

# The Transformative Impact of AI and ML in the Insurance Domain

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**Abstract:-** This research explores the transformative applications of artificial intelligence (AI) and machine learning (ML) in the insurance domain. Specifically, the study investigates how these technologies are automating underwriting processes, optimizing insurance pricing models, and enhancing fraud detection capabilities.

**Keywords:-** AI, ML, Insurance, Decision Making, Impact of AI, Underwriting, Claim Processing.

insurance industry or implementation of artificial intelligence or AI and machine learning or ML has significant scope, in its potential to reshape fundamental processes and redefine the insurance industry's entire supply chain. It includes the insurance lifecycle, from product development and underwriting to claims processing and customer engagement. To implement these changes industry faces various challenges like data privacy, human-AI collaboration, ethical considerations, etc. This article will help you to understand the transformative potential of ML & AI across various stages of the insurance lifecycle, which includes focus keywords such as claims processing to underwriting and customer engagements, etc. However, the true motivation of this technological revolution in the insurance domain lies behind the multi-featured implications of AI and ML and the challenges behind the successful implementation of this advanced technology.

## I. INTRODUCTION

In the constantly evolving environment of the insurance industry, increasing adoption of artificial intelligence (AI) and machine learning (ML) technologies are needed just to be ahead of other competitors in the view of Insurance companies. The advancement of the structure of the

