

**College of Humanities
Master of Financial
Technology-
Fin Tech**

**Artificial Intelligence for
Financial Technology**
FNT 626

Lecture 08

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Artificial Intelligence for Financial Technology
FNT 626- AI for Fin Tech

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CHAPTER 10



**Opportunities and use cases of AI in
the insurance industry**



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Learning Objectives

1. Understanding AI Applications in the Insurance Sector
2. Explore the opportunities and benefits of adopting AI technologies in the insurance sector
3. Examine the use cases of AI in underwriting processes
4. Understand how AI is utilized in claims processing
5. Explore the role of AI in risk assessment and management within the insurance industry
6. Address how AI technologies can enhance customer service in the insurance sector
7. Examine the use of AI in fraud detection and prevention
8. Understand how AI-driven data analytics can provide valuable insights for insurance companies
9. Address the regulatory compliance requirements and ethical considerations associated with AI adoption in the insurance industry
10. Explore the future trends and innovations in AI insurance

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Chapter outline

1. INTRODUCTION
2. OVERVIEW OF THE INSURANCE INDUSTRY AND ITS INTERSECTION WITH AI.
3. AI USE CASES IN THE INSURANCE INDUSTRY
4. CRITICAL FACTORS FOR SUCCESSFUL AI IMPLEMENTATION
5. CASE STUDY ON PRACTICAL IMPLEMENTATION STRATEGIES: PRUDENTIAL
6. LEGAL, REGULATORY AND ETHICAL CONSIDERATIONS FOR AI
7. CONCLUSION

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1. INTRODUCTION

In reality, AI consists of a diverse set of technologies, such as computer vision, text to speech/speech to text recognition, natural language processing, trade-off analytics and the like, that enable computers to perceive, learn, reason and assist in problem solving.

In doing so, the chapter considers how AI plays a part within the traditional insurance domain, such as sales, underwriting and claims, and also how it could be leveraged to further the more modern aspirations of progressive insurers seeking to evolve from being primarily a healthcare payer to a wellness and lifestyle partner in life.

While insurers are increasingly able to use AI on narrow, tactical work such as straight-through processing for simple claims or AI chatbots with a clearly defined scope, transformational use cases are still few and far between.

2. OVERVIEW OF THE INSURANCE INDUSTRY AND ITS INTERSECTION WITH AI.

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2. OVERVIEW OF THE INSURANCE INDUSTRY AND ITS INTERSECTION WITH AI

The insurance industry is made up of different types of insurers – by and large, life insurers, general insurers, composite insurers, reinsurers and distributors. On the other hand, general insurers write all insurance businesses typically in property and casualty business lines, apart from life policies and long-term accident and health policies. This may include marine insurance, commercial insurance and motor insurance.

Reinsurers are business-to-business (B2B) focused, in that they serve insurance companies and write insurance policies to take on all or part of the insurance risks. In sales and distribution, actors such as agents (otherwise known as appointed representatives) of insurance companies and financial advisors who are appointed representatives of the **independent financial advisor (IFA)** firms, personal bankers in bancassurance (who are appointed to represent the bank they are employed with) and insurance brokers (which are typically B2B-focused).

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2. OVERVIEW OF THE INSURANCE INDUSTRY AND ITS INTERSECTION WITH AI

According to McKinsey, the future of insurance will be shaped by the explosion of data from connected consumer devices, increased prevalence of physical robots such as surgical robots which can impact risk assessments, open source and data ecosystems which enable wearable data to be shared with insurance companies, and with the advances of cognitive technologies, such deep learning can enable insurance products to be tied to an individual's behavior and activities. For example, life insurance policies could be priced on a 'pay-as-you-live' model, analogous to **usage-based insurance (UBI)** in motor insurance by incentivizing drivers to develop safe driving behaviors with telematics. By taking advantage of data, insurance companies can have the ability to provide customers with information to mitigate hazards or prepare them for potential losses – for example being able to detect a leaking pipe and turning off the water source.

