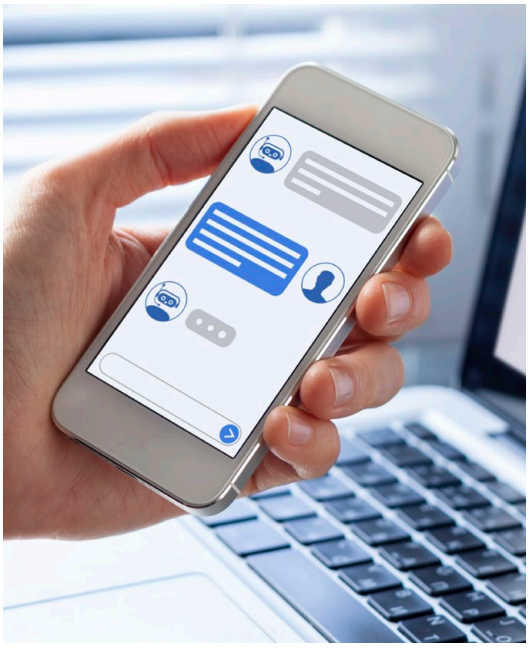
New Zealand Case Studies

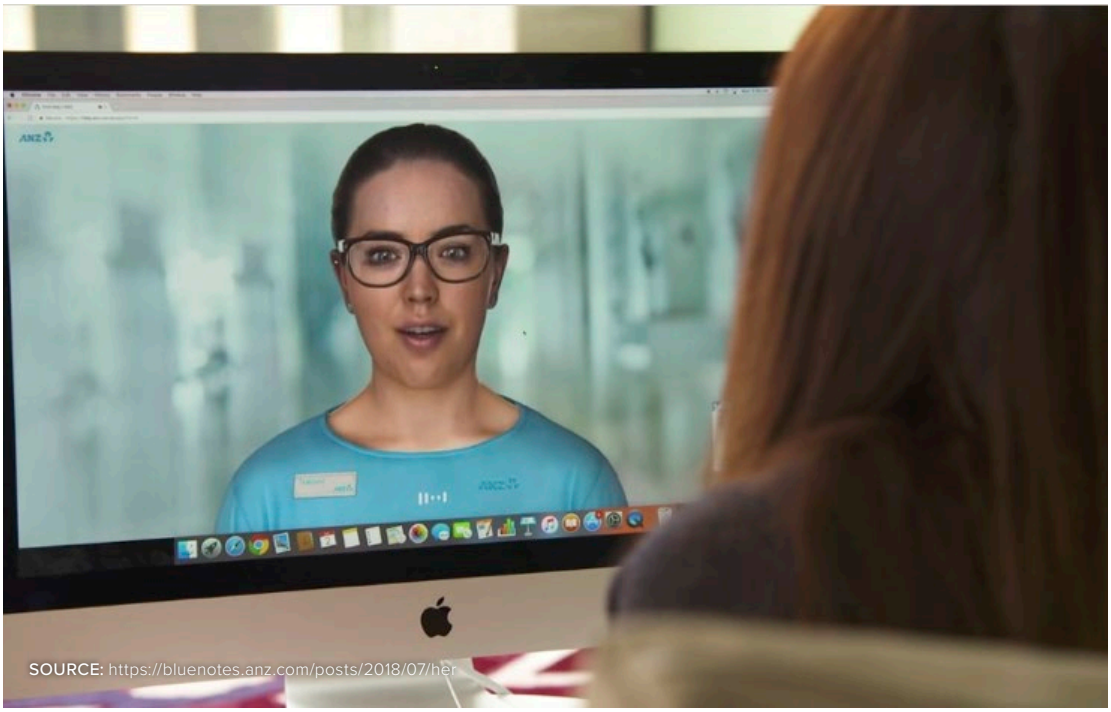
HARMONEY: FAST, ACCURATE RISK ASSESSMENT

Harmoney is a digital marketplace that facilitates digital peer-to-peer (P2) lending, acting as an intermediary between lenders and borrowers. Potential borrowers apply online for a loan up to $70,000 and are assigned an interest rate based on an individualised credit risk assessment.

Harmoney uses artificial intelligence to accurately assess the credit risk of borrowers. Information from over 300,000 loan applications are used in training Harmoney's models. This use of machine learning has led to fewer questions on loan application forms, reduced costs for borrowers and increased profitability for investors.[43]

Harmoney's machine learning services are provided by DataRobot, an automated machine learning platform, which streamlines the process of deploying accurate models. Taking this approach has resulted in a reduction in the time it takes to deploy a model from 12 to 16 weeks to minutes.[44]





ANZ: PERSONALISED, LIFE-LIKE CUSTOMER SERVICE AT SCALE

In July 2018, ANZ New Zealand launched their new digital assistant pilot, called Jamie.

The AI technology was developed with New Zealand company Soul Machines. Jamie was initially programmed to answer questions based on the 30 most frequently searched online topics. The pilot has since been extended and is increasing Jamie's workload as it learns to answer a broader range of customer enquiries and increase its Te Reo Māori vocabulary.

In its first 100 days Jamie had more than 12,000 conversations with people visiting the site. The most common question was how to open a bank account, which Jamie was asked nearly 1200 times. Liz Maguire, ANZ's Head of Digital and Transformation, reports that Jamie was able to answer approximately 60 percent of customer queries.[45]

To avoid robotic responses to standard banking questions, considerable effort was made to optimise Jamie's friendly persona. This included spending time observing the ANZ contact centre team. In addition, Jamie's creators developed a backstory and personality.

Currently, Jamie is only able to assist with general banking queries. However, it is expected that Jamie will soon be able to carry out personal banking tasks.

"When you're driving in the car you might go: 'Hey, Jamie, I really need to pay the babysitter $50.' And Jamie would do that for you," says Maguire.[46]

ANZ is not alone in using AI-enabled customer service. Other banks also have chatbots or digital assistants, including:

- **Josie**, ASB's digital assistant developed in partnership with New Zealand company UneeQ.

Josie is designed to help with questions about starting a small business, and is available by appointment to meet customers at the ASB Auckland offices.

- **Wes**, Westpac's (text-based chatbot, available to assist customers on the Westpac website.
- BNZ has created two chatbots – one for their internal helpdesk, and another built in Microsoft Azure which is being trialled for KiwiSaver customers.[47]

BNZ: DETECTING FRAUD IN REAL TIME

In late 2018, BNZ announced it was deploying IBM's Safer Payments, a transaction monitoring system that uses machine learning and artificial intelligence to identify fraudulent activity before it happens, without accidentally stopping customers' genuine transactions.[48] The Safer Payments system uses a combination of a customer's transaction history with other financial and non-financial data to profile and authenticate every transaction as it happens.

While many banks' legacy systems were designed to identify and stop repetitive fraud patterns, the move to "anytime, anywhere" mobile banking has made fraud detection more challenging.[49]

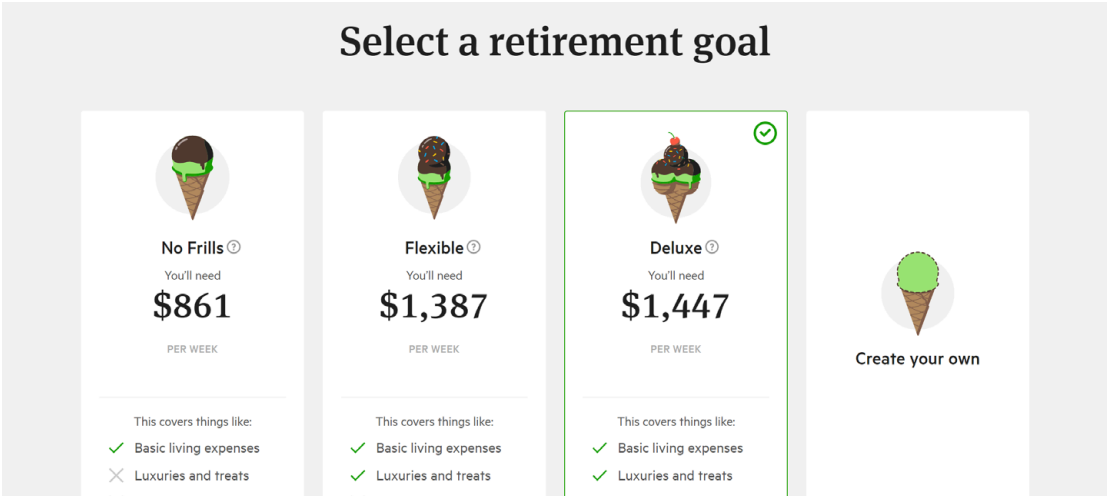
Mike Smith, Managing Director of IBM New Zealand says "With financial crime becoming increasingly sophisticated, BNZ partnered with IBM to address the rising threat of crime and fraud while still enabling top quality experiences for customers and allowing for future growth."[50]

Safer Payments is one of a number of AI-enabled solutions that BNZ has announced. As another example, in 2017, BNZ was an early adopter of Intel's Saffron Anti-Money Laundering advisor.[51]

KIWI WEALTH: ROBO-ADVICE TO HELP WITH SAVINGS GOALS

In late 2018, Kiwisaver provider Kiwi Wealth introduced a robo-adviser service for its customers. The robo-advisor, which is accessed through Kiwi Wealth's Future You online tool can provide information and advice about the most appropriate Kiwisaver account for a customer based on their savings goals, circumstances and preferences.