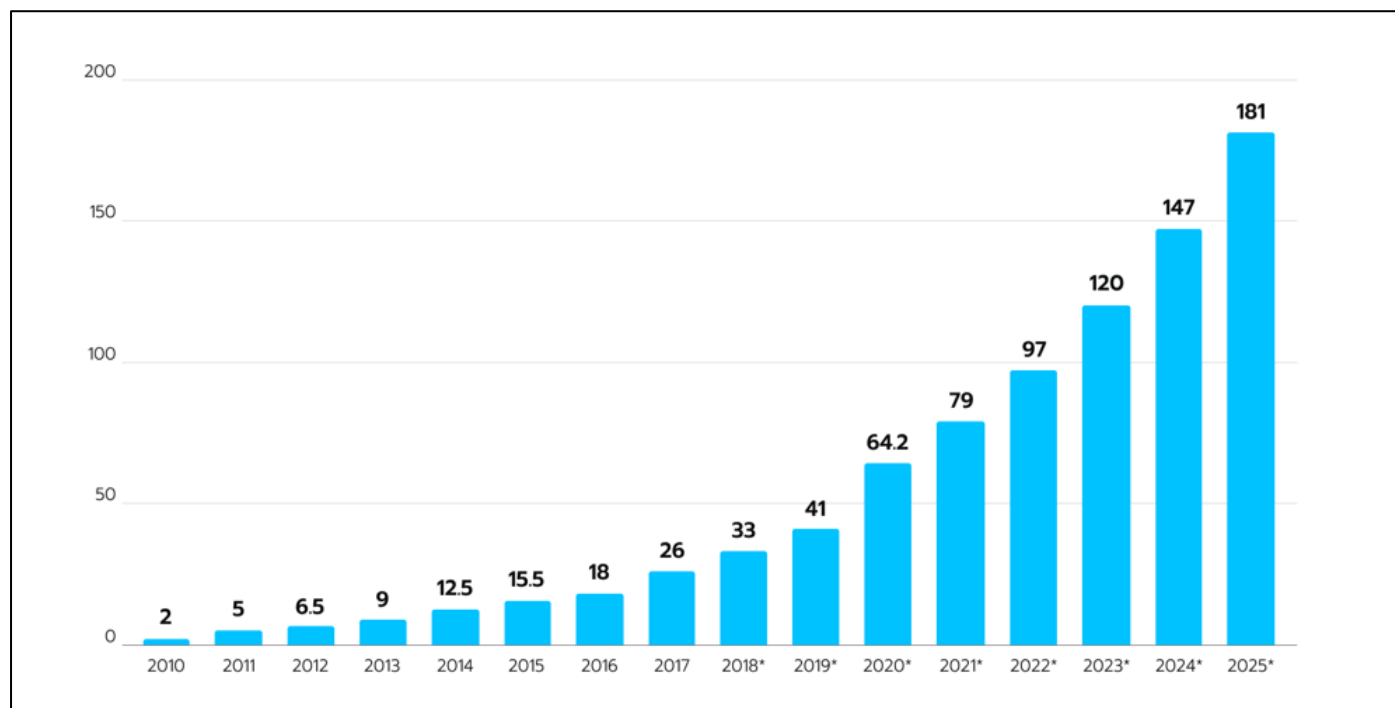


Fig 1 (Streamlining Insurance Claim Management with AI: A Closer Look – Avenga)

Sapiens Northern Europe Sales Director for Nordics, Jonathan Rusby highlighted the positive impact or necessity of having the digitalized and cloud-based insurance industry based in his area at Nordics. Rusby commented in his survey analysis, "Neither AI nor humans can be perfect. That's why we shouldn't 100% automate decision making but leave it in the realm of recommended options with confidence indicators and peer review" highlighting the need for adopting AI & ML technology in the insurance domain.

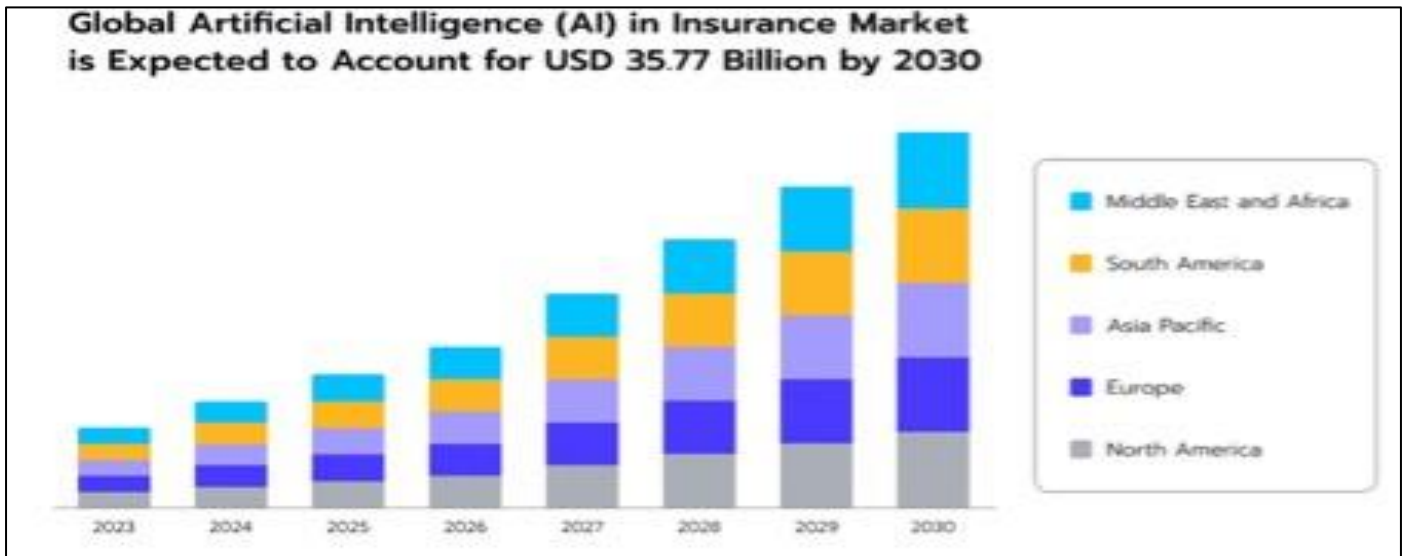


Fig 2 (<https://www.avenga.com/magazine/insurance-claim-management-with-ai/>)

Global market trends data based on the USA above shows clearly the increasing growth of all regions and global adaptability of AI technology at the current time and it is expected to reach 35.77 billion dollar business by 2030. The use of ML & AI holds the potential to improve the entire product lifecycle and value chain (as shown in the below figure) in the insurance domain from product development and risk management to process claims, fraud customer rectification and in customer engagement.