3. AI USE CASES IN THE INSURANCE INDUSTRY

3.1 Sales and Distribution

3.1.1 Chatbot for product discovery and simple product sales

3.1.2 Underwrite, quote and purchase

3.1.2.1 Algorithmic underwriting

3.1.3 Customer service

3.1.3.1 Intelligent virtual assistants and call centers

3.2 Claims Management

3.2.1 Claims estimation

3.2.2 Fraud detection

3.3 Product Management

3.3.1 Product analysis and development

3.4 New Aspects of Insurance: Moving from Healthcare to Health and from Pushing Products to Being a Lifestyle Concierge



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3. AI USE CASES IN THE INSURANCE INDUSTRY

look closely at AI use cases in the business processes.

3.1 Sales and Distribution

Lead generation is vital to any sales process. In insurance, this could come from various channels, such as email campaigns, online content, social media, events, or referrals. With marketing consent and a series of interactions via the channels, a lead can be generated for a follow-up call or appointment.

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Ch. 10- Opportunities and use cases of AI in the insurance industry**3.1.1 Chatbot for product discovery and simple product sales**

A chatbot on product discovery will allow customers to self-discover products quickly rather than the current static way of filling out forms or downloading product brochures. This is done using a series of interactive chats to understand, guide, nurture and pre-qualify the prospect based on needs, preferences, and suitability of a product. New leads can be generated when the user has shown interest in a product. Chatbots could start off from a rules-based pre-defined Q&A framework and evolve to more sophisticated algorithms leveraging **Natural language processing (NLP)** for intent and context recognition and return recommended replies. The use case can be extended to the selling of simple products through the chatbots.

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3.1.2 Underwrite, quote and purchase

Underwriting may be performed through a process of collecting and analyzing data at the point of application for a policy. For example, in life insurance, medical history and attributes are mapped to point values to assess the financial risks to the insurance company and price premiums accordingly when writing the policy.

3.1.2.1 Algorithmic underwriting

New insights to risks profiling and categorization can be made by **machine learning (ML)** algorithms through a feature selection of traditional and non-traditional data sources (e.g., financial data, electronic medical records, wearable sensors, etc.) With adequate advancements, products can be underwritten autonomously with customized offers according to the customer's risk profile while reducing underwriting to mere seconds and freeing up human underwriters to focus on the long-tail complex cases.

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3.1.3 Customer service

This is the business process that serves customers in customer enquiries and other servicing instances, such as updating changes in customer information to their contact details, residential address, payment, and bank account information, etc.

3.1.3.1 Intelligent virtual assistants and call centers

The volume of calls to the call center can be optimized through the use of intelligent call routing and deflection in an AI-human hybrid setup. Simple cases such as enquiries and the updating of simple customer information can be handled by chatbots for the first-level support, and complex cases can be escalated seamlessly to human specialists. Such a setup will require NLP, including topic modelling, text-to-speech techniques and natural language generation models, which provides for richer call analytics to be carried out to further improve the chatbots and call experience.

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3.2 Claims Management

A claim could be registered with the insurance company at the instance of loss. Typically, claim information is collated in a structured manner and is supported by unstructured data sources, such as images of reports and receipts. The claim is then adjudicated and assessed for validity for payment according to the policy terms and coverage.

3.2.1 Claims estimation

Computer vision and classification algorithms can be used to estimate claims from the first notice of loss. A classical use case is in motor claims where object detection algorithms are used to detect car parts and estimate the cost of repairing the damage, and possibly recommend a repair or parts replacement. This enables the customer to get an estimate of the total bill of the damage quickly, thereby improving customer experience and informed decision-making. The use case requires the computer vision and ML model to recognize damaged car parts, estimate the extent of damage and size of the bill.

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3.2.2 Fraud detection

Fraud cases are typically outliers, which in a sense is like picking a 'needle out of a haystack'. Fraud problems will have to deal with a highly skewed, imbalanced dataset and the true positives of the data are not known. Using unsupervised techniques such as clustering (mini-batch K-means, isolation forest, etc.) can identify suspected fraud clusters. This subset of data can be further worked on with sampling strategies and supervised algorithms such as light **Gradient Boosting Model (GBM)** and possibly enhanced using ensemble learning incorporating other **classification and regression tree (CART)** algorithms to identify cases which have higher potential to be fraudulent for follow-on human investigations.