Ramesh Naran, Kiwi Wealth's head of digital strategy told Stuff.co.nz that "Robo-advice is allowing us to reinvent the way Kiwis manage their finances, giving many access to personalised



SOURCE: https://www.kiwiwealth.co.nz/kiwisaver

financial advice that's previously been out of reach."[52] Kiwi Wealth was the first financial services provider in New Zealand to get Financial Markets Authority (FMA) approval to deliver personalised digital financial advice.[53]

Other financial services are also planning robo-advice services. The Warehouse founder and philanthropist Sir Stephen Tindall's K1W1 investment arm has signed a deal to fund the growth of Simplicity Kiwisaver.[54] Part of Simplicity's plans for growth include developing an AI 'robo-advice' platform that would be available to all Kiwis.

ANZ: VOICE-DRIVEN BIOMETRICS

In 2017, ANZ bank partnered with Nuance, a speech software company to launch AI driven voice biometrics. The system identifies a person by using the characteristics of their speech and is designed to improve security on mobile devices for higher value transactions. Voice biometrics allow ANZ customers to use their voice to automatically authorise payments of more than $1000 through the bank's mobile apps.

The addition of voice identification technology simplifies the payment process at ANZ, allowing customers to omit the usual security measures when making payments, by using their voice. Although this change makes transactions faster, security is not compromised. This is because a person's voice has five to 10 times as many security points than other methods such as fingerprints. "Our customers expect digital options for their banking and for it to be seamless and easy. A key challenge for banking today is to help customers do what they want to do safely and securely" says Craig Bunyan, ANZ General Manager, Technology.

Section 4: Challenges and Barriers to AI Adoption

NEW ZEALAND ALREADY HAS A STRONG DIGITAL ECONOMY AND IS ADOPTING AI RAPIDLY IN FINANCIAL SERVICES, BUT THERE ARE SOME CONSTRAINTS AND CHALLENGES TO WIDE ADOPTION.

These include regulatory challenges, a lack of skills and talent, the need for increased industry investment, organisational challenges, workplace concerns and evolving social licence. More information about each of these areas is below.

Regulatory Challenges

Technology usually moves much faster than regulation.[55] It is hard to predict the future, and often regulations are specifically tied to the status quo and the technologies currently in use. The World Economic Forum has stated that "prescriptive regulations are currently limiting the advancement in financial services".[56] It further notes that inflexible requirements constrain financial service providers ability to keep up with the rapid pace of change, creating significant uncertainty for institutions seeking to use new technology".[57]

This sentiment is echoed in the New Zealand context by the report Analog Regulation, Digital World published in 2017 by the New Zealand Initiative in collaboration with InternetNZ.[58] The report notes that "When setting rules for an uncertain future, it may help to favour tech-neutral principles over tech-specific rules; to regulate less or later while new behaviours take shape; and to employ sunset clauses to let us re-think over time".[59]

Notable regulatory challenges identified by the World Economic Forum are:

- Complexity of regulatory frameworks
- Lack of standards for identity
- An undefined liability model for the use of AI
- Fragmented data sharing regulations
- Auditability of new systems
- Tendency to avoid risk.[60]

In New Zealand, work is underway to address some of these challenges. For example, banks, along with other private sector entities, are "seeking digital identity solutions that allow them to improve New Zealanders' online experiences, while also reducing fraud, protecting against cyber-attacks, mitigating regulatory risks and lowering transaction costs associated with accurately establishing an individual's identity".[61]

It is expected that the RegTech (Regulatory Technology) sector will grow significantly, providing technology solutions for increasingly complex regulation and compliance requirements for the financial services industry. As shown in the case studies above, some New Zealand financial services providers have already started to deploy AI for credit card fraud detection and anti-money laundering investigations.

Skills and Talent

As with many sectors, the ability for financial institutions in New Zealand to quickly adopt AI is limited by the shortage of skilled workers. This includes both the computer scientists and programmers needed to build and implement AI tools, but also the internal workforce at banks and other organisations in the sector. Implementing and using AI effectively requires an agile workforce that is able to accommodate changes in workflow and process, and have the ability to adapt to radically new ways of doing things.

New roles are being created to support and extend the development of AI, but currently demand is outstripping skill supply. Tertiary providers in New Zealand are responding to this need by rapidly growing AI research and learning capabilities. Banks and financial institutions will need to compete for skilled employees if they are to adopt AI quickly and effectively.

The other side of the skill and talent coin is a concern that AI will disrupt workforces and result in job losses. Former Citigroup CEO Vikram Pandit noted that developments in technology could see some 30 percent of banking jobs disappear in the next five years,[62] although this is likely to be

offset by the creation of new jobs. While potential reduced labour costs may be a benefit for many financial institutions, it will be necessary to manage the transition carefully and ensure workers whose jobs are replaced are upskilled where possible, and transitioned to other parts of the company.

Banks and FinTech organisations that have introduced AI have not necessarily seen major reductions in their workforce. When India's Axis bank introduced AI chatbots to its suite of customer service tools, the impact of AI on labour was often indirect, as the majority of its customer service operations were outsourced and thus were not conducted by direct employees of the bank. Axis reduced the size of its outsourced customer service team, but its internal workforce was not greatly affected.[63] For organisations that had previously outsourced customer service functions, PwC suggests that AI technologies "are likely to unleash a wave of re-shoring, as firms discover that this approach is even cheaper than outsourcing or offshoring".[64]

For a deeper discussion of AI Talent and Capability in New Zealand, see the *Towards Our Intelligent Future* report.

Industry Investment

As the FinTech industry first started taking off, many legacy banks intended to create their own custom-built FinTech solutions. Institutions that had the funds and capabilities invested heavily in developing FinTech on their own. Now, though, most legacy institutions have come to the realisation that creating their own tech from the ground up is too onerous—due to regulations and scaling issues—or too expensive to meet all their AI and digital needs.

Moving forward, there is a need for cooperative investment across the sector, to build the tools and capacities that can help the whole industry thrive. Additionally, collaborative solutions built on shared datasets provide another way to accelerate AI opportunities.[65] Legacy banks may face internal pushback when it comes to investing in collaborative solutions, as this signals a shift from a vertically-integrated model to more openness and integration across different kinds of organisation.[66] Additionally, individual banks will need to figure out ways to update their technology and systems to enable them to integrate with FinTech and AI solutions. This will take considerable time and investment, and may also require organisational transformation.

Organisational Challenges

For AI to work, it needs good data. While banks have huge repositories of good data, most incumbent banks tend to have siloed data assets that are not easily accessible.[67] As CitiGroup notes, this is due in part due to regulatory requirements, but also due to technology and organisational structures. Banks in the US and Europe are often built on 60s and 70s mainframe technology that is product-based not customer-based.[68] Established financial institutions also face the challenge that their legacy systems may not easily "talk to" each other, and can't easily integrate with AI or other FinTech solutions.[69] For banks and other established financial institutions, it will be essential to find a way to effectively use data and integrate new AI and FinTech solutions, whether through APIs or systems overhauls.