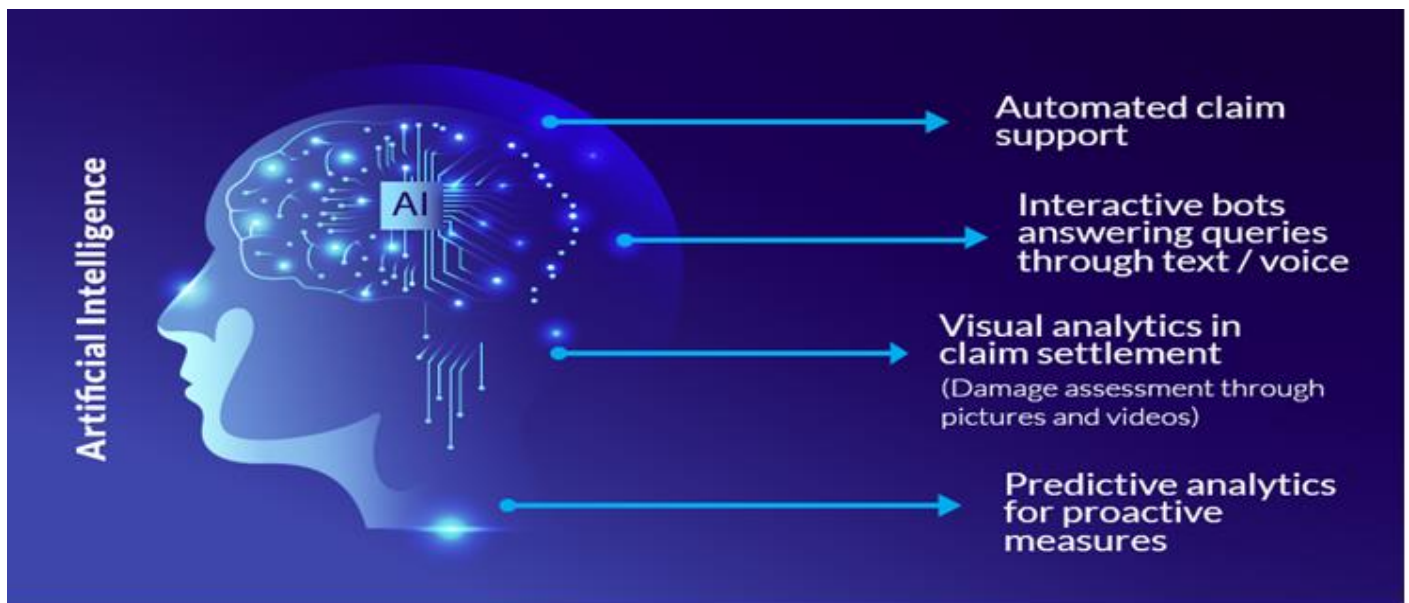


Fig 3 Artificial Intelligence (Source: Simple Solve)

## II. ENHANCING AI PROCESS EFFICIENCY IN THE INSURANCE INDUSTRY

In the age of potential AI and ML implementation in insurance, there is much research available to study the cause it will have no end to learning more and getting better. The general use of AI and ML which have become very popular in the world is the use of Chat-GPT, Siri, and Alexa-like free applications which are examples of exciting technology produced by AI and ML often used by humans globally. Product and Strategy Director of Sapiens Graham Gordon has done a concise overview report which says the excellent and simple way that it is not the perfect result we

are getting by using Siri, Chat-GPT, and Alexa-like tools still we are using it is just the stage of learning and it will continue to be better day by day. The report discussed that it is just the starting of AI and ML implementations it will be more popular by implementing in every prospect and possible way wherever needed.

