

Cognitive Automation and Predictive Personalisation: Transforming Policyholder Interactions Through Intelligent Systems in Insurance

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1. Introduction

The global insurance industry is a highly competitive space. As such, many large insurers are choosing to adopt a more consumer-driven focus. This strategy focuses on incorporating various consumer preferences and needs. Among the trends in the industry, these preferences include simplicity, better accessibility, on-demand products, and superior services. Despite the move toward more consumer-focused strategies, few companies have successfully implemented technology to assist in such efforts. The focus on customer-centric innovation takes the current insurance practices to the next level. There will be a demand for companies to continue to identify new and better ways to develop their relationship with the customer.

The reason for taking an in-depth look at artificial intelligence for customer experience management in the insurance industry is twofold. Firstly, insurance is complex, and often customers have difficulty understanding their policies. The use of AI could make personal insurance experiences more timely and accurate. The second reason for exploring AI in insurance is that the world is heading in a dynamic, technology-driven direction. To maintain their position in any industry, organizations will need to understand and be aware of what emerging technologies are available for customer interactions. Therefore, insurance companies will need to adjust their strategies and offer additional services and products to meet the new customer needs; this would need to proactively meet customer demand rather than waiting for the customer to ask. The consumer's insatiable demand for information in real-time and unique products and services has very significant consequences for all industries operating in the digital space of the world. While appealing, AI can shift the focus to greater customer

experience, as there is a risk of it becoming a rejection engine. Some potential benefits of mastering AI involve automating common claims management in these insurance fields and providing users with products and services. It might also contribute to improving the efficacy of insurance sales and marketing and enhancing personal relationships. In the following sections, we will discuss how AI can transform the customer experience in insurance.

1.1. Background and Significance

Insurance institutions have paid little attention to customer service and satisfaction due to their control of the market. Market competition has expanded, and customer satisfaction, along with technological advancements, has increased. Customers deserve perfect assistance to relieve their worries and navigate the material because insurance is a service, not a physical commodity. There are distinctions between industries that employ AI technology based on projected IT difficulties. These include the banking industry, which is divided into situations where institutions have IT-related issues but would rather do without AI and situations with no serious IT-related issues.

AI technology can drive the company forward. For insurance, assisting or replacing advisors can lead to force enhancement. Advisors will have the ability to closely track their customers 24/7. Personalized advice can be produced even more effectively by AI technology. Consumers and society will benefit through greater affiliated creative development. Disruptive technologies, especially AI, are obligatory. AI is no longer a cool creative tool used by corporations to enhance operations. It is the new age, and its transformative capacity is limitless. Since it will be extremely difficult for AI to achieve our normal standard, we must automate it as efficiently and accurately as possible while still maintaining a human touch ethic. Consumers in all industries have become more sophisticated as a result of this. AI-supported efficiency may be a potent tool to help organizations boost consumer satisfaction, but they must commit to using AI in ways that add value and answer consumer inquiries.

1.2. Research Objectives

The main objective of the current research is to identify and analyze how AI can augment customer experiences in general and in what ways AI and technologies in the background can support not just the sales process, but enhance customer experience at various stages of the sales process and customer contact. Furthermore, as the use of

digital channels is gaining ground in insurance, we also seek to answer the question of how AI-driven technologies can serve customers in direct and digital channels and build on our earlier findings supporting the development of direct contact and sales in insurance. We aim to summarize the inhibitions of AI augmentation as well, which are identified in the specialized literature.

As exploratory research, the first objective is the analysis of the specialized international and Hungarian literature, documents, and related market overviews, and to collect the available information on how the different AI platforms can be embedded in insurance, providing operational or customer experience-related advantages. The procedural objective of the research is to analyze the different technological solutions offered by AI solution vendors and insurance companies. Furthermore, with the help of experts and, expectedly, the involvement of relevant organizations, we want to describe customer sentiments toward the various ratings and awards. We think that the detailed, cross-industry study of the verbal evaluation can provide a representative image of what kind of experts can make a contribution as described above. We believe this research will provide some background into why the insurance industry did not wait for the practical exploitation possibilities of the next-generation AI technologies, and how confidently the industry experts approach the exploitation of the rapidly innovating field. In addition to evaluating the explosive spread of these technology markets, the really important, immanent task is to provide the scientific basis for the demand for artificial intelligence-based insurance and its derivatives based on what advantages it can offer in customer service, and we can recommend a technology background that maximizes customer satisfaction. In addition to providing a scientific background, the results are also expected to serve as a guideline and source of inspiration for telecommunications service providers, which is why a statement for the industry is also provided in the study.

