

The Role of Artificial Intelligence in Insurance Product Innovation, Risk Assessment and Delivering Value to the Customers

¹Dr. Ravi Jaiswal

Associate Professor, Dept. of Management, International School of Business & Media, Pune, India

²Ms. Shikha Jaiswal,

**Research Scholar, Dept. of Management, MIT ADT University,
Pune, India**

Abstract. Health insurance focuses on multi-facet products where sciences, medical fields, and biotechnology studies need to be considered. As a post-covid-19 pandemic, there is a need for health domain risk considerations in various aspects. Most importantly, the insurance industry is poised for significant disruption due to rapid technological advancements. Artificial intelligence (AI) is becoming increasingly important in this sector, particularly in risk management. With the ability to analyze vast amounts of data and identify patterns, AI can help insurers accurately assess and manage risk, enabling them to develop products, price, and customization of products effectively, detect fraud, process claims more efficiently, and minimize underwriting losses.

The emergence of AI-based insurance carriers will be characterized by innovative product development, cognitive insights from new data sources, streamlined processes, lower costs, and an emphasis on personalized customer service and dynamic adaptation. Additionally, AI can help insurers adapt to changing market conditions by customizing products based on their criteria and transferring risks to other insurance companies. Hence, the proposed research focuses on developing a risk analysis strategy using an artificial intelligence module for value deliverables with risk assessment for insurance products.

Keywords: Artificial Intelligence (AI), machine learning, risk analysis, innovation, pricing, big data, deep learning

1. Introduction

Advancements in technology have always played a critical role in the evolution of the insurance industry. Artificial Intelligence (AI) has been on the rise in the insurance industry in recent years. AI technologies such as machine learning and natural language processing have been utilized in various aspects of insurance services to improve efficiency, accuracy, and customer experience. From paper-based records to digital databases, the industry has come a long way regarding automation, efficiency, and customer experience. However, the pace of change is accelerating, and the next decade promises to be a period of unprecedented disruption. The insurance industry is poised for significant disruption due to the rapid technological advancements expected in the next decade.

AI, in particular, has the potential to transform the insurance industry in numerous ways. One of the most significant impacts of AI is in risk management. With the ability to analyze vast amounts of data, AI can help insurers accurately assess risk, enabling them to develop products, price them appropriately, and manage risks more effectively. This can lead to more personalized insurance products, improved customer experience, and reduced underwriting losses.

AI can also help insurers streamline processes, reduce costs, and enhance customer service. For example, AI-powered chatbots can provide instant support to customers, while claims processing can be automated using machine learning algorithms. By automating routine tasks, insurers can focus on higher-value activities such as customer engagement, product innovation, and risk analysis.

However, the emergence of AI-based insurance carriers also raises some challenges. One of the main concerns is the potential impact on jobs. With automation and AI, some roles may become redundant, and new skills will be required to remain competitive. Insurers will need to invest in upskilling their workforce and rethinking their organizational structures to take advantage of the opportunities presented by AI.

In this paper, section 1 gives the introduction; the literature review is presented in Section 2; the proposed

research methodology is discussed in Section 3, whereas Section 4 presents the results and data analysis. Section 5 concludes the research.

2. Literature Review

"Artificial Intelligence in Insurance: A Review" by Asif Hasan, Syed Hasan, and Imran Hasan. This literature review aims to provide an overview of the current research on the use of AI in insurance services. This paper comprehensively reviews AI applications in insurance, including underwriting, claims processing, fraud detection, and customer service. The authors discuss the benefits and challenges of AI adoption and provide insights into future research directions. (Hasan, Hasan, & Hasan, 2020)

"Internet of Things in Insurance: A Systematic Review" by Mithun Mukherjee and Amit Kumar Ray. This paper presents a systematic review of IoT applications in insurance, including usage-based insurance, risk management, and customer engagement. The authors highlight the potential benefits of IoT adoption in insurance and discuss the challenges associated with data privacy and security. (Mukherjee & Ray, 2019)