### A. Improved Decision-Making

(Chen, and Liu, 2021) highlighted in the study about the processing time of AI concerning different system limitations and compared and produced the below graph to deliver an idea about AI processing time for any system.

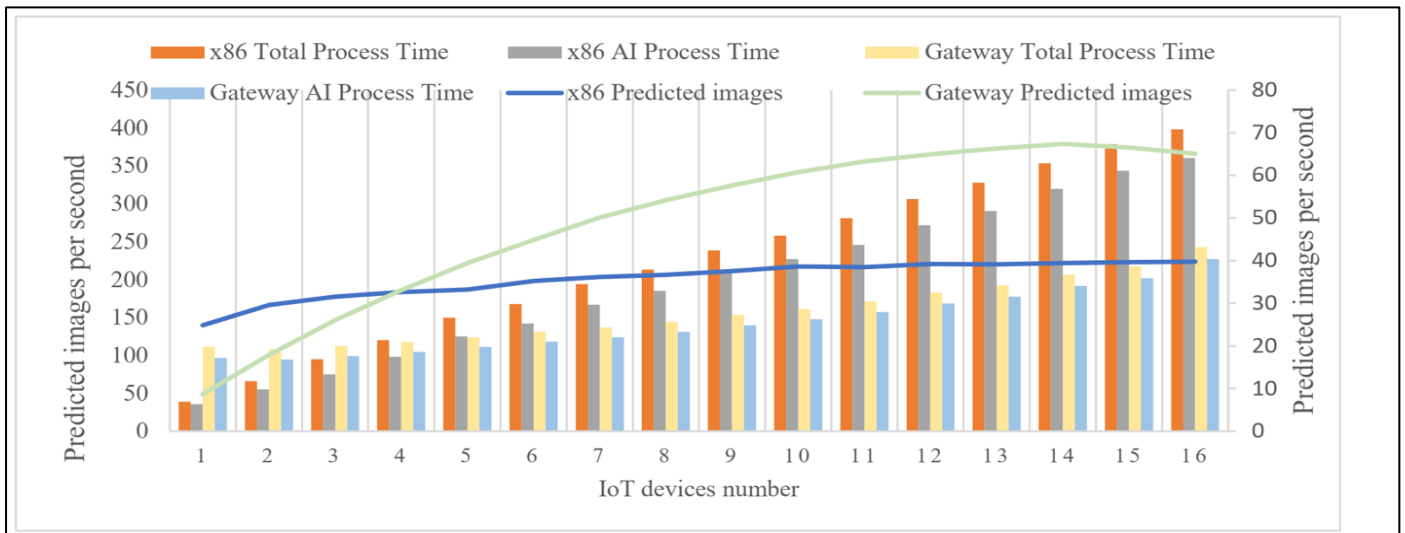


Fig 4 (Chen, and Liu, 2021)

Also, the researchers (Chen, and Liu, 2021) performed an exclusive analysis of process time shown below figure which shows comprehensively the various uses of ML. The processing time graph above gives an idea about the processing time of AI implementation and its output processing time.