In addition, organisations face challenges when it comes to finding the right talent to build and implement AI and FinTech. If they are to be effective, banks and other institutions will need to assess their organisation's maturity level, and build their capacity and data readiness before integrating AI.[70]

Existing Workforce Fears

While there is much excitement and expectation around the improvements that AI can bring, there is also a strain of trepidation about its side effects. Workers and economists alike have expressed concern about potential job losses to AI, especially in fields where many workers perform jobs that can be wholly or partly automated. This includes bank employees, where customer facing and back office tasks alike are often routine and repetitive. As AI and automation become more advanced, repetitive jobs are likely to be first at risk to automation, before jobs that involve more complex or physical tasks.[71]

At the same time, other data suggests that increased development and deployment of AI will be accompanied by a rise in banking jobs. According to James Brown, General Manager of FinTechNZ, adoption of new financial technology, including AI, is driving the creation of new jobs.[72] Along with the computer scientists creating FinTech and AI, there are also roles for data scientists and communicators who analyse data-driven insights and communicate it throughout the organisation.

A recent Accenture report indicates that between 2019 and 2022, banks that invest in AI and human-machine collaboration at a high rate could boost their revenue by 34 percent and their employment levels by 14 percent.[73] Generally, research on near-term outcomes indicate that finance will add jobs in the short term, as organisations work to implement and use AI insights. However, growth does not mean stability. ANZ notes that even if employment levels are stable or growing, AI and other FinTech will mean that new operational models need to be taken into account, and workforces will likely become more liquid and disaggregated.[74]

Social Licence and Trust

Social licence refers to the ongoing acceptance of a company or industry's standard business practices and operating procedures by its employees, stakeholders and the general public.[75] As AI and machine learning become increasingly visible and wide-reaching in the financial services industry, it will be important that customer understanding of AI, and how it is used grows along with it.

PwC notes that "when ATMs were first introduced, many customers refused to use them. Gradually though, after time and training, they came to see that ATMs could offer a better service experience. And trust followed".[76] As AI-enabled services like virtual assistants and robo-advisors enter wider use, is likely that it will take time to build trust with customers.

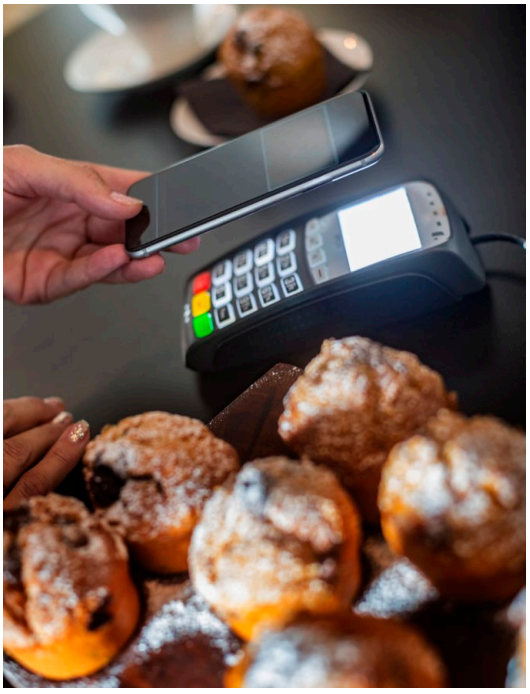
Financial service providers will also need to consider whether to adopt explicit ethical frameworks as they increase AI adoption. An ethical framework can help to guide decisions about the use and implementation of AI, and can be especially important when making decisions about what data and AI models will and won't be used for. Many of the ethical frameworks that have been adopted by organisations to date consider issues including accountability, transparency, and fairness.

Section 5: Future Trends and Opportunities

THE FUTURE OF AI IN THE FINANCIAL SERVICES SECTOR IS TIED UP WITH WIDER TRENDS AND POTENTIAL CHANGES. THE INDUSTRY IS ALREADY UNDERGOING MAJOR CHANGES AND DISRUPTION, WITH SOME COMMENTATORS BELIEVING THAT THIS IS JUST THE BEGINNING OF SIGNIFICANT CHANGES TO THE WAY WE BANK.

While around two-thirds of senior financial services industry decision makers globally predict disruptive technologies like AI will have "a positive impact" on their business in the future, a recent study reveals only a third of them are currently deploying AI in their companies.[77] For financial services organisations looking to take advantage of AI opportunities, this is an ideal moment to invest in accelerating adoption.

There are many opportunities for AI to change the face of financial services in the future. Many companies are already experimenting with the possibilities. Some examples of AI-enabled technologies likely to have an impact in the near future include:



- **Social Payment Systems and Mobile Banking.** In its 2019 Tech Trends Report, the Future Now Institute notes that "as social payment offerings grow more robust, millennials may opt out of traditional banking services altogether."[78] As wealth transitions from the baby boomer generation to their children and grandchildren, this could lead to significant changes to the banking landscape as we know it today. The Libra cryptocurrency, which has many major corporations backing it and providing governance, could further catalyse fundamental changes to the banking sector in a short amount of time.
- **IoT Enabled Banking.** Billions of connected devices and the volumes of data generated will need AI-based modelling to turn data patterns into actionable insights. When customers use networked devices to access banking data, banks can anticipate the needs of customers through data collected and analysed with AI. Banks can then offer solutions and advice that help customers make good financial decisions.[79]
- **Automated Personal Finance.** Bots and digital assistants are expected to become increasingly sophisticated, and will create opportunities to streamline personal banking. AI-enabled assistants will likely be able to plan and execute short- and long-term tasks, from paying bills to preparing tax filings.[80]
- **Image Recognition and Verified ID.** Computer vision applications that use AI to process and verify customer identity can improve security IDs and image recognition can ease the burden of insurance claims. AI-enabled identification will likely have other additional applications in finance.[81]

Section 6: Accelerating AI Adoption in Financial Services

Recommendations for New Zealand Financial Services Organisations to Accelerate AI Uptake

GOVERNMENT-SUPPORTED INDUSTRY STRATEGY

- In July 2019 the Government released a new strategic direction for industry policy and indicated it will co-create four initial industry transformation plans: agritech, digital technologies, food and beverage, and forestry and wood processing. The Government notes that over time, this could be expanded into other areas such as creative industries, tourism, aerospace, health technologies and renewable energy.

  Given the contribution that the financial services sector has for the economy, and its importance to people's day-to-do-day lives, there could be specific government-supported focus on the future of the financial services sector, including the role that AI has to play.

INCREASING EXPORT OF AI-DRIVEN SERVICES

- There is an opportunity for New Zealand FinTech companies to develop and export AI-driven financial services products, with markets like the UK having big potential for sales. James Brown, Executive Director of FinTechNZ has noted that "While New Zealand currently exports around $1.6 billion in traditional products to the UK, the big growth opportunity is in hi-tech."

  He added that "Technology is now New Zealand's third largest and fastest growing export sector, so opening a market such as the UK, which is advanced and able to consume many of our tech innovations, will further drive export growth."[82] MFAT figures show that in the year ending 31 March 2017, service exports increased by $406 million (2%) and was a driver for overall export growth.

WORKING TOGETHER

- Banks in New Zealand are already working together in some areas, for example, through Payments NZ and its API Centre. There is an opportunity for institutions to work together on collective solutions to shared problems — for example anti-money laundering controls and fraud prevention. Deloitte and the World Economic Forum have noted "Collaborative solutions built on shared datasets will radically increase the accuracy, timelines, and performance of non-competitive functions, creating mutual efficiencies in operations and improving the safety of the financial system."[83]

Conclusion

AI for financial services is a strong opportunity area for New Zealand. With the country's relative openness to new technology and digital innovation, and an interest in further diversifying the economy beyond the historic drivers of primary industry and tourism, New Zealand is an ideal testing ground for new AI applications. Despite regulatory hurdles and challenges around hiring and industry maturity, AI-enabled improvements at legacy banks and FinTech startups alike are already proving valuable and creating relatively rapid returns on investment. With increased levels of investment and effective regulation, AI-driven innovation can help make the New Zealand financial services industry more nimble, customer driven, and effective.