2. AI and Machine Learning in Insurance

AI and machine learning in insurance focus on predicting behavior and automating tasks. Insurance is evolving to be increasingly driven by technology to improve the customer's overall experience. By utilizing data, machine learning can analyze and classify large volumes of data and recognize historical patterns, thus improving prediction accuracy and providing powerful insights. AI can analyze data faster and

more accurately, providing valuable information to business executives in making decisions.

Models are representations of how the world works or could work based on factors and techniques an analyst can see and understand. Many businesses or their departments are excessively dependent on a method for predicting or understanding the relationships between data based on statistical models, considering logistic regression, claims modeling, revenue estimation, or other methodologies for making decisions. These modeling data-based outputs may be relatively accurate and deep, but they are fundamentally more 'descriptions' of the present and the past, effectively providing us with a good picture of what has occurred. Most of the massive growth in technology over the last two decades has centered on the application of machine learning principles to tackle modern business issues. Insurance is applied in a variety of practical ways that can be cumbersome and time-consuming to predict and make numerous decisions on a day-to-day basis. Furthermore, the introduction and horizons of AI in insurance have to be tested and dictated sufficiently to match the already implemented and traditional predictive models. The increased decision-making speed and accuracy many argue are the primary and continual benefits of AI-supported machine learning. Many consider the technology a major evolution in the insurance sector's general understanding, insurance inclusion, customer service, management of risks, and provision of insurance policies to individuals and companies alike.

2.1. Overview of AI and Machine Learning Technologies

2.1. Overview of AI and Machine Learning Technologies. AI can be defined as a process, method, or system approach that enables computers, machines, or robots to perform work that would typically require human intelligence in terms of cognitive ability and decision-making, to complete a task in a manner that would meet human expectations. To deliver an outcome, several methodologies, processes, and systems must work together for AI to be able to replicate or enhance a specific aspect of human intelligence. Machine Learning (ML) is the most commonly used approach within the insurance sector and is concerned with designing algorithms and neural network architectures such that the system learns a predictive model from underlying patterns in data to make decisions, generate insights, or achieve outcomes based on new, unseen observations.

Algorithms. There are several analytical, statistical, and operational research algorithms that support how ML models work. This includes a range of neural network models that underpin Deep Learning, a complex area of AI that includes running ML models with several layers. Analytics and Data Science Tools. These refer to the tools that are used to build ML models. Technologies assist with the implementation of components such as DNN and CNN functional architecture, learning and training algorithms, platforms, and frameworks. Machine Learning can be used to communicate individual preferences based on predicted customer behavior. Customers trust insurers with their data, and the right AI technologies can help customers navigate insurance in a way that empowers them while ensuring their rights under the General Data Protection Regulation. Scalability and real-time analytics help insurers respond proactively in a dynamic environment.

2.2. Applications in the Insurance Industry

AI and machine learning offer a promising toolbox for insurance companies. Indeed, insurance is an information-based industry—there are several applications of AI and machine learning in insurance, solving information or data-related problems. Using the latest customer data available, insurance companies can build a comprehensive customer profile. This can, in turn, lead to optimal customer segmentation with insurance products that best suit each individual customer's requirements. Data such as customer transaction or claims history is used to assess risks better. AI and machine learning in the insurance industry also work towards applications such as fraud detection. By recognizing patterns and identifying anomalies from the large amounts of data available, including unstructured data like text and images, they offer a much more detailed and accurate process of fraud detection and speed this process up significantly. Finally, there are potential applications of AI and machine learning in efficient underwriting and better risk analytics.