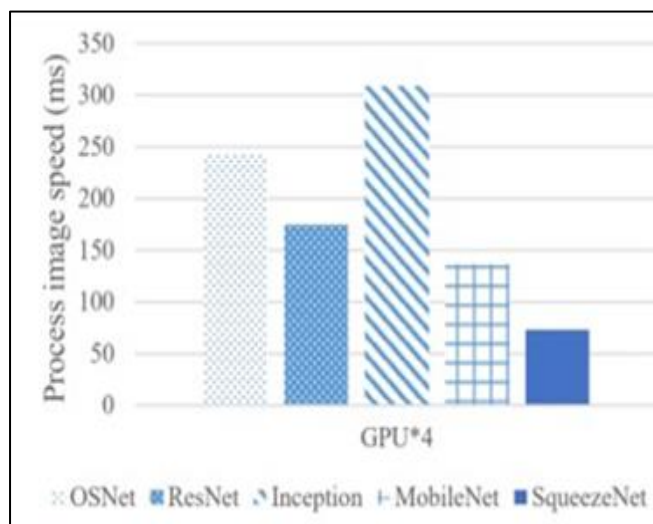
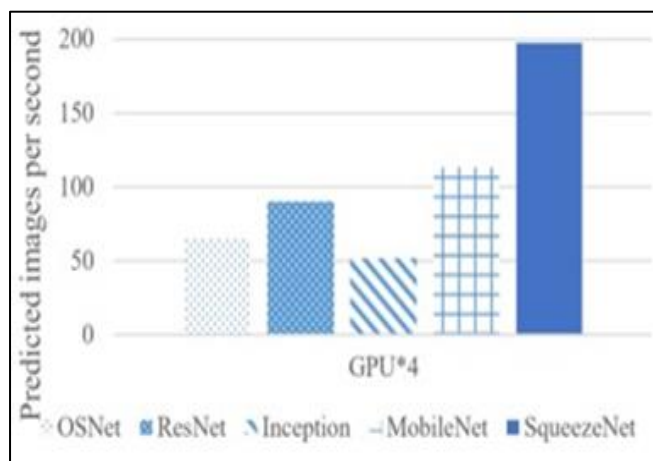


Fig 5 (Chen, and Liu, 2021)

Processing time is the key metric behind the decision-making process of AI & ML-based technology implementation in all fields including the insurance domain. (Pillay, and Njenga, 2021) also cited that artificial intelligence can reduce processing time by collecting data, analyzing, and processing data in respect of the insurance industry.

➤ *Customer Experience*

A worrying challenge for any business is to improve customer review experience, which is the primary factor in choosing any platform for using it for decision-making processes. For example, globally customers are getting easily correct grammatical sentences using Grammarly. It is efficient in doing that with very fast execution time and processing time with perfection accuracy is so high that it reflects on every aged people globally as shown in the below figure.

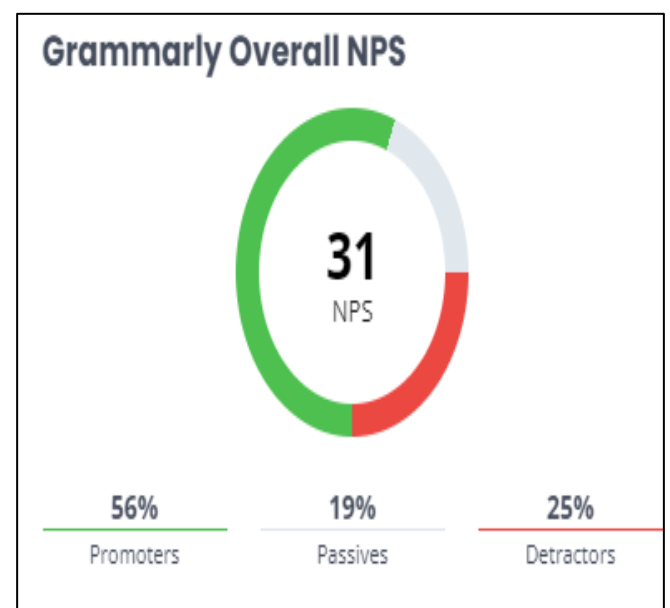


Fig 6 (<https://www.comparably.com/brands/grammarly>)



Fig 7 (<https://www.comparably.com/brands/grammarly>)

(Gupta, 2020) cited that AI plays an important role in giving customer satisfaction concerning the insurance domain. A case study drawn by Accenture Insurance shows implementation of AI in the insurance domain has a 70 % satisfaction rate among customers as shown in the below figure.