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Ch. 10- Opportunities and use cases of AI in the insurance industry**3.3 Product Management**

This is the function that designs, develops and manages insurance products for profitability and to meet the evolving needs of customers. For example, a new travel insurance plan can be introduced to cater to the needs and budget of the leisure traveler of various segments and consider competitive products.

3.3.1 Product analysis and development

Policy documents and contracts can be scanned using NLP techniques such as NER and information extraction to analyze product features, competition and shorten product development cycle. Product recommendations using collaborative- or content-based filtering in recommendation engines with the assumption that 'like-mindedness' or similar customer profiles tend to buy similar products can be explored to improve offerings.

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Ch. 10- Opportunities and use cases of AI in the insurance industry**3.4 New Aspects of Insurance: Moving from Healthcare to Health and from Pushing Products to Being a Lifestyle Concierge**

As technological advancements and customer expectations evolve, traditional industry borders are falling away. Ecosystems have emerged across industries providing a platform to connect offerings from cross-industry players while embedding insurance products to offer a seamless customer experience. An insurance company could position itself at the center of an ecosystem of interconnected services, such as smoke, intrusion and leakage monitors for the home, and health and wellness including diagnostics and advice. In the case of health insurance, the insurance company takes on a proactive stance to partner with customers in their health and wellness journey. It can recommend to customers, for example, fitness regimes, nutrition plans, mental well-being, or health screenings to enhance the well-being of customers while providing an avenue and incentive for early detection of disease and sickness. This is well aligned with the overall objective to 'reinvent' their relationship with customers, attract new customers, increase revenue, and reduce costs.

4. CRITICAL FACTORS FOR SUCCESSFUL AI IMPLEMENTATION

4.1 Data and Digital

4.1.1 Clean and complete data

4.1.2 Connected data

4.1.3 Comprehensive data

4.1.4 Cyber-safe, compliant data

4.2 People

4.2.1 Skills

4.2.2 Culture

4.3 Business Model Innovation

4.3.1 Disruptive business models

4.3.2 Open innovation ecosystem



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Ch. 10- Opportunities and use cases of AI in the insurance industry**4. CRITICAL FACTORS FOR SUCCESSFUL AI IMPLEMENTATION**

All major international insurers have now claimed to have embraced AI in one way or another, with insurers in the motor, property and casualty space perhaps showcasing the most transformative changes. These include using ML to instantly assess the damage to motor vehicles after an accident and running open-source data through AI algorithms to understand the likelihood of future claims, risk profiles and quality of risks, respectively. A 2019 cross-industry 'Demystifying AI' study comparing 114 digital transformation leaders with 424 'laggards' – which were defined as companies that either had no AI plans or were still either planning or testing out implementation – provides insights into what the differentiating organizational capabilities could be. The top traits that separated the leaders from the laggards centered around three themes: data and digital (integrated data management, security strategy, digital processes, digital strategy), people (CEO priority, agility) and business model innovation (open innovation ecosystem).

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4.1 Data and Digital

4.1.1 Clean and complete data

Insurers sit on a trove of data; much of it is gained from pre-purchase **know your customer (KYC)** forms and when customers make claims. High-level information, such as whether the claim was paid out (yes/no/partial), how much was paid, and similar information, was usually recorded and aggregated into management reports, but the line items containing details such as what medicines were prescribed, which line item claims were approved or rejected, and other information critical for machine learning to happen were often tucked away in oblivion, still existing in the insurer's records but without easy access. Even after solving the issue of incomplete and inaccessible data, the absence of clean data would typically prevent immediate use. AI-minded insurers have thus found that it was critical to build a data dictionary that functioned as a centralized repository of information about what the data meant, its relationship to other data, origin, usage and format. For traditional insurers, this is sometimes a huge, multi-year task, as it involves understanding how its internal teams and external stakeholders (like the thousands of clinics and hospitals it serves) use particular phrases, and then working to standardize them in the backend, with a view on both historical and future impacts.