"Blockchain in Insurance: A Review" by Yuan Gao, Ke Hu, and Xiaofeng Liu. This paper reviews the use of blockchain technology in insurance, including smart contracts, claims management, and identity verification. The authors discuss the advantages of blockchain adoption, such as increased transparency and efficiency, and identify the challenges of implementing blockchain in the insurance industry. (Gao, Hu, & Liu, 2019)

"The Impact of Mobile Technology on the Insurance Industry: A Review" by Khaleel Ur Rahman Khan, Mohammed AbdulrahmanAlshareef, and Abdulrahman Abdullah Alqahtani. This paper reviews the use of mobile technology in insurance, including mobile applications, mobile payments, and mobile marketing. The authors highlight the benefits of mobile technology adoption, such as improved customer engagement and increased sales, and discuss the challenges associated with mobile technology integration. (Khan, Alshareef, & Alqahtani, 2021)

The insurance industry has made significant progress in digitalization, surpassing the mere shift from analog to digital information processing, as stated by Stoeckli et al. (2018). Eling and Lehmann (2018) define digitalization as the integration of the analog and digital worlds using new technologies that improve customer interaction, data availability, and business processes. The emergence of InsurTechs in the last decade has driven digital transformation, with cloud computing, telematics, the Internet of Things (IoT), mobile phones, blockchain technology, artificial intelligence, and predictive modeling being some of the new technologies affecting the industry, according to Cappiello (2020).

Digitalization has already had a substantial impact on the insurance value chain, and with the emergence and maturity of new technologies, it will continue to do so, as stated by Eling and Lehmann (2018). Research has shown that the use of AI technologies, such as machine learning, can improve the accuracy and efficiency of claims processing. For example, a study by Cognizant found that by using machine learning to automate claims processing, insurers can reduce claims handling costs by up to 30% (Cognizant, 2018). Another study by McKinsey & Company found that by using machine learning to automate claims processing, insurers can reduce claims processing times by up to 70% (McKinsey & Company, 2017).

AI technologies are also being used in the underwriting process to help insurers better assess risk. For example, a study by Deloitte found that by using predictive analytics to analyze data on an individual's medical history, insurers can better determine their risk profile and tailor policies accordingly (Deloitte, 2018). Another study by Accenture found that by using machine learning to analyze data on an individual's driving behavior, insurers can better determine their risk profile and offer personalized pricing (Accenture, 2018).

Research has shown that by using machine learning to analyze large amounts of data, insurers can better identify patterns of fraud and take action accordingly. For example, a study by the University of Portsmouth found that by using machine learning to analyze data on claims patterns, insurers can better identify potential cases of fraud and prevent losses (University of Portsmouth, 2019). A study done by Accenture revealed that the proper application of insurance AI for process automation could help insurers save more than \$ 7 billion in just 18 months. When combined with fraud detection AI, the potential savings are staggering.

3. Research Methodology

The proposed study focuses on the current landscape and trends of AI adoption in the insurance sector, including the types of AI applications being used and the potential benefits and challenges of implementation. The proposed study also investigates the impact of AI on key business areas within the insurance industry, such as underwriting, claims processing, fraud detection, and customer experience. The proposed study presents the framework for the best practices and recommendations for insurance companies and customers' facilities looking to implement AI technologies, including strategies for managing data quality, developing AI tools, and balancing automation with human oversight. Following Fig.1 depicts the conceptual framework for the proposed study.