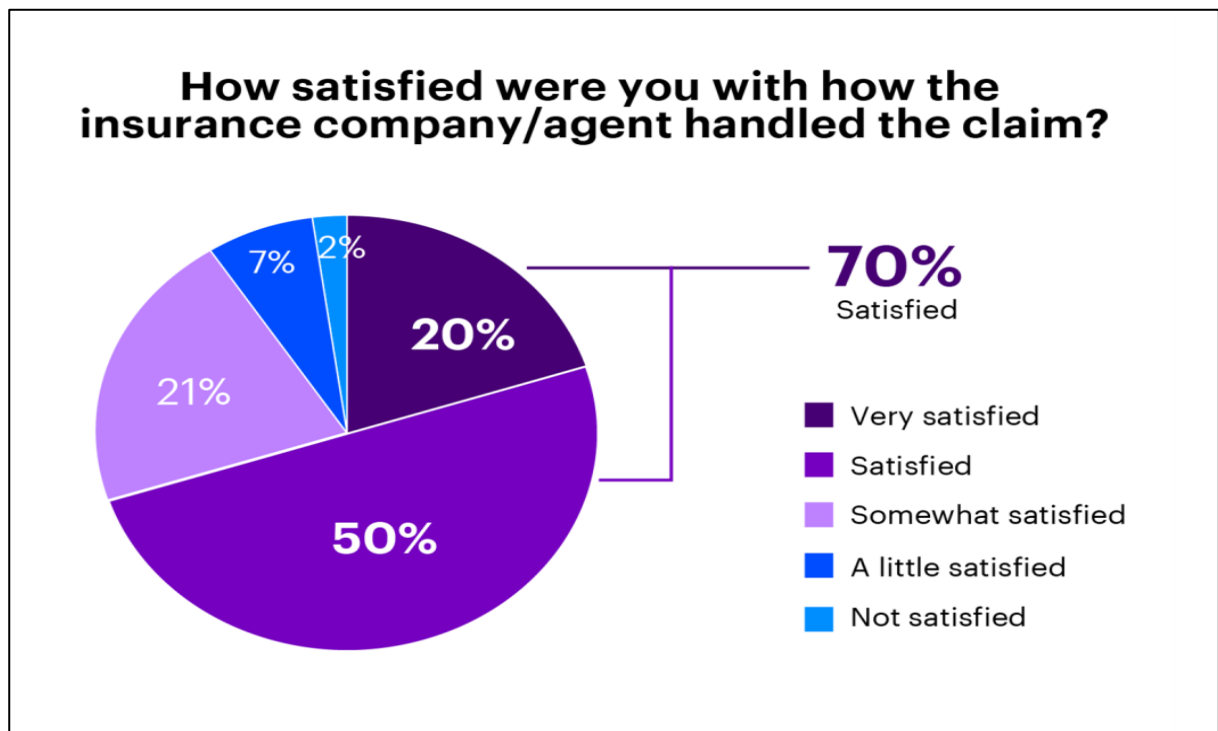


Fig 8 (<https://insuranceblog.accenture.com/getting-it-right-why-is-claims-satisfaction-so-high>)

The study report by Accenture also discussed briefly the implementation of advanced technology in claim processing with a high accuracy value of decision-making (as shown in the below figure). It also added a lack in claim processing indicating that it needs more polishing and improvement in the implementation of revolutionary technology of the current decade such as automation, AI, and ML in the insurance domain.