PART B:

AI for Insurance Services

Section 1: Current State of AI in Insurance

AI Adoption in New Zealand

In 2018, just 1.2 percent of New Zealand organisations said they have adopted AI solutions.[84] 62 percent told IDC that they have plans to implement the technology within the next five years (i.e. by 2023). However, in IDC's 2018 Future of Work Survey the current adoption rates are reported to be much higher.[85] This is a reflection of the overall lack of awareness of what is and isn't AI. Small, relevant and practical uses will boost overall AI investment in the next two years and beyond and this will apply to insurance, as it will to all sectors. PWC analysis indicates that AI will have a 'huge impact' on the insurance industry with 50 percent of potential use case adoption occuring in the next three years.[86]

In IDC's 2018 APEJ Cognitive and AI Adoption Survey, about 20 percent agreed or strongly agreed with the statement, "My organisation should have in-house cognitive/AI capabilities and the skill set comprised of both technology and dedicated staff." This desire for inhouse resources suggests the current skills shortage may worsen.

Organisations may need to look to alternatives to get skill sets. This could include reskilling the existing workforce or seeking staff from the gig-economy. These issues are discussed in more depth in the *Towards Our Intelligent Future* report.

IDC asked organisations about the importance of AI to gain a competitive advantage in the next five years. Over half (60%) of the surveyed organisations agreed or strongly agreed that AI would be a critical tool for their organisation. This reaffirms the intent to deploy by 2023.

New Zealand businesses told IDC that the key benefits they expect to see from deployment of AI systems are increased process automation, increased employee productivity and to uncover new insights. The top AI use cases include automating repetitive tasks, security and fraud detection and real time inventory management.

AI SYSTEMS ADOPTION IN NEW ZEALAND

Q. *Which of the following best reflects your organisation's status regarding cognitive/AI Systems?*

My organisation is exploring cognitive/AI systems but has no plans to adopt for now.	**37.0%**
My organisation is planning to adopt cognitive/AI systems in two to five years.	**44.4%**
My organisation is planning to adopt cognitive/AI systems within two years.	**17.3%**
My organisation has adopted cognitive/AI systems.	**1.2%**

AI WILL BE CRITICAL FOR COMPETITIVE ADVANTAGE

Q. *Within 5 years, Cognitive/AI Systems will be a critical requirement for businesses to gain a competitive advantage.*

Strongly Disagree	**2.5%**
Disagree	**10.0%**
Neither agree nor disagree	**27.5%**
Agree	**52.5%**
Strongly Agree	**7.5%**

SOURCE: IDC, 2019

Trends in the Insurance Sector Driving AI Adoption

Consumers increasingly wish to communicate and buy through digital channels. They expect to be able to reach companies 24/7. Having to wait for a quote, for example, could mean consumers will simply move on to the next insurer.

The recent EY InsurTech report says the New Zealand insurance sector is under increased pressure to move from being product centric to being customer centric. It must simplify insurance products. New products should deliver fair value to the customer and be fit for purpose.[87]

There is a growing need for personalised, contextual, and value-centric products and services, to attract and retain customers in a fast evolving marketplace. This is where AI plays a part. For example, AI-based product recommendation (for example a real time, contextual and personalised offer of a relevant insurance product during another customer journey), automated underwriting for fast sign-ups and digital assistants for customer service.

The trending changes in the insurance landscape include:

- **The Rise of the Sharing Economy.** This includes the sharing of cars, workspaces, logistics, accommodation, or parking spaces. Major players in this space include Uber and Airbnb. Currently, there are coverage gaps. Insurers must pivot to provide coverage or miss out on new revenue streams.
- **The On-demand Economy.** Consumers want insurance coverage, but not all the time. For example, insuring a vehicle only when it is driven, or insuring the contents of a holiday home only when it is occupied. Insurer AXA Singapore has a vehicle insurance that calculates premiums on a 'per kilometre' basis.
- **Commercial Cybersecurity Cover.** Insurers don't yet fully understand cybersecurity as a risk. There is a lack of historical data, inadequate understanding of the evolving nature of the risk and uncertainty about its financial impact. This is a growing space and opportunity for insurers.
- **Semi-autonomous and Autonomous Vehicles Raise New Questions for Insurers.** Which insurable incidents are a product liability and which are a personal liability? Where does the machine end and the person begin, particularly in semi-autonomous vehicles? What data can we access to assess the risks with autonomous vehicles? How will the risk profile evolve as communities transition to autonomous vehicles with a changing mix of autonomous and human driven vehicles on roads? AI will help to assess risk and claims by making sense of massive amounts of vehicle sensor data.

Some tech vendors are now offering industry customised AI solutions. For example, Australian company Flamingo.ai offers an out-of-the-box Auto Insurance chatbot. Flamingo.ai has pre-seeded the chatbot with over 3,000 questions, answers and phrases specific to auto insurance. In New Zealand, Precision Driven Health (PDH) is developing a healthcare machine learning model (see Part Three's companion deep dive into the Health Sector). The company can build upon the base model to use it for different healthcare use cases. It won't need to develop new, separate models for different but related purposes. This vertical focus reduces the time, effort and risk for insurers to deploy AI solutions.

Another industry trend is a change in focus from risk mitigation to risk prevention. For example, USA insurance is shifting from a repair-and-replace mindset to detect-and-prevent. In partnership with Honda, it is developing a safe-driving coaching service for Honda's in-car technology platform. The system uses algorithms to detect and score driver behaviours. The intent is to reduce accidents by enabling drivers to improve their driving skills. This therefore lowers the risk profile of the insured fleet of drivers.

Fraud remains a problem for the insurance industry. This includes fraudulent claims and dishonest insurance applications. Fraud results in higher premiums for honest policyholders. Reducing fraud keeps the insurer more competitive on price. In New Zealand, Insurtech Cove plans to let consumers submit video vehicle claims. The videos will include evidence of damage to the vehicle and a 'selfie' personal statement from the driver. Cove will use AI to analyse the behaviours, phraseology and other aspects of the video to identify a potentially fraudulent claim.[88]

How AI is Helping

The insurance industry needs to create simple, transparent, and personalised digital experiences. These experiences should be rooted on the principles of proactive risk management and secure, seamless and contextual engagements across the customer journey. To achieve this and align to the changing expectations of customers, partners, and markets, the industry needs to transform. Digital technologies enable the transformation.

AI is a technology that will be critical to the industry's reinvention. AI is a general term for a basket of technologies and techniques which enable computers to carry out narrow cognitive functions. Artificial Intelligence includes technologies such as neural networks, machine learning, machine vision, transfer learning and expert systems (see *Towards Our Intelligent Future* for a fuller explanation).

The benefits of applying AI in the insurance industry include:

- **Higher Accuracy in Risk Assessment and Pricing.** This means more accurate premium levels and policy endorsements. For example, a global insurer uses an AI based solution to review client site surveys for engineers to better assess client risks.
- **Lowering Actual Risk.** For example, a U.S. insurance company uses in-car technology and AI analytics to monitor fleet drivers' behaviours. The system provides coaching to improve driving skills to reduce the risk of incidents.
- **Reducing Cost.** There are many AI solutions to reduce cost for example by automating processes or providing digital customer service. For insurers one way to reduce costs is to use AI to expose fraudulent claims.
- **Better Customer Experience.** Southern Cross Health Insurance has launched a digital human to answer customers' health queries 24/7. Chatbots and digital assistants provide 'anytime, anywhere' non-judgmental help for customers. Automating policy application and claims processes speed up interactions.
- **Improving Productivity and/or Efficiency.** Digital assistants in the workplace help employees be more productive. Several other use cases around supply and logistics, intelligent process automation and IT automation also bring improved efficiency freeing up humans to focus on higher value tasks.
- **Maximising Value from IoT Deployments.** The connected-everything society will produce mammoth amounts of data with useful insights for insurers. There will be far too much data for humans to analyse or draw insight from. AI can make those connections.

According to technology market research firm IDC, top use cases for the insurance sector include:

- **Automated Claims Processing.** The use of automated systems which guide intelligent data capture to adjudicate insurance claims.
- **Fraud Analysis and Investigation.** The detection of unusual patterns in complex data sets to identify the probability that a claim may be fraudulent.
- **Advice and Recommendation Systems.** Matching the consumer's needs with the correct level of insurance product.
- **Regulatory Intelligence.** Using AI to more efficiently address compliance, limit exposure and reduce the impact of issues.
- **Automated Threat Intelligence** and prevention systems to identify threats to databases, websites, and other systems.
- **IT Automation** links systems to become self-acting and self-regulating and automate mundane software maintenance activities.
- **Intelligent Processing Automation.** The automation of specific knowledge worker processes.
- **Sales Process Recommendation and Automation.** The use of AI to generate the next best action or activity.
- **Supply and Logistics.** The augmentation of enterprise resource planning capabilities, improving visibility across the supply chain.
- **Automated Customer Service Agents.** Understanding the needs of customers, reducing time and resources spent in resolution.
- **Digital Assistants for Enterprise Workers.** These help workers answer questions and provide recommendations internal to the workplace.