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4.1.2 Connected data

Insurers also quickly realized that data needed to be stored, structured, and presented to the user by means of a modern data architecture, avoiding data silos and incompatible data formats. The traditional monolith architecture had tightly linked modules with strong interdependencies and limited scalability. This is increasingly being replaced by more responsive and agile systems that consist of reusable components in **service-oriented architecture (SOA)** or even microservices architecture. Microservices calls for the creation of a large number of small, independent, highly decoupled processes communicating via APIs, and is the most resilient and flexible. Again, this is a large undertaking requiring significant financial and people investment. Also, as each type of architecture comes with its unique set of issues and complexity, there also needs to be sufficient executive will to push through such data integration projects.

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4.1.3 Comprehensive data

It is necessary but not sufficient for an insurer to get its internal data cleaned and connected. In the case of a fresh graduate in her 20s who purchases a life insurance policy and faithfully pays her premiums for the next 20 years but otherwise has no contact with the insurer, personal details like occupation, income level, marital status, health condition and other details become outdated. Progressive insurers recognize their need for a comprehensive data strategy that will allow them to have access to data that enriches and complements their internal datasets, to better serve their customers, reach out to untapped markets and proactively identify risks. Open banking is also starting to make its presence felt across the globe, either mandated by government, in the case of Europe's second **Payment Services Directive (PSD2)**, or strongly advocated and supported by the government, in the case of **Singapore's SGFinDex** initiative, a collaboration by Singapore's financial regulator, its tech and employment agencies as well as by participating financial institutions. With this consent-enabled, consolidated access to financial information on a platform of their choice, the ability to provide customers with novel, value-added services and insights, powered by AI, will be a competitive advantage and differentiator. The challenge is to do so in a cost-effective manner.

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4.1.4 Cyber-safe, compliant data

Learning from the failings of the tech behemoths and coming from an industry that is far more heavily regulated to start with, insurers are acutely aware that the data that feeds machine learning algorithms must be accessed, stored and used in a manner that is ethical. The challenge here is two-fold: a technical race to keep ahead of the cyber-security curve and navigating through the complexities of the still-evolving legal frameworks for AI, privacy, and competition law, as the various countries work out their social contract on what optimal balance of security versus cutting-edge innovation should be. A successful data and digital strategy is one that builds trust with the customers it is serving. AI will flourish to the extent that insurers are able to assure customers that their data is being used responsibly.

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4.2 People

4.2.1 Skills

Data and digital transformation require markedly different skill sets from what insurers have traditionally recruited. While information technology (IT) teams used to be tasked with incremental improvements on existing systems, insurers hoping to succeed with AI are now recruiting world-class executives who can set direction on data architecture, elite programmers who are able to work on agile sprints to support ongoing development work and AI engineers. A third challenge is helping senior leaders in both management and on the board to have a good working knowledge of AI so that they will be able to effectively steer the business and provide oversight on business, regulatory and ethical issues that will arise from the use of AI in insurance. Finally, besides professionals directly working on AI initiatives, supporting specialists are also critical to the success of AI in insurance. For example, design innovators help the insurer work out the best use cases and solutions for AI, user experience professionals make the newly designed customer journey smoother and more frictionless, and the ecosystem partnership managers amplify the effectiveness of the firm's AI strategies with complementary partners who provide key technology or share data. In the most progressive insurers, mandatory basic AI training has been rolled out to all staff, so everybody, regardless of their functional duties, will be able to support AI initiatives.