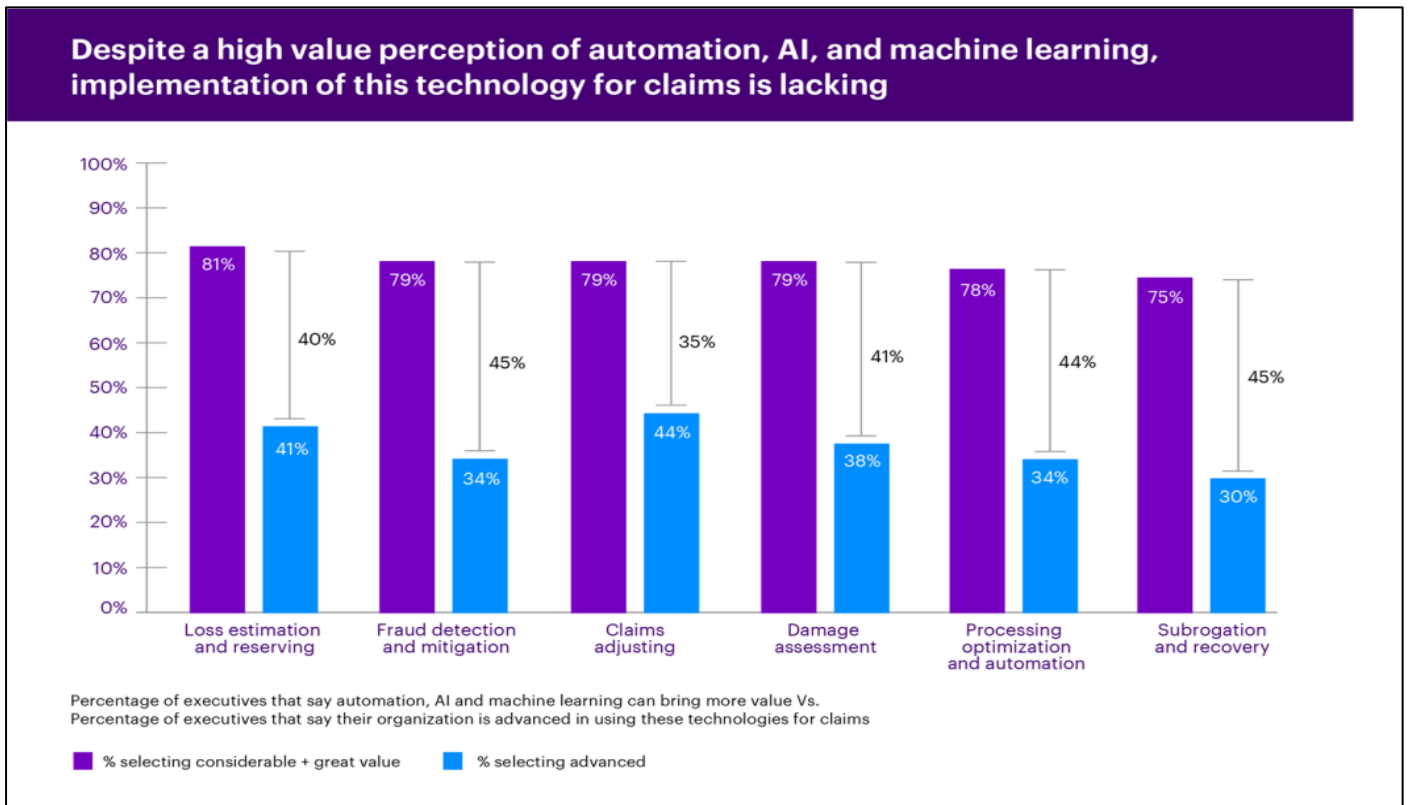


Fig 9 (<https://insuranceblog.accenture.com/getting-it-right-why-is-claims-satisfaction-so-high>)

### III. PRODUCT DEVELOPMENT

When the insurance product claim is designed it can be automated in some part by using AI, ML, or automation which will make auto acceptance, or declination of claim processing without taking any human help at the primary stage of claim processing (Qin, 2020). It could save time for the insurance holder as well as for the insurer company and the new advanced technology implementation needs a more polished way to make the future better for the Insurance domain. The study (Qin, 2020) also added that AI, ML, or automation can be used in various developments required for the insurance domain and the Sapiens report was conducted analysis on their survey report as shown in the figure below about the various implementations of advance technology in various domain of Insurance.