- **Augmenting human to human processes.** AI can be used to surface questions, assist humans to respond better, and save time.

State of AI Adoption in the Insurance Industry

INSURANCE AND AI GLOBALLY

The insurance industry is using AI to automate claims processing and recommend products. By leveraging machine learning, insurers are finding they can gain a competitive edge over their competitors by developing real-time actions on behavioral and demographic data.

For example, AI systems are used to detect deceptive or fraudulent insurance claims by utilizing rule-based learning to identify transactions that indicate fraudulent activity or the heightened risk of fraud, automatically learning the rules to identify numerous insurance-related fraud schemes and using text and statistical analytics to analyze claims adjusters' reports for anomalies. Worldwide, AI adoption in the insurance sector is at early stages but is steadily increasing. IDC estimates spending within the insurance sector to triple by 2023.

Some tech vendors are focusing on AI solutions specific to financial services. For example, Avaya is a prominent vendor for unified communications and contact center solutions. It is integrating its solutions with AI engines such as IBM Watson. The company is recruiting expertise from the financial services industry. It collaborates with management consulting or systems integrators with financial services expertise. This lets Avaya create AI powered unified communications and contact centre solutions, specific to financial services organisations.

INTERNATIONAL CASE STUDIES

Anthem Inc.

Anthem Inc is an Indianapolis-based health insurance company. Subsidiary Anthem Blue Cross is collaborating with Stanford University. Together they want to understand how AI can help with price transparency, improving patient engagement and assisting members with wellness and spending choices.

As the first cab off the rank, Anthem is improving price transparency in healthcare. There are new federal mandates in the U.S. around healthcare price transparency. There is also a lack of meaningful information around out-of-pocket costs to consumers, says AI Program Lead Rajeev Ronanki. The collaboration will build tools to help consumers understand their options and make more informed decisions.

AXA and Expert System – Document Analysis

AXA XL is a subsidiary of global insurer (and re-insurer) AXA. AXA XL offers property, casualty and specialty reinsurance.

AXA XL property risk engineers carry out site visits and review around 10,000 risk survey reports for client properties each year. The company says the amount of data that risk engineers deal with grows each year. AXA XL recognised that it could use AI to automate parts of the risk survey report review process. It partnered with AI company Expert System which deployed its Cogito platform for AXA XL. The platform uses natural language processes to identify and understand information. This information is often contained within unstructured data sets. Analysis helps AXA XL better assess client risks and provide better prevention recommendations.

This enables risk consulting teams to focus risk engineering time on high-impact areas, increase their ability to mitigate client site risk, and decrease underwriters' speed-to-quote time.

Nationwide and Lytx, DriveCam solution, commercial insurance

U.S. based insurer Nationwide partners with fleet management company Lytx. Nationwide offers a safety program for fleet managers of long-haul trucking members. The solution combines video and sensor data from windshield-mounted recorders. Using AI based machine vision the solution monitors driver behaviours. It provides targeted video-based driver coaching to improve driving habits to reduce risk.

This solution enables Nationwide to offer usage-based-insurance (UBI) to its commercial clients. AI algorithms can then calculate premiums tailored to the fleet of drivers. A safer fleet of drivers means, decreased risk, which means lower premiums.

Cigna and Amazon, "Answers by Cigna"

Cigna is a global health services organisation whose products include health insurance and life insurance. Cigna developed a skill for Amazon Alexa it calls "Answers by Cigna". The hands-free skill provides answers to 250 commonly asked healthcare questions. This simplifies healthcare concepts for policyholders. It makes it easier for them to take full advantage of their health benefits with better knowledge. Using their voice, customers can access information at any time and immediately.

AllState ABIe

US insurer Allstate branched out from consumer insurance to new business products. This created a lot of new process and knowledge for insurance agents to know all at the same time. Agents relied on calling the sales team or underwriters for simple queries. This overloaded call centre resources. So AllState created its chatbot ABIe (pronounced "Abbie"). Agents ask ABIe questions and ABIe provides step-by-step help to quote and issue products. ABIe learns as it goes, and can add questions and answers to its repertoire. AllState has enhanced ABIe and it now also assists small business owners with their insurance queries.

Flamingo Ai

Australian based AI startup Flamingo Ai provides platform based Conversational AI for financial services providers. This includes an out of the box cognitive virtual assistant for auto insurance. One of Flamingo Ai's customers is Nationwide Mutual Insurance Company. The insurance company uses Flamingo Ai products for Data Science as a Service and for digital assistants.

Flamingo Ai's other insurance industry customers include MetLife, Cua Health, AMP and Liberty Mutual Insurance.

Zurich and Spixii

London based AI startup Spixii creates chatbots that ask questions to figure what insurance a customer needs. Users access the chatbot via messaging platforms or a mobile app.

Zurich Insurance UK could only provide its customers with a claims service during standard office hours. It wanted to find a solution to let customer lodge claims at any time. Zurich Insurance partnered with Spixii. The insurer wanted a chatbot to handle first notification of non-emergency home and motor claims.

Spixii held a series of collaborative workshops with Zurich insurance and deployed the chatbot, called Zara, within three weeks. Launch day coincided with the start of heavy snow storms for Britain, meaning a surge in claims. Spixii says that in the first 6 weeks of the pilot Zara received 765 interactions, which equated to 20% of the reported claims volume.

Zara won the Innovative Use of Technology award at the British Claims Awards in June 2018.

Riskgenius

Insurance agents and brokers need to spend a lot of time reviewing policy documents. Reviewing takes a lot of human time that could be better used on higher value tasks.

Riskgenius is a US based company with a proprietary machine learning platform solution for underwriting. The solution scans policy documents, reads and organises the content and makes sense of it in a standardised way. The agent or broker uses the results instead of reading the entire document.

The organisation builds up a library of insurance documents in Riskgenius. Now they can compare wording variations to determine how best to standardise policy wording. QBE Insurance Group Limited partnered with Riskgenius to run a proof-of-concept in 2018. The proof-of-concept focused on comparing policies for its product development process. QBE signed up for a production launch of the AI powered solution with plans to upload over 125,000 policy documents into RiskGenius.

Insurance and AI In New Zealand

In New Zealand three owners or underwriters control the traditional insurers:

- IAG: brands include AMI, Lumley, NZI, State
- Suncorp: brands are Vero and AA Insurance
- Tower: owns the Tower brand

Each of the three groups offers direct insurance as well as through brokers, banks and other financial services companies. Each offers personal and commercial

LEMONADE: AI EATS INSURANCE?

Lemonade is a new insurance company operating in the US which operates as a public benefit corporation ("B-Corp").

In a recent blog post, Lemonade argues that supremacy in statistics has moved to Silicon Valley – and this augurs badly for established insurance firms. A loss ratio – previously the "gold standard" insurance metric – is being superceded by new insights based upon deep, textured and rich data. While Silicon Valley technology companies have been collecting huge amounts of nuanced data for decades now, traditional insurance companies are still challenged to collect accurate, machine-readable data about all aspects of their customers and their business.

"Unlike traditional insurers, tech companies won't make do with a global 'loss ratio.' They will monitor the loss ratio per device, browser, and advertising campaign. They will compare the loss ratio of people who press hard on the screen, to those who don't; the loss ratio of those who bought insurance from home, to those who bought it on their commute; those who bought it at 4pm, to those who bought it at 2am. Not only will the machine answer all these questions, it will answer a myriad more we didn't know to ask."

– LEMONADE BLOG[89]

insurance products ranging through fire and general insurance to life products and liability insurance.

Anecdotal evidence suggests these incumbent insurers are at early stage AI engagements. Some are experimenting, running low-scale proof of concepts. IDC's research heard that while executive teams understand the strategic importance of AI based solutions to problems, executable roadmaps or plans aren't yet in place.