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4.2.2 Culture

To scale up AI, insurers will also have to implement new ways of working. Functional silos, where the focus is on imposing control rather than eliciting commitment, is increasingly giving way to cross-functional, interdisciplinary collaboration. This will ensure that AI initiatives address broad enterprise-wide priorities, not just narrow departmental concerns. It will also increase the likelihood of incidental operational impact being picked up at an earlier stage, lowering implementation risk. Also, given that AI implementation usually works best by starting from a minimum viable product before working its way to its full desired level of functionality through numerous test-learn cycles, the culture within an insurer also needs to shift towards becoming more agile and experimental. To this end, borrowing from behavioral science principles, framing agility and test-learning as risk mitigation tools that help manage costs, business exposure, and operational risks could help these new ways of working resonate better in the insurance context. Given the centrality of the role of ethics in responsible AI, insurers also need to double down on their focus on ethics.

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Ch. 10- Opportunities and use cases of AI in the insurance industry**4.2.2 Culture**

While the emphasis on doing the right thing is already a key feature of many compliance and ethics programs within insurance companies, the power of social norms can be further tapped into to encourage ethical development and deployment of AI. By spotlighting ethical beacons, ethical norms are created, which makes it easier and more natural for others to make ethical choices in AI and beyond. Looking further into the future, as AI algorithms work alongside experienced insurance staff in creating value, decisions may increasingly be made by working-level staff who have access to the predictive analytics they had helped set management-approved parameters for. While it is impossible to predict the extent of this, a culture of co-opting rather than being adversarial to AI would be helpful to accelerate AI adoption in both core insurance functions as well as in decision-making within the firm.

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4.3 Business Model Innovation

4.3.1 Disruptive business models

The best people building out the best technology does not necessarily bring success. Apple's iPod with its iTunes store, which later evolved into Apple Music embedded on the iPhone, revolutionized both the music industry and portable entertainment for consumers. However, few if any insurers have successfully combined AI with an innovative business model to power themselves into a clear market-leading position, the way Apple (disrupting the music and mobile phone markets), Amazon (disrupting retail) or Tata (creating a brand new market for low-cost cars in India, even without AI) have. Any successes tend to be localized, as in the case of Chinese insurers, or relatively narrow in scope, as in the case of general insurers using AI and external data to manage risks in their property and casualty business.

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4.3 Business Model Innovation

4.3.1 Disruptive business models

Professor Clayton Christensen's seminal work on disruptive innovation could be instructive to insurers wishing to go further in redesigning their business models. The starting point, according to Professor Christensen, is to find opportunities to satisfy a real insurance customer who needs a job done, or in other words, to work out the customer value proposition by solving a fundamental problem for the customer. The more important the problem is to the customer, and the better the proposed solution is compared with existing options, the higher the value to the customer. After identifying the 'job to be done', the next step is to work out a blueprint, or profit formula, to solve the problem for the customer while creating value for the insurer itself, considering the revenue model, cost structure, margin model (contribution from each transaction to achieve profits), resource velocity (how resources should be utilized to support the business objectives), key resources available and key processes. The recommendation by Professor Christensen is to start by setting the price required to deliver the customer value proposition and then work backwards from there to determine the other factors. Ultimately, whether AI in insurance is a passing fad, a nifty add-on to the core business or a real and sustainable competitive advantage will depend on the viability and strength of the business model it is nestled within. This would in turn affect the continuing investment into AI initiatives.

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4.3.2 Open innovation ecosystem

It is also worth mentioning that, to scale up AI initiatives quickly, progressive insurers are pivoting from their traditionally closed 'we will do it all ourselves' model to that of an open ecosystem, where the focus is on working with other experts outside of the company to create value. Another key feature of open innovation is the degree to which **intellectual property rights (IPRs)** are tightly held: while the closed model emphasizes control of IPRs so that competitors do not profit from it, open innovation advocates profiting from others' use of our IPRs as well as buying other people's IPRs whenever that advances the internal business case. As in many other companies, insurers are not immune to the 'not invented here' syndrome which inhibits AI innovation, and the cultural shifts within insurers as articulated above provide a good foundation for the firm to benefit most from the open innovation ecosystem.