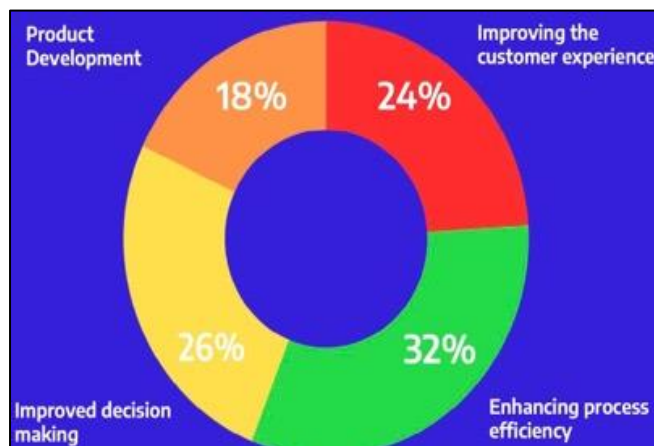


Fig 10 (Sapiens.com)

#### ➤ Efficiency through AI-Driven Insurance Cover Verification

(Zarifis et al., 2023) and a study by Sapiens found that AI has the best ability to collect and extract information and give customers several insurance product suggestions as per customer requests or prompts AI tools like **Alexa and Siri** are popular to use for finding out results by voice command easily. A study report by [www.outsourcestrategies.com](http://www.outsourcestrategies.com) explained various benefits of using AI, or ML technology in the insurance domain where the primary stage of AI or automation implementation helps to save time for claim processors and allows solving complex claim processing applications by human claim processing employers.

#### ➤ Pricing & Underwriting Processes with Predictive Accuracy by AI and ML

AI-supported automation can help primary pricing of insurance and accounting which can be considered as another vital implementation technology in the insurance industry. (Maier et al., 2020) cited the positive side of AI implementation to simplify complex claim processes and with good prediction accuracy. The study report explained the benefits of using AI and ML for the underwriting, and pricing process of the insurance domain resulting in better risk mitigation and management processes for the insurance domain. A report discloses AI can help suggest personalized insurance plans as well as can be implemented to keep customer engagement anytime by Chat bot service to improve customer satisfaction and retention easily and primarily.



➤ *Marketing & Customer Engagement Across the Policy Lifecycle*

However, (Eslami et al., 2022) confirmed the role of artificial intelligence in improving communication between Insurance providers, and customers throughout the whole day by using for example auto chat-bot service with sufficient answers to provide customer satisfaction and retention. The below figure shows an extensive scope of using AI implementation in the insurance industry which says it is capable of customer support, claim fraud identification and prevention, underwriting, pricing, faster claim processing, optimizing reserve claims, and claim recommendation. AI in the insurance company can help to predict customer churn which can help overall increases to give the better market value of any insurance product. It can keep customer engagement better with the insurance company.



Fig 11 Marketing & Customer Engagement Across the Policy Lifecycle  
(Source: Analytics Vidhya)

**IV. AI INTEGRATION ACROSS INSURANCE OPERATIONS**

AI can be used for visualizing data intelligently analyzed by AI to improve the insurance registration process. It can assist in the pricing of insurance products to influence the customer to choose the insurance product as per the need of the customer with the best solution. A recent report study shows the main focus of AI implementation by the Insurance industry can enhance **customer experience by 58%**, enhance **insurance process optimization by 43%**, and also increase product development for **customer innovative way by 19%** which is shown in the below figure.

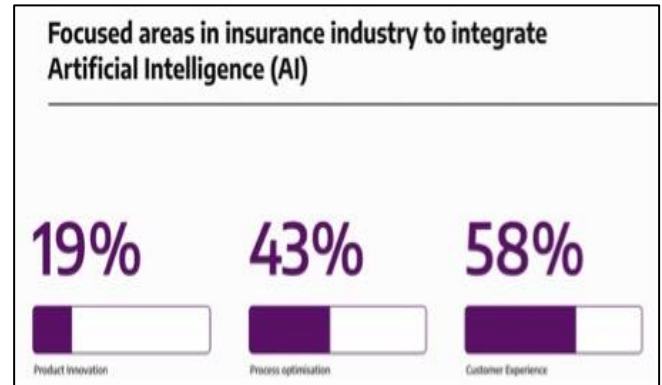


Fig