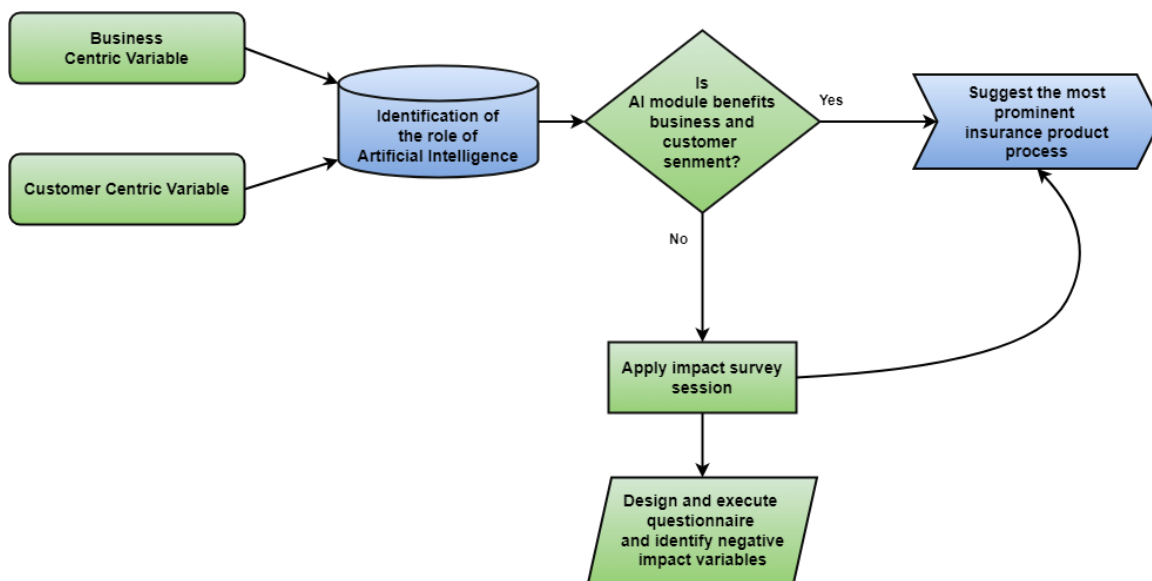


Fig.1: Proposed Conceptual Framework (Generated by the researcher)

As core elements, insurance companies and customers are two mandatory elements that impact each other. The AI feasibility for various insurance products and related services can be framed together through feasibility surveys. This can lead to flawless service execution and identification of products which can be managed by reducing risk elements.

Following Fig.2 shows the proposed research methodology which can be employed by insurance companies for risk assessment, which further can help to boost customer service values using Artificial Intelligence development. The proposed methodology can be useful for managing data quality, developing AI tools, and balancing automation for better strategic management of insurance services.