By automating some of the steps in the decision process, self-learning systems can help underwriters better assess risk. By doing so, companies can potentially increase their effectiveness where there is overreliance on existing practices and excel in markets with higher quality risk metrics. Insurance companies can use AI to verify small claims, for instance, in car insurance. Claims processing, including simple text analysis to rapidly verify bona fide claims, can speed up the process of payments, thus increasing

consumers' satisfaction. In addition, many insurtech solutions focus on how to make claims handling richer by linking AI to automated settlement options or by visualization techniques, such as dashboards. Other use cases include applications that improve customer need assessments, churn predictions, sales optimization, and personalized recommendations of insurance products. This process is based on what is labeled as cognitive value, which refers to the positive impact that cognitive computing has on key performance indicators such as customer satisfaction, sales effectiveness, operational efficiency, quality and risk management, forecasting, and decision-making management, as well as its cost-effectiveness because of its easy scalability.

3. Enhancing Customer Interactions

Developing persuasive and effective customer-facing technologies is essential for progress in the insurance industry. While finding tailored services and solutions is important to cultivating satisfied customers in all industries, being able to effectively communicate this is a huge part of ensuring customer retention. AI technology solutions in insurance are often about honing the user experience and can often be linked to customer interactions. There are numerous ways insurers can tailor their services in line with the data, provide personalized interactions, and encourage better customer experiences.

In insurance, possible targeted strategies can focus on the specific needs of a group of people, a specific event, a group of people with specific attributes, or a person. Personalization can run through everything – from one's insurance product build, their payment arrangements, and even their marketing messaging. By changing each approach, insurers are better able to heighten individual customer satisfaction. It's becoming increasingly important, however, to have a range of innovations available to insurers that mimic customer preferences. These approaches can be as wide-ranging as those targeting the customer alone to, increasingly, those focusing on a customer-facing approach.

Chatbots and virtual assistants are trending in insurance more than ever now, with leading the way in adoption. Chatbots exist primarily for the instant support they provide. Where a chatbot fails, an AI assistant can usually still succeed, with the ability to manage a longer text exchange and answer a wider array of questions. One main priority in AI assistant development is the ability to deliver more high-level support

rather than answer one-off questions. So here, digital assistants rank more highly than chatbots. Central to other customer priorities is the automation of answering and responding to customer calls and emails and notifying clients of product changes, data breaches, or irregularities. This is where finds its strength. Increasingly, are offering AI-enabled automation platforms that can manage end-to-end customer service operations.

3.1. Personalization Techniques

As customer experience is optimized through personalized interactions at every touchpoint, the need for behavioral personalization stems not just from the customer but from the insurer. Personalization comprises customizing policy and underwriting products as well as the sales process, thereby leveraging both personalization through product offerings and the sales process. To enable this level of personalization, insurers are primarily employing data analytics and machine learning. Insurers are leveraging these technologies across a range of fronts, producing instant policy and quotation offerings, understanding consumer purchasing behavior, and creating customer, product, channel, and location-based micro-segmentation for custom personal product offerings. Ultimately, through personalization, the insurer begins to understand the way a customer interacts and what their need is.

Insurers can use this insight to fuel personalized marketing messages, offering a higher likelihood of the messaging being understood and acted upon as its relevance to the consumer is more acute. When the customer is understood at an individual level, rather than through personas, the response rates to communications grow considerably. For example, in a case study where product terms and wording were altered rather than the premium changing to reflect the immediate needs of a consumer, the discounting on the product premium ceased. The need for this relationship means that personalization can be useful in creating not just a single sale but driving long-term customer satisfaction, refinement, and ongoing loyalty. Privacy, data ethics, and the balance of trust are important considerations when delving into personalization. It is important to consider and communicate the way that personalization is being achieved, offering transparency, reassurances, and allowing customers to opt out; this can be standard practice in the context of the increasingly strict data protection regulations.