Dr Ratneesh Suri, Head of Analytics and AI at IAG said that her organization has done data science for decades, building risk reserving and pricing models, and the company is now in early phases of its experimental journey into the new generation of AI technologies and techniques. The division is conducting stakeholder engagement, driving business education, identifying use cases and building capability. Practical experiments have been initiated both internally and in partnership with start-ups and big vendors. Dr Suri believes IAG's AI maturity is on par with other large New Zealand insurers.

INSURTECH

InsurTech refers to the use of technology to improve efficiency and reduce costs within an insurance company. From there the definition diverges. In New Zealand the term InsurTech could refer to:

- a start-up insurance firm,
- a technology innovator working in the insurance vertical,
- or a traditional insurer with a strategy to use technology such as AI or an established innovation department.

InsurTech insurers tend to offer a narrow product range with a compelling customer experience. Cove, for example, sells just car insurance and phone insurance. Consumers can set up a policy using Facebook messenger.

The recent report by EY and InsurTechNZ investigated the InsurTech industry in New Zealand. The report said that 82 percent of InsurTechs were established less than five years ago. The report found that the InsurTech landscape is unfolding in New Zealand with pace. Seventeen new Insurtech companies have been established in New Zealand since 2017. Around half were less than one year old at the time of the EY/InsurtechNZ report.

Most InsurTechs are already working with an established insurer, broker or services provider. However, over half say there is not enough collaboration yet between incumbents and InsurTechs. The pace of change is illustrated by the number of businesses offering AI for insurance, which include Cove, JRNY, Ambit and UneeQ, this illustrates the pace at which tech-enabled change is happening within the insurance sector in New Zealand.

New Zealand Case Studies

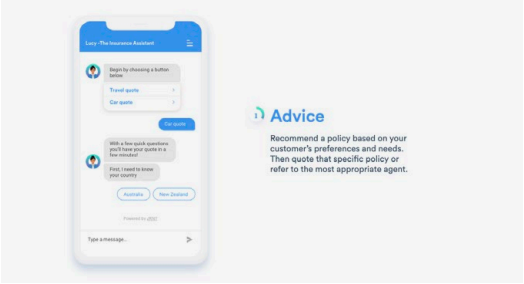
SOUTHERN CROSS AND UNEEQ

Southern Cross Health Society announced in May 2019 that it will launch a digital assistant later in the year. It says the digital assistant will answer questions about health insurance. This includes how the New Zealand health system works, and explaining pre-existing conditions. Southern Cross says its goal is to empower New Zealanders to take more control of their health by creating an engaging digital experience available 24/7. It says consumers are less likely to feel embarrassed asking a digital assistant questions than a human.

The digital assistant, powered by UneeQ, will be available on desktops, tablets and mobile phones. It will be capable of showing empathy using expressions, tone of voice and its choice of phrasing. Southern Cross feel this ability to emote is a key differentiator. UneeQ supports this assertion. "No one wants to talk to a lifeless robot" notes UneeQ CEO Danny Tomsett in a press release.[90] Southern Cross emphasises that its digital human will support the human touch, rather than replace it.

JRNY

New Zealand AI start-up JRNY focuses on creating digital assistants for the insurance industry. Using the digital assistant, consumers can research, buy, manage and renew policies. Its software solution benefits insurers by increasing their sales conversion rates and reducing the cost of customer service.



The company built the solution using seven different technologies. These interact to provide an emotional digital assistant. JRNY partners with IBM, using its Watson conversation engine for much of JRNY's natural language processing. JRNY also partners with UneeQ, a New Zealand based company that develops avatars. Insurers can deploy JRNY's digital assistants on a webpage, in a chat box, or within social media.

Mike Lovegrove, CEO of JRNY, says the company started by creating a basic chatbot covering general queries. JRNY realised, that to be successful, it needed to focus within verticals. A focus within a vertical enables AI to provide higher business benefit than a 'generic' chatbot or digital assistant.

Lovegrove and his team chose insurance because they say research indicates the industry is 'ripe and ready' for artificial intelligence. JRNY selected a vertical that would give its AI large amounts of consumers to quickly create data for machine learning.

Fire and General insurance is the most straightforward for a digital assistant. This is because the interactions are quite transactional. JRNY is adapting its digital assistant for more complex insurance, such as cyber security or commercial liability insurance. Lovegrove notes that life insurances are the most challenging, with a higher need for person to person interaction.

TOWER INSURANCE AND AMBIT

New Zealand start-up Ambit deploys chatbots on its conversational AI platform. The platform is use-case agnostic but Ambit focuses on some specific verticals including Financial Services. Its customers include Tower Insurance, which deploys an Ambit Chatbot called Charlie to help customers answer car insurance claims questions.

Ambit's platform focuses on natural language processing. It contains a series of language models; company aligned, industry aligned and universal language models. Overlaid is software that enables conversation design, analysis and machine learning.

Ambit is a platform play. Comrie says this means a shorter engagement to get a chatbot up and running. What could take 9 to 12 months for a services company to build, Ambit says it can deliver in a matter of weeks on its platform.

COVE

Cove Insurance is a New Zealand start-up that focuses on just two products; car insurance and phone insurance. It provides a chatbot experience through Facebook for consumers to insure their car or phone. The sign up process takes around three to five minutes. Consumers can also sign up via a streamlined, simple web interface.

In the future Cove plans to introduce video claims. Customers take a video of the damage to their car and then record a short "selfie" video to explain what happened. Cove will use AI to assess the claim. AI can also be used to look for anything in the video that could suggest a fraudulent claim and flag that to the company during the claims process.

ACCURO AND INTELLIGENT LIFE

IntelligentLife is a New Zealand based InsurTech company founded in 2006. Accuro Health Insurance is a not-for-profit insurer in New Zealand with around 30,000 policy holders. It partnered with IntelligentLife to develop an automated underwriting solution it calls HUGO (Health Underwriting Goes Online). HUGOs logic ensures it only asks customers relevant application questions based on their prior responses.

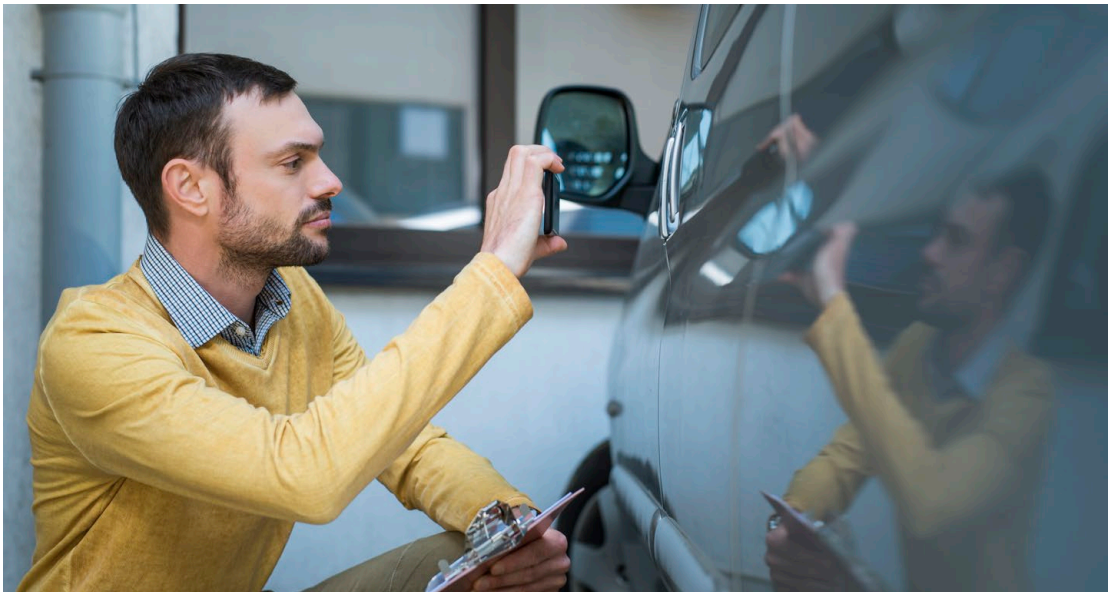
Accuro says 64% of consumers receive an automated health insurance offer, without human intervention. The solution means a more personalised and faster application process for applicants. It also meets the need to have a digital channel where customers can apply for insurance at a time and place that suits them.

Accuro won the Innovation of the Year award for HUGO at the New Zealand Insurance Industry Awards in late 2018.