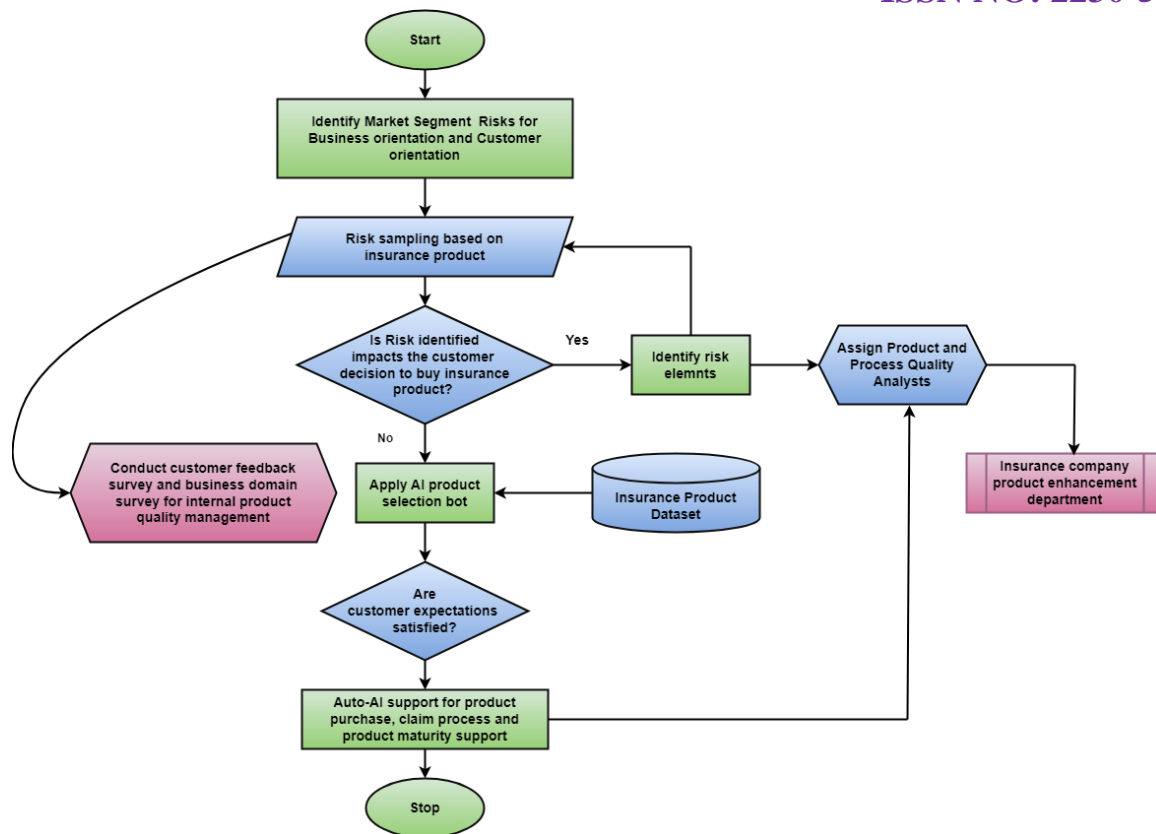


Fig. 2: Proposed research methodology (Generated by the researcher)

The key requirement for any insurance product marketing is to identify risks associated with the customer criteria and support. The AI can help customers select the appropriate insurance product based on predefined criteria. However, for risk assessment at the business tier, evaluating every risk based on business impact is necessary. Hence, to provide value-based customer services and support, developing the risk dataset for every product is necessary. The product and process analyst can evaluate the received risk elements and can suggest product/service modifications. This further can enhance the product features to lower/eliminate identified risks based on customer feedback surveys and business domain surveys. Based on the sample size, we conducted data analysis which is discussed in the next section 4.

4. Data Analysis and Results

To verify the detailed research methodology and conceptual framework, we conducted rigorous data analysis.

Primary Data:

The primary data is collected from the population of Maharashtra state.

Secondary Data:

The secondary data is collected from the insurance product documents, risk datasets, research papers, magazines, and newspapers and is used for the proposed research.

Data Sampling

As the known value of participants, we used a randomized sampling method. The sample data for participants is collected from Maharashtra, India. Following Table 1 shows the sample size and participants' domains.

Table 1: Sample size of the proposed research

Respondent/Data	Population	Sample
Health insurance experts, MNCs employees, management analysts, Artificial Intelligence developers, and existing insurance customers from Pune, Maharashtra, India.	89,871	400

As per the calculated sample size, 10% of the total sample size is considered for reliability testing.

Questionnaire Design

The questionnaire is designed in English and distributed to record the closed-ended questions. We distributed forms to 400 respondents and collected responses from them. The questions were framed as closed-ended and open-ended queries for interview purposes. The collected responses are processed using the IBM SPSS tool. The next section formulates and tests the hypotheses for the proposed study. The reliability test is carried out for the 40 samples.

Hypotheses Testing

H0: Artificial Intelligence cannot be a prominent solution for the health insurance domain from a business growth perspective.

H1: Artificial Intelligence can be a prominent solution for the health insurance domain from a business growth perspective.

	df	Mean Square	F	Sig.
Between respondent cluster	4	1.056	1.988	0.04
Within respondent cluster	396	1.089	-	-
Total	400	-	-	-

Table 2: Analysis of the artificial intelligence support for the health insurance domain

The result of the significant level is 0.04; hence the positive hypothesis is accepted.

H0: Artificial Intelligence cannot be a prominent solution as a health insurance risk assessment tool.