3.2. Chatbots and Virtual Assistants

Conversational AI technologies such as chatbots and virtual assistants have made it easy to provide real-time help to customers, field queries, and transfer clients to the right customer support representative in insurance. The benefits of using these chatbots are apparent - they create savings in operational costs, and call center staff can deal with more substantive and challenging inquiries. Chatbots can be utilized for quick information retrieval and spreading policy changes, coverages, and products, and they increase customer satisfaction and loyalty due to their 24-hour availability. Chatbots can also be used for claims processing for specific inquiries and processing claims based on the data entered by the customer. A chatbot mobile app assists in photographing accident scenes and providing a fast claims estimate. A company has teamed up with another to use a chatbot for property claims information and processing. Another company has a chatbot on its website to field initial customer inquiries about standard insurance products. Today, chatbots commonly operate as virtual assistants for both the purchase of policies and service support, helping customers with chat interfaces. These chatbots have been rated an average of 4.7 out of 5 for two or more user queries and anticipate premium savings or offer insurance links to customers at the end of the chat. Feedback is clear - non-invasive during customer interactions. There continues to be a place for personal and white-glove treatment for more sophisticated customer interactions where a human must take over. Complications do arise when using chatbot-integrated AI as the sole machine to analyze and make decisions. If the customer wants to appeal the decision rendered, how do you handle this if it was a machine-made decision?

4. Improving Service Delivery

AI transforms insurance by enabling and enhancing service delivery. Claims handling and underwriting – the two most conventional operations in an insurance company – have been profoundly affected by AI. The embedding of AI-based automation in claims handling can reduce claims settlement times from weeks to minutes. When it comes to underwriting, AI can assess an individual's risk not only more accurately but instantaneously, drawing on vast amounts of data. Service delivery in insurance is becoming more automated and more accurate. There are a number of closely related operational areas where AI will significantly change the way insurers operate. One of them is claims processing. Claims are the moments of truth for a policyholder, where the

promise to indemnify them for a loss takes practical effect. AI transforms claims handling by improving business processes, reducing compliance issues, and enabling better decision-making. This is not only about automating the process from the moment the service detects the wear and tear in a fridge, but also about ensuring there are records and standards of service that the insurer can rely on when indemnifying its customer. Claims processing is one of the two areas where significant changes are happening because AI is providing rapid improvements in the operational efficiency and accuracy of service delivery. Data analysis has improved fraud detection rates and reduced error rates. Faster claims handling means happier customers. Providing this instant and accurate claims settlement is about building trust and is a way insurers can differentiate themselves in the marketplace. Moreover, instant claims handling from an accident site reduces overheads. The improved data accuracy of connecting devices to claims processes also dramatically reduces the frictional costs of assessing repair costs, assessing policy sums insured, as well as processing these claims. Data subject to real-time validation at the point of submission is a game changer. Underwriting and risk assessment is the other core area where the use of AI techniques will become a norm. Insurers have traditionally assessed an applicant's proposal and reviewed the proposal against various data points such as personal statements, based on a No Claims Bonus or their postcode. Statistical underwriting, risk assessment, and pricing will become more advanced with the use of technology and insurer data. Not only are traditional underwriting techniques becoming more sophisticated, but they are also becoming more common. More modern methods such as AI products, underwriting, and advanced analytics that employ predictive modeling to aggregate data can provide supplementary analysis for the intermediary to present to the insurer. Subjective hysteria is removed when underwriting is purely data-driven. Either the data facilitates the underwriting decision or it does not. The use of data changes the process of negotiation between the underwriter and the intermediary or customer. It's also susceptible in the data touch revolution. Although various technologies can aid UI and its underlying decision-making as supplementary information, the product experts themselves are the ones to underwrite. AI can play a very clever role in the application process, receipt of the application form. This can scrape all the necessary information, input it in real-time, and assure it is sufficiently accurate before it enters the clerical department for review once completed.

4.1. Claims Processing Automation

One of the most promising applications of AI in insurance is the fully automated processing of claims, thereby significantly reducing the human effort required for these critical routine tasks. Manual claims processing can be a bottleneck because of varying volumes of claims. It can be costly and time-consuming, often leading to long processing times. Automation can help to resolve the claim process, serving customers better and performing the necessary tasks more quickly. The impact of automation processes such as claims detection and fraud detection can lead to an increase in customer satisfaction. A typical example is the use of robotic process automation to automate the process of handling notices of loss, because incoming claims are usually in high volume.