Section 2. Transformational Use Cases for Insurance

Key use cases for AI in the insurance sector include:

- **Pricing and Risk Assessment.** Using machine learning AI to optimise risk and pricing algorithms based on large and complex historical data sets.
- **Automated Claims Processing.** Automated and intelligent data capture and analysis for investigators and adjusters to investigate and adjudicate insurance claims.
- **Fraud Analysis and Investigation.** Cognitive/AI systems can be used to detect deceptive or fraudulent insurance claims by utilising rule-based learning to identify transactions that indicate fraudulent activity or the heightened risk of fraud. AI systems can automatically learn the rules to identify numerous insurance-related fraud schemes and can use text analytics along with statistical analytics to analyse the reports of claims adjusters for anomalies.
- **Program Advisors and Recommendation Systems.** Cognitive/AI systems use natural capabilities to assist applicant interaction or processing by matching the needs and requirements of the individual with the correct insurance product and level of coverage.
- **Regulatory Intelligence.** Allows companies to more efficiently address their immediate regulatory compliance and move beyond the use of traditional structured data to leverage unstructured information and external data. This can be applied in real time to help deliver actionable insights, limit exposure, and reduce the impact of compliance and conduct issues that arise.
- **Automated Threat Intelligence and Prevention Systems.** AI systems can process intelligence reports, extract the critical pieces of information, structure them in a fixed format, and push the information into the relevant pipeline. The systems can connect the dots between different pieces of information and highlight threats to databases, websites and other systems.
- **IT Automation.** Cognitive/AI/AI-enabled systems orchestrate the linking of IT systems to become self-acting and self-regulating. They can also automate mundane software maintenance activities. These automation engines can perform the decision-making and execution tasks of an IT system. New events are learned from IT human operators rather than



being programmed by software programmers. Examples may include automation of fixed price projects from IT service companies.

- **Intelligent Processing Automation.** Intelligent automation of specific knowledge worker processes, where the system learns to undertake complex workflows. Intelligent process automation excludes non-intelligent robotic process automation such as screen scraping.
- **Automated Customer Service Agents.** Provide customer service via a learning program that understands customer needs and problems to reduce the time and resources spent in achieving customer issue resolution in the insurance industry.
- **Digital Assistants for Enterprise Knowledge Workers.** Digital assistants help workers answer questions, predict future events, and provide recommendations internal to the workplace. Digital assistants help surface information related to a knowledge worker's ongoing daily efforts. Examples may include assisted knowledge discovery during customer calls or complaints: AI could be used to surface up relevant facts, knowledge articles or scripts to assist in faster completion, vastly improving dispute resolution and customer experience.. These intelligent systems leverage machine learning on large data sets, enabling innovation, collaboration, and higher employee productivity, thereby maximising return on information assets.
- **Sales Process Recommendation and Automation.** Cognitive/AI computing engines can work with customer relationship management systems to understand customer context in real time. The systems can then recommend actions to the sales agents that are most relevant to the specific interactions, as well as recommend the next best action for the sales process to try and qualify or close a sale.
- **Supply and Logistics.** Enterprise cognitive/AI systems augment enterprise resource planning capabilities, resulting in improved global visibility across the downstream and upstream portions of the supply chain. The combination of advanced algorithms with the subtlety of human reasoning will anticipate supply and demand imbalances and assist with daily recommendations for schedule adjustments across process silos. Ultimately, this will optimise automated warehousing, delivery schedules, and logistics.

Section 3. Nature and Scale of Impact – Insurers of the Future

Future Trends

Industry analyst IDC predicts that By 2023, 40 percent of New Zealand workers will start working with bots or other forms of AI.[91] This requires company leaders to redesign operational processes, performance metrics, and recruitment strategies. IDC believes this transition to AI assisted working will show up strongly in the insurance sector. This is due to its transactional nature, particularly fire and general quotes, applications and claims processes.

IDC says insurance will become more personalised, more predictive, and more real-time. The company predicts that by 2020, 35 percent of insurers will deploy cognitive systems for improved contextual services. Already, between 6 and 15 percent of insurers worldwide are using cognitive models. IDC also expects that by 2020 around 15 to 20 percent of the total vehicle insurance market will be driven by usage based insurance.[92]

Personalisation is the future of insurance marketing. Our digital native generations already expect personalisation in their online experiences. AI technologies can sift through large amounts of known customer data to enable the development of personalised offers and personalised protection.

Predictive analytics will underpin personalised protection. It will also enable an agile, adaptive and dynamic model to assist underwriters with tailored solutions. AI powered predictive analytics can improve customer retention rates by improving on traditional analytics techniques and better understanding customer preferences and proactively 'saving' customers at risk of churn.

Insurers will shift towards real time situational awareness and dynamically developing the next best action. There are a number of AI based applications for real time awareness. For example, improving pricing, fast-tracking claims and settlements, real time fraud detection, real-time monitoring or portable assets such as vehicles.

There are many opportunities for AI to change the face of insurance in the future. Already companies are experimenting with the possibilities. For example:

- **Facial Recognition Technology.** AI company Lapetus is working on a solution that will use facial recognition technology to assess life insurance risk. Customers provide a recent selfie picture. AI will assess information such as how quickly a person is aging, whether they smoke, their body-mass index. It will also assess more standard information such as gender, height and age. Lapetus believes an AI risk assessment will not only be faster than using traditional models, it will be more accurate.
- **Geo-AI Feature Extraction.** Imagery mapping using drones and AI feature extraction will revolutionise Agri-insurance, geographical risk assessment, and assessing mass claims from a natural disaster. US company Aerobotics maps terrain in 3D and determines plant health from the imagery. Christchurch based Geo-AI company Orbica focuses on feature extraction from aerial/satellite imagery.
- **Leveraging IoT Data.** Billions of connected devices and the volumes of data generated will need AI-based modelling to turn into actionable insights and patterns. This will show up in predicting high-risk classes, optimising premium pricing at an individual level and enabling personalised product recommendation. The most impacted lines of business will be health and wellness, mobility and auto, and travel and leisure insurance.
- **Pre-emptive Health.** Insurance companies are participating in collaborative platforms along with doctors, hospital networks, consultants. This is to address customer needs around when it comes to diagnosis, treatment or even preventing critical diseases. The holistic approach of treatment is facilitated by AI-based modelling and tools.
- **Agri-Yield Prediction.** One of the emerging areas is agriculture business platforms where AI technologies and models are used to predict future events, yields, and loss estimation. The platforms can be leveraged by all participants who can be empowered with quick decision making.

Section 4. Accelerating AI Adoption in the NZ Insurance Sector

THERE ARE A NUMBER OF CHALLENGES AND BARRIERS TO THE ADOPTION OF AI IN THE NEW ZEALAND INSURANCE SECTOR. HOWEVER, THERE ARE ALSO SOLUTIONS TO THESE CHALLENGES. IN THIS SECTION WE DESCRIBE THE CHALLENGES AND A NUMBER OF RECOMMENDATIONS FOR ACCELERATING AI ADOPTION, ALLOWING THE SECTOR TO MOVE FROM ITS EARLY PRESENT STATE TO AN AI ENABLED FUTURE.

Challenges and Barriers to AI Adoption in Insurance

Across industries New Zealand organisations say that cost is the biggest barrier inhibiting deployment of AI solutions (IDC's Cognitive AI Adoption Survey 2018). Organisations are also concerned about governance and regulatory implications. This barrier resounds in the insurance sector where data regulation and compliance is key to customer trust. Indeed, one reviewer commented that "Explainable AI is the #1 enabler that will provide the industry with confidence to use AI to assist in customer claims decision without eroding trust".

Other challenges that impact AI adoption in New Zealand include:

- A lack of understanding from both employees and consumers of AI or its potential.
- A lack of visibility of AI use cases.
- Lack of data science skill sets within end-user organisations.

It should however be noted that insurers are filled with people who are data- and statistics literate (particularly in actuarial and pricing functions) and these skillsets may turn out to be more transferable to AI than in other industries.

There are specific barriers and challenges for the insurance sector in New Zealand. The below challenges and barriers to AI adoption in New Zealand are drawn from qualitative industry interviews:

- **Data Regulation in Financial Institutions.** Company governance, regulation and compliance matters can challenge AI plans. Data is the core foundation for AI solutions. This data must be secure by design and meet regulatory requirements which can be a barrier to using the data at scale for AI solutions.