H1: Artificial Intelligence can be a prominent solution as a health insurance risk assessment tool.

	df	Mean Square	F	Sig.
Between respondent cluster	2	2.157	2.009	0.09
Within respondent cluster	398	2.104	-	-
Total	300	-	-	-

Table 3: Analysis of the artificial intelligence for risk assessment

The result of the significant level is 0.09 the positive hypothesis is accepted. The reliability test for risk assessment is conducted for N=40 and shown in Fig. 4 below.

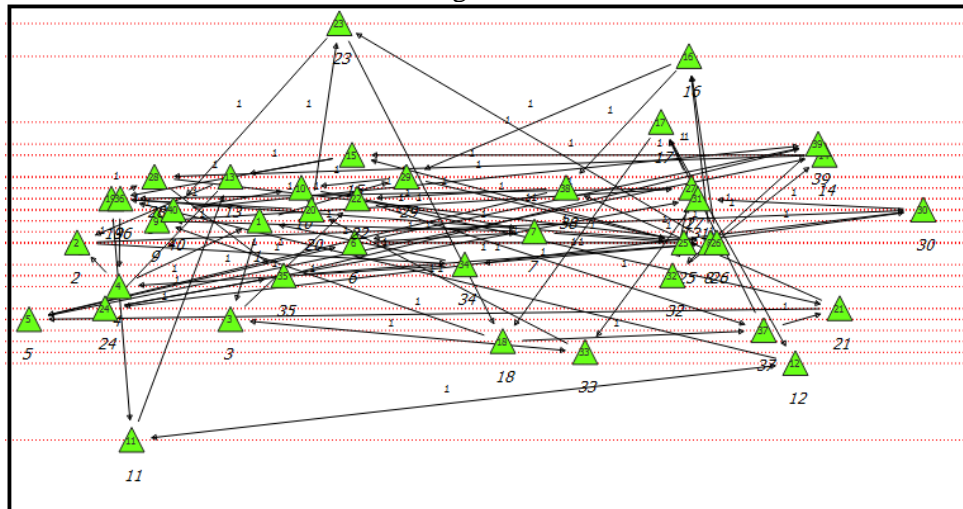


Figure 4: Risk assessment reliability results (Generated by the researcher)

The considered risks, as per the respondent responses, are delayed claim process, difficulties in the maturity of the policy and renewable of policy, and issues with document management. On the business front, respondents' opinion is about the issues like incomplete documentation by customers, lack of knowledge (of the customer) while initially selecting insurance policies and different coverage for different policies/products. Hence, an Artificial Intelligence model is needed to avoid manual process delays. Based on customer responses, generalized value services feedback is depicted in the following Fig. 5

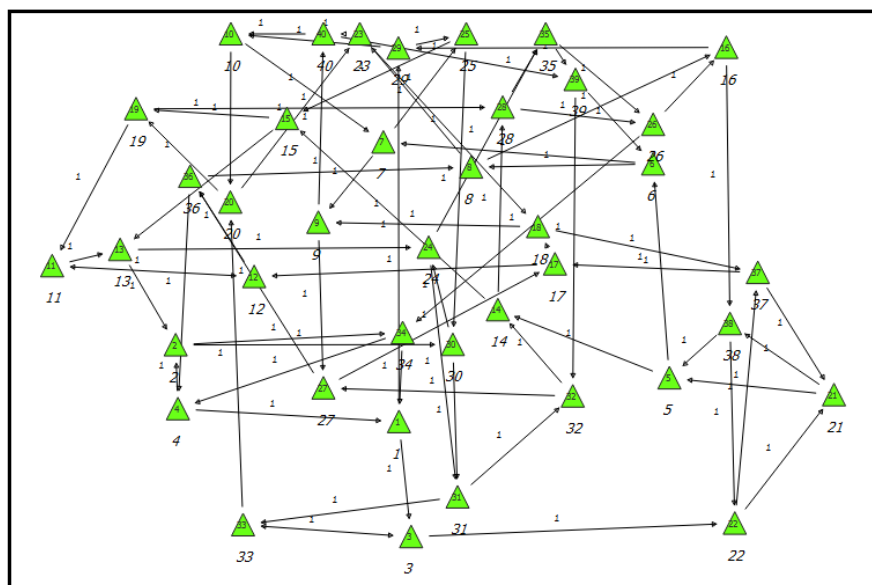


Fig.5: Analysis of customer responses for value service feedback

Fig.5 above shows that the customer feedback about value services for insurance products is similar and needs to be considered for insurance product development with artificial intelligence incorporation. Aside from this, as a new research direction, health experts' responses give birth to new segments like no specific disease policies available like neurological, transplantation, viral diseases, etc.