A case study identified successful claims processing solutions for the management of standardized claims under a certain value. An AI claims solution was implemented as part of an end-to-end customer portal. This solution meets customers' urgent and high-level need for immediate resolution and satisfaction. The system identifies low-risk claims, automatically validates them against coverage rules, channels certain cases to a more detailed investigation, and brings them to one or two decisions. Automation of claims by the use of a digital claims solution potentially accelerates the end-to-end claims service process. Faster processing times also mean that timely payouts can improve the customer experience. Using these capabilities also responds to the simple AI goal of automated customer service for lower volume and value claims.

Machine vision can be used to validate facts of the claim and check those facts against historical data, matching similar contusions and injuries in order to estimate a settlement value. The faster estimation of claims settlements, with the use of a machine learning approach, can help to provide more superior and timely customer service. The use of smart AI for the first contact point will speed up the handling of the claim and can help to process only for further investigation (if required) in the total settlement process. Automating fraud detection within claims handling minimizes insurers' exposure to fraud, while also ensuring that an open claim is solved to meet the demand for a more efficient claims process. One of the barriers to investment in fraud detection is that the claims may already be fully handled before fraudsters are caught, meaning some detection is wasteful.

4.2. Risk Assessment and Underwriting

Relying on the traditional underwriting process tends to result in defaults where the information is less certain or where firms deny coverage due to a lack of understanding of their clients. In the insurance context, large datasets are available but require processing before this information can effectively be leveraged. Utilizing AI, this data can be mined more efficiently and effectively, allowing firms to make better predictions with respect to risk and coverage provisions. Noting this outcome, it is observed that the result of experimenting with data-driven underwriting is often that firms will have a wider variety of policy coverage options available to sell to clients, thus increasing the size of their potential customer base and, ultimately, their revenue.

Operationalizing the aforementioned by demonstrating how Actuarial Risk Scoring (ARS) could be used to blend actuarial and risk-based approaches to pricing. Indeed, the company provides a general assessment for management, summarizing different approaches to data management that can make a positive impact on pricing and underwriting. For designated clients, ARS resulted in approximately \$40,000 per month in reduced premiums, as ARS brought in monthly revenues once rolled out for new users and monthly fees for new applications and use cases such as new products, acquisitions, and mortgages. The potential advantages of data-driven underwriting can affect regulatory bottom lines as well. The same efficiencies, sales, risk-adjusted prices, risk profiles, and coverage options were available using AI to inform predictive models about client profiles and claims history. Indeed, the focus of underwriting will need to shift to the extreme tail individuals posed to induce losses. This shift in the focus of underwriting often makes for discretionary choices in underwriting regarding coverage and service provisions.

When those choices are not covered by traditional regulations and guidelines, firms can run afoul of specific or general provisions and guidelines. Regulators may impose rules on the coding and use of predictive models used in underwriting and in general data privacy and usage rules. Insurance companies pay out for privacy violations in data and AI use and need to mitigate those risks. The oversight regime imposes compliance costs, such as AI and algorithm audits, and regulatory overlap or divergence. Those rights-based concerns need to be mitigated in system development and monitoring processes. Allowing insurance firms to use AI/ML to offer greater coverage to individuals may

thus exacerbate differences between insured individuals and the uninsured if insurance firms make more coverage available based on predictive models using large datasets while individual discretion and complexity are rather sidestepped.

5. Case Studies and Success Stories

In this chapter, we introduce a collection of cases and success stories about enhancing the customer experience. We start with a plant visit to Sundahl in Sweden, where we meet and get to know closely many of the people involved in the customer service value chain. From Sundahl's manufacturing floor, we move to South America. In Argentina, we visited the Latin American fulfillment center for large consumer electronics and met with key employees at the plant. Later in Brazil, we met with customer relations and IT support employees at an internet service provider. During these plant visits, we gathered many examples of very sophisticated customer service operations. In addition to the highlighted companies, those that provided especially useful new insights were also Ohio-based aerospace company Goodrich, Calltec of Brazil, LeNettec of Mexico, and Sweden's Ericsson Customer Care.