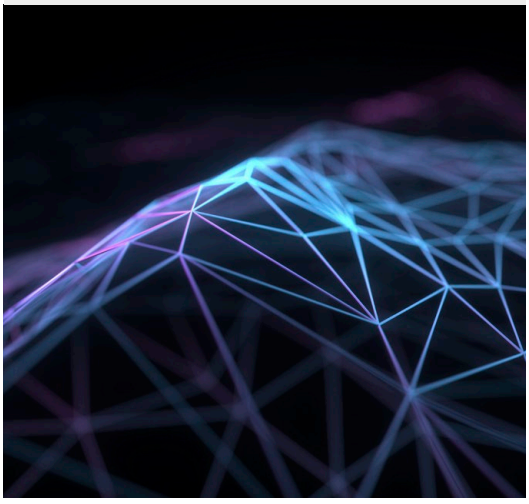
- **Leadership Team Often Focused on "Here and Now" Problems.** It can be difficult to get executive level focus on the possibilities of AI. The leadership team is focused on delivering to KPIs and the "here and now" problems. The "AI department" needs to have a focused effort and an accelerated long term plan to get AI solutions in place.
- **Developing the Mindset to "Do Things Differently".** New Zealand insurers tend towards a conservative approach to change. Management may fall back into known patterns. They know those patterns are secure and compliant and will provide returns. When exploring AI solutions, businesses need to be prepared to experiment, to fail fast, and to accept that not every experiment will have an ROI.

- **Scaling Up is Hard.** Companies may launch a proof of concept as a point solution with scant regard for how it might scale within the existing IT architecture, business processes or employee culture. Lack of budget is another barrier to scale.
- **Market Penetration.** As more consumers engage with AI such as that in Alexa or Suri, this increases the likelihood to engage with other AI. Meanwhile low social license means consumers may be less willing to engage with AI in a domain such as insurance.
- **The Trust Barrier.** High consumer trust is an important factor for any financial services company. A poor experience with AI can ruin that brand trust. Brands tend to be careful about ensuring consumer engagements are safe and low risk. This can slow down experimental plays.
- **Collaboration as a Discipline.** AI providers are often tech companies that need to partner with insurance domain expertise. The recent EY/ InsurTechNZ report said 63 percent of New Zealand's InsurTech companies say there isn't yet enough collaboration to realise successful ecosystem transformation. The insurance industry doesn't have roles such as Chief Collaboration Officer. The industry doesn't often have teams that work together with tech companies to solve industry problems. This is a challenge for an industry that is yet to learn how to collaborate well. It can also lead to insurers trying to build AI projects in house without the value of outside knowledge and collaboration.
- **The Value Exchange:** Customers may be happy to share data if they get something back. For example faster claims processing or lower premiums. There has been some criticism that the financial services sector can be somewhat self-interested when it comes to the value exchange of sharing data. How insurers use customer data needs to be more informed and upfront.
- **Lack of a Clear Definition and Understanding for the Term InsurTech.** To some an InsurTech is a start-up insurance company, leveraging technology, with often narrow product sets. Others define InsurTech as AI vendors that have customised their solutions for the insurance industry. Some incumbent insurers are starting to define themselves as InsurTechs, because they are deploying tech solutions.
- **Avoiding a Larger Divide.** AI bias, discrimination and ethics are a major international research issue. Insurers' risk profiling already ignores some segments or demographics of customers. There is a challenge to overcome to ensure that AI solutions don't oversimplify factors that will introduce machine learnt bias such as gender stereotyping or over simplifying risk assessment. IAG is a founding partner at the Gradient Institute, based in Sydney, to explore these AI ethics issues.

THE GRADIENT INSTITUTE

GRADIENT INSTITUTE
The Science of Ethical AI

The Gradient Institute is a partnership between IAG, CSIRO's Data61 and University of Sydney launched in December 2018. The Gradient Institute has the goal of creating a "world where all systems behave ethically" through research, policy advocacy, public awareness, and training people in the ethical development and use of AI.



Overcoming the Challenges

RECOMMENDATIONS FOR NEW ZEALAND ORGANISATIONS TO ACCELERATE AI UPTAKE

The following guidance for New Zealand insurers adopting AI is sourced from interviews within the New Zealand insurance sector and IDC's Financial Insights APeJ (Asia Pacific excluding Japan) research into AI adoption. Insurers seeking to adopt AI based solutions to business problems should consider the following:

Strategy

- Plan an effective AI strategy aligned with the business goal. Where possible, exploit the disruptive power of new business model with your AI strategy.
- Actively explore partnership-based business models (e.g. wearable tracker manufacturers, real estate agents, automakers) to deliver customer-centric packaged offerings that help build brand loyalty and retention.
- Take part in a connected insurance ecosystem. This involves partnerships with diverse stakeholders including InsurTechs. The aim is to deliver contextual and value-centric products and services to customers in an accelerated fashion.
- Use AI at a tactical level and then elevate to bigger and bigger functions. AI in marketing can form an important part of your strategy – it is a low-hanging fruit. Do something small with relatively low risk but with measurable business benefit.
- To get attention at the C-Level and board level, make sure your first experiments and low scale projects address a "here and now" issue that is currently consuming time in the boardroom.
- AI is a data-driven technology which needs to be understood in the context of providing automation of, assisting in or the creation of decisions. Insurers will need frameworks and principles to ensure the inputs (data) and outputs (decisions) are managed with the same or better risk and quality levels.

People and Culture

- Ensure an enabling organisational culture. AI should be an organisational capability rather than something the "AI department" comes up with. There is a risk of a lack of linkage between the top and the bottom in an organisation which increases the likelihood that misalignment on expectations from AI occurs. This will require a more mature, more tangible, less excitable conversation about AI throughout the organisation, driven from the top.
- Have a multi-pronged approach to engagement. Engaging senior leaders to approve budget is a very different conversation to engaging frontline staff concerned their jobs could be at risk from displacement from AI. Companies should have a workforce and change plan as this new trend changes the job functions where AI assists or replaces core elements of those functions.
- Showing what's possible. AI can seem a nebulous term to those that don't yet understand how to realise its promise. Showing business teams what AI can do relative to existing systems (eg pricing and retention models) is an important engagement step.
- Business education. Once people have bought into the promise of AI they then need education to understand how it will work.
- Try buy-in at people, process, and platform levels (companywide or departmentwide) in the company for successful execution.

Process / Partners

- Be clear about the purpose. AI can have significant benefits but it isn't a panacea. Companies should identify their business problems and gaps then evaluate if AI is an appropriate solution.
- Recognise that AI has different applications for different purposes. A single application or model will not cover the totality of the engagements between customer and the insurance company. For that reason, consider different and best-of-breed applications of AI for specific purposes.
- Consider where AI plays a part in investing in direct channels to complement conventional channels such as customer contact centers or agents/brokers to improve customer outreach and meaningful engagements.
- Look for a balanced human-led versus machine-led automation. In the early stages of AI implementation, you may be hiring more people.
- Reducing the risk. The leadership team takes on the acceptance of risk but it is the business and tech teams that make the initiative low risk.
- Partnership plays a big role. Expertise needs to come from third party vendors. These vendors should have AI experience but also have experience within the insurance domain.

Data

- Data privacy and security are large concerns for the insurance industry. This needs to involve the regulators as well as the industry itself
- Develop data frameworks that will cover data regulation, security and privacy. The framework should feed into your AI design. Ensure both your technical and business side staff understand the basic tenets of the framework, so as to understand what's possible and what's not when it comes to how they use data in AI.

Conclusion

AI has moved into the global insurance sector and New Zealand organisations will need to pay attention. With spending on AI in insurance set to triple by 2023, this is a growth area. New Zealand businesses can increase their rate of AI adoption by formulating an executable single strategy that incorporates AI. There will be a need for culture shifts from the top down along with experimentation, innovation, and a willingness to move fast and learn from failure. Partnerships with the vendor community will be important, as will connections across an ecosystem of diverse stakeholders including InsurTechs. There is great potential for businesses to leverage AI to respond to the changing marketplace and become more customer centric to remain competitive and relevant.

The Research Team

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We welcome feedback and are committed to correcting any errors in future editions. Please direct any comments on this report to our editorial team **research@aiforum.org.nz.**

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