5. CASE STUDY ON PRACTICAL IMPLEMENTATION STRATEGIES: PRUDENTIAL

- 5.1 Tone from the Top
- 5.2 Tune in the Middle
- 5.3 Test-learning with Partners
- 5.4 AI Ethics and Governance
- 5.5 Inclusion and Diversity



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5. CASE STUDY ON PRACTICAL IMPLEMENTATION STRATEGIES: PRUDENTIAL

A study by the United Kingdom's (UK) Financial Conduct Authority (FCA) on nearly 200 firms in 2019 suggested that barriers to adopting AI seem to be internal rather than regulatory. Today, the Prudential group is taking on one of its largest AI projects yet: Pulse by Prudential ('Pulse'), an AI-powered app with multiple service offerings. In addition, Pulse offers bite-sized insurance products that can be bought directly from the app, as well as interactive AI tools. These include a health check, symptom checker, and various computer-vision-based tools, such as a food log, that allow the user to gain health and wellness advice directly from their mobile device. Pulse also has wealth tools (Wealth@ Pulse) that are designed to make it simpler for everyone to begin their financial planning journey.

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5.1 Tone from the Top

It is a truism that the very essence of leadership is having a vision that is articulated clearly and forcefully on every occasion. 'You can't blow an uncertain trumpet,' influential American priest and university president Reverend Theodore Hesburgh famously declared. The depth of conviction by senior members of Prudential's group leadership team is a key reason for the traction of the Pulse app. Recognizing that a smart app like Pulse could only be built with new ways of working, different work streams were set up to support the digitalization process. A **Centre of Excellence for AI (AI CoE)** was set up with the aim of applying machine learning and neural networks to large-scale, multi-structured datasets, and deploying these models into Pulse. Specialists in London, Singapore, and Thailand were hired - data scientists, entrepreneurs and actuaries working side by side to tackle AI challenges. To ensure that Pulse was being built as a single platform with the ability to contextualize for local audiences, reporting structures were changed, regular regional hothouses were set up and agile ways of working introduced throughout the organization.

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Ch. 10- Opportunities and use cases of AI in the insurance industry**5.2 Tune in the Middle**

A study of large-scale change and innovation efforts in 56 randomly selected companies, including those from the insurance sector, showed that only 32% succeeded. Their success was credited to the involvement of mid-level managers two or more levels below the CEO. In those cases, the mid-level managers were not just managing incremental change but leading the charge by effecting change across the organization. The local businesses that initially had the best track record of implementation were also the ones where the middle managers were most bought into the vision of Prudential expanding from its traditional role of providing financial protection against sickness to becoming a partner in people's wellness. Through regular sprints and hothouses (intensive multi-day workshops where an idea was brought from idea to prototype and, where appropriate, integrated into Pulse), more of the middle management and their teams from across Prudential's Asian markets became engaged. There was a high bar set for programmers to be allowed into the hothouses, and the best of them were acknowledged as elites, a coveted title many worked hard for. In addition, to enable a broad-based understanding of AI throughout the organization, all staff in Prudential Singapore would have completed an AI in Finance course.

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5.3 Test-learning with Partners

Creating something new from scratch is often challenging. Prudential forged close partnerships with leading tech providers, AI start-ups, clinicians, and governments across the region, enabling it to scale up Pulse quickly. A key mindset shift is to co-create solutions with partners, instead of crafting specifications of the solution then getting the partner to either build or adopt it. Prudential has also been running its own open innovation competitions, with the aim of identifying talent, themes for further development, and implementable solutions. A particular difficulty of doing AI proof of concepts are the legal and regulatory restrictions around sharing the confidential data required for testing machine learning models. Possible ways to overcome this include anonymizing data, using third party data collaboration platforms, and bringing the machine learning algorithms within the company's secure environment for testing, instead of allowing the data to go out.

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5.4 AI Ethics and Governance

While the use of AI has brought significant benefits to Prudential's customers and insurance operations, Prudential also proactively manages potential risks in deploying AI. Its Global AI Council, chaired by Prudential's Group Chief Digital Officer, is responsible for oversight of AI tools and their implementation in its business. This council meets quarterly and includes six working groups. The council reviews all projects incorporating AI and machine learning across the business units before they receive approval. In 2020, Prudential developed a set of AI ethics principles, reviewed by the Global AI Council. These principles align with the Group Code of Business Conduct and set clear standards for staff responsible for designing, developing, and operating complex applications. In addition, psychological safety to voice concerns is also baked into Prudential's day-to-day operations by having 'Courageous' as one of its five enterprise-wide values. These values are continuously reinforced by senior management and people managers at company events, and staff receive regular ethics training to remind them to always do the right thing.