5. Conclusions

In a post-covid-19 era, it is necessary to reform insurance products. The paper presents the need for the integration of AI in insurance product innovation, and customer service has the potential to transform the

insurance industry. The paper also depicts that AI technologies can help insurers to develop more personalized and tailored products and services, improve customer experiences, and reduce costs. However, some challenges and limitations must be addressed, such as the need for high-quality data and the risk of bias in AI algorithms. The medical field, biotechnology, and sciences need to be considered for future AI product development to build the most appropriate insurance product considering precise health conditions.

References:

- Accenture. (2018). Usage-Based Insurance: Driving Value Through Personalization. Retrieved from <https://www.accenture.com/us-en/insight-usage-based-insurance-driving-value-through-personalization>
- Cappiello, G. (2020). The insurance industry and blockchain: An explorative analysis. *Journal of Financial Management of Property and Construction*, 25(1), 84-97.
- Cognizant. (2018). Transforming Claims Processing with Artificial Intelligence. Retrieved from <https://www.cognizant.com/whitepapers/transforming-claims-processing-with-artificial-intelligence-codex3223.pdf>
- Deloitte. (2018). Use of Predictive Analytics in Life Insurance Underwriting. Retrieved from <https://www2.deloitte.com/content/dam/Deloitte/us/Documents/financial-services/us-fsi-predictive-analytics-in-life-insurance-underwriting.pdf>
- Eling, M., & Lehmann, M. (2018). The impact of digitalization on the insurance value chain and the insurability of risks. *Geneva Papers on Risk and Insurance-Issues and Practice*, 43(2), 131-158.
- Gao, Y., Hu, K., & Liu, X. (2019). Blockchain in insurance: A review. *Journal of Risk and Financial Management*, 12(1), 26.
- Hasan, A., Hasan, S., & Hasan, I. (2020). Artificial intelligence in insurance: A review. *Journal of Insurance Issues*, 43(2), 25-57.
- Khan, K. U. R., Alshareef, M. A., & Alqahtani, A. A. (2021). The impact of mobile technology on the insurance industry: A review. *International Journal of Advanced Computer Science and Applications*, 12(5), 203-210.
- McKinsey & Company. (2017). Making Insurance Work Better for Customers. Retrieved from <https://www.mckinsey.com/~media/mckinsey/industries/financial%20services/our%20insights/making%20insurance%20work%20better%20for%20customers/making-insurance-work-better-for-customers.ashx>
- Mukherjee, M., & Ray, A. K. (2019). Internet of things in insurance: A systematic review. *International Journal of Information Management*, 46, 173-189.
- Riikkinen, J., Hassan, S. U., & Sjödin, D. R. (2018). The impact of InsurTech start-ups on the insurance industry: A systematic review. *Digital Insurance*, 1(1), 1-23.
- SciTech, Insurtech – Transforming The Insurance Sector- <https://www.patent-art.com/knowledge-center/insurtech-transforming-the-insurance-sector/>
- Stoekli, E., Huggenberger, S., & Wegmann, L. (2018). Insurtechs and the digital transformation of the insurance industry: A taxonomy and review of the current state. *Journal of Innovation Management*, 6(3), 51-76.
- Susan Morse, Accenture (2018)“How artificial intelligence can save health insurers \$7 billion.
- University of Portsmouth. (2019). Combating Insurance Fraud with AI. Retrieved from <https://www.port.ac.uk/news-events-and-blogs/blogs/innovation-enabling-growth/combating-insurance-fraud-with-ai>