At the time we wrote this book, we also defined and created five case studies of companies and organizations that have implemented successful CRM systems in a variety of industries. Successes like those highlighted in the case studies underscore the fact that software can both consolidate service and marketing operations, one of the top items under scrutiny by the CIO community. Later in this chapter, we use these selected cases to tell the stories of successful CRM implementations. We mentioned above the recent developments in edge companies such as Apple, Macy's, and others. These companies are different, and the current focus of service chiefs at these and other companies will be on how to leverage the internet for consumer support. A key component to developing CRM customer information touchpoints is to leverage the power of the web as a full-service customer interaction channel.

6. Future Direction

We will examine a few potential future directions where we expect AI and machine learning to deepen their roots within the industry. We begin by looking at trends of emerging technologies, especially concerning customer behavior, and explore subsequent market size growth. The proffered predictions in this section thus represent one logical progression from the current landscape to a foreshadowed future.

Sustaining positive changes often requires the same volume of investment as that which incurred them in the first place. As customer expectations shift, regulations evolve, and new technologies proliferate, insurers' margins are set to continue changing. Successful insurers of the future, then, will not be judged by the investments they make today, but by those they are willing to make next year. In this landscape, AI and machine learning represent more than mere investments, but a continuous path of innovation that companies must embark upon to sustain their competitive advantage. There indeed exists a viable market for AI-driven solutions in the customer space in the future. A significant two-thirds of insurance respondents expect policy selection and risk profile management to be driven by AI/ML in five years, making this a centerpiece for an engaging customer experience.

Moreover, analysts suggest that in just 2030, AI and IoT are likely to manage a market of 353 billion euros, helped by their capacity to deliver real-time underwriting and refine the customer/market segment experience. Yet the promise of AI technology to reinvent the insurance landscape and enable more personalized products also necessitates a close relationship between insurers and tech providers. Both the data and IT architecture of a firm need to be able to make full use of AI for there to be value, underscoring the importance of flexible and compatible operating layers between all parties.

7. Conclusion

In the insurance industry, AI has already started to change how businesses approach strategy in order to enhance customer experience. By showing how administrative and technology-based work can be automated by machines, insurance businesses are redefining themselves as more customer-centric organizations than simply protection-based. With some existing examples advanced in this context, the insurance industry is set to witness significant transformations in the highly competitive landscape of various geographies as AI becomes more than just machines, but intelligent machines.

By focusing on customer needs, the customer experience is delivered in an enhanced form. In order to adopt a customer-centric strategy integrating digital, businesses usually focus on four key segments. These are personalization, the degree of automation, delivery of service, and leadership engagement. AI-powered applications and systems are seen and integrated as technology experts' enrollment by the businesses. It is very clear that insurance is slowly moving towards the implementation

of AI systems in not just their customer-facing solutions, but in claim processes, efficiency improvements, customer satisfaction, and underwriting as well. The commercial viability of many of these applications is still on a test and small pilot, but they show extremely successful initial results that present the potential of AI in defining the insurance customer experience further.

Research shows some great examples of such AI-powered models being tested and developed. As a conclusion, it is important to emphasize how to establish collaboration between all stakeholders. These initiatives within insurance markets are still at an initial level, with limited integrations. In the coming years, the challenge will lie in scaling up these individual developments and pushing towards mass adoption by businesses and end users, while considering the human conduct and socio-economic policy dimension of use. In essence, the use of AI in insurance for heightening customer value has opened a Pandora's Box, the depth and range of which is yet to be explored comprehensively. It also needs significant understanding and strategy formulation that would ensure people are still at the core of these AI systems and businesses using AI are not just in the quest to deliver but to be hyper customer-centric in every action. This debate and research hope to answer these areas and more in the years to come. If AI can focus on in-depth research activities, strategizing, and further identifying consumer needs and requirements, it can, within a few years, actually act as the customer-centric tool, moving business discussions from customer-centric to human-centric.