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A lack of organizational staffing diversity has been flagged as a cause of biased AI. As AI systems are built on learning from data, its fairness is in part dependent on whether that data itself is in any way biased. Such bias can be unconscious. Apart from the safeguards institutionalized in the governance process as described above, Prudential is also taking steps to ensure its workforce is diverse and inclusive. Amongst other initiatives, in 2021, Prudential's Global Chief HR Officer sponsored a Women in Tech initiative to support early career female tech staff in growing their careers.

6. LEGAL, REGULATORY AND ETHICAL CONSIDERATIONS FOR AI

6.1 Key Issues and the Positions Taken by Various Jurisdictions

6.1.1 Who is responsible for AI in insurance?

6.1.2 Standards for AI

6.1.3 Data and data privacy

6.1.4 Competition law

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Ch. 10- Opportunities and use cases of AI in the insurance industry**6. LEGAL, REGULATORY AND ETHICAL CONSIDERATIONS FOR AI**

The deployment of AI solutions in insurance provides unprecedented opportunities for improving health and wealth outcomes, as well as for financial inclusion and smarter decision-making. As we briefly consider some of the legal, regulatory, and ethical issues surrounding AI in insurance, it is worth making a preliminary observation that insurance has historically been heavily regulated and closely supervised. This significantly reduces the risk of willful misuse of AI in insurance as, AI or not, insurers are ultimately still held accountable for their activities under current insurance laws, regulations, and practice directions.

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6.1 Key Issues and the Positions Taken by Various Jurisdictions

Due to the constraints of brevity, we have taken a signposting approach here, spotlighting issues and suggesting avenues to further develop an understanding of those themes.

6.1.1 Who is responsible for AI in insurance?

When humans act, they typically have direct legal responsibility over that. While a good number of countries have AI ethics frameworks that make people and organizations responsible for the creation and implementation of AI accountable for them, this is not yet settled law. Some scholars still consider that it is 'difficult and important' to be able to ascribe responsibility when a machine learning algorithm goes wrong. This difficulty appears to be absent in the insurance sector, with regulators across the globe clearly placing responsibility for AI on humans. In the US, the **National Association of Insurance Commissioners' (NAIC)** Principles on AI guidance addresses 'AI actors', which they define as insurance companies and all persons or entities facilitating the business of insurance that play an active role in the AI system lifecycle, including third parties such as rating, data providers and advisory organizations. In Singapore, the Monetary Authority of Singapore ensures that insurers adhere to the AI Principles it had set out, and UK regulators have also stated that the adoption of AI systems will not reduce the existing accountability burden on humans.

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6.1.2 Standards for AI

As of 2021, the EU, Australia, Canada, Japan, Singapore, and the OECD all have rolled out ethical frameworks on responsible AI. While each framework is structured differently and uses slightly different terminology, they share a similar conceptual foundation and are principles-based, rather than prescriptive. There are two reasons for this: first, because AI comprises a diverse set of technologies, uses, cases, and stakeholders, and second, because the technology is still rapidly evolving. Broadly, principles include that AI is being designed for the benefit of humans and avoiding unintended consequences on third parties, having governance structures and technical safeguards to avoid unfair bias. In Singapore, the Monetary Authority of Singapore, which regulates insurers, has specifically and succinctly put forward 14 principles for financial institutions assessing existing or developing new internal **AI and data analytics (AIDA)** frameworks to consider. As many AI use cases are relatively novel, there is also the issue of what weights should be reasonably attached to each limb of the relevant laws, regulations, or guidelines. In this regard, the three case studies considered by the **Monetary Authority of Singapore (MAS)** and the **Personal Data Protection Commission (PDPC)** in collaboration with their industry partners are useful in providing further guidance.

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6.1.2 Standards for AI

In **Case Study 1**, AI was used to predict which credit cards would be used for travel – an issue considered included the materiality (i.e., probability and severity) of the application of AI. Applying the PDPC's AI Framework, materiality was deemed as low because the outcome of improper decision-making was a low campaign success. Another factor spotlighted included that context is important in ensuring that an AI model is built fairly (e.g., as travel is seasonal, the model should ensure that individuals are not disadvantaged by decisions made by the AI solution in a particular season because the training data was gathered from a different season).

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6.1.2 Standards for AI

Case Study 2 involved using AI to automate the verification of wet ink signatures, to minimize the risk of forged signatures accepted. In that case, factors considered included materiality of the application of AI (on the lower end in this case, as this was to support or replace an operational decision as to whether a client instruction should be processed or escalated to a human assessor) and transparency (balancing the need to explain the use of AI to customers versus not giving away too many details so that customers could game the system). Another interesting point to note is that not all responsible AI principles are equally relevant in every context: here, it was concluded that there was no need to explain to the customers what data was used to make AI-driven decisions as the only input data was their wet ink signatures. Here, data quality was flagged as a key issue affecting the materiality assessment as there is a trade-off between having a dataset as complete as possible for greater accuracy versus increasing the risks of poor data quality by using more datasets from third parties. In this regard, the PDPC AI Framework acknowledges that there may be situations in which it was neither reasonable nor practical to provide information on an AI algorithm.

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Ch. 10- Opportunities and use cases of AI in the insurance industry**6.1.3 Data and data privacy**

Data is the oil fueling the growth of AI, and any further significant advances of AI in insurance will depend on the quality of well-formatted, representative data free from biases and discrimination. Broadly, such data usage needs to be lawful and transparent, with full disclosure to individuals on how their data will be used and then to only use it for that purpose alone. It also needs to be representative, as AI is only as fair as the data it draws from. In this regard, care needs to be taken to ensure that the data does not perpetuate previous bias or discriminatory behavior, for example in disallowing a disproportionate number of claims from a particular gender or racial group because historically their claims record had been more spotty.

LECTURE 8

Ch. 10- Opportunities and use cases of AI in the insurance industry**6.1.4 Competition law**

With the advancement of machine learning, there is a possibility that complex algorithms could one day lead to collusive activities amongst firms, such as in the area of pricing. Such algorithmic collusion has been found to be the case in online retailers of consumer goods, in the US, UK and EU. Regulators like the Competition and Markets Authority in the UK, and their EU counterparts, have opined that companies will not be able to escape responsibility by hiding behind a computer programme.

Conclusion

In this chapter, we have explored how AI presents both opportunities and risks for insurers and their customers, and how insurers can leverage AI to achieve the best outcomes for themselves and their customers. The chapter also identified potential use cases that may come into play once the technical, risk, legal and regulatory preconditions are more fully present. In doing so, the chapter consider how AI plays a part not just within the traditional insurance domain, such as sales, underwriting and claims, but also how it could be leveraged to further the more modern aspirations of progressive insurers seeking to evolve from being primarily a healthcare payer to a wellness and lifestyle partner in life. Finally, the chapter surfaces some of the key legal, regulatory and ethical considerations around AI application, and points out the significant common ground of AI governance policies worldwide while highlighting the importance to translate them into practice for insurers and AI InsureTechs with collaborative exercises and guidance, such as the ones launched by the Monetary Authority of Singapore and the Singapore Personal Data Protection Commission.

Artificial Intelligence for Financial Technology

References:

Required Reference:

Remolina, N. and Gurrea-Martinez, A. eds., 2023. Artificial intelligence in finance: Challenges, opportunities and regulatory developments. Edward Elgar.

Recommended Readings

Chishti, S., 2020. The AI book: the artificial intelligence handbook for investors, entrepreneurs and fintech visionaries. John Wiley & Sons.

The End of Lecture

Thank You

Dr. Abeir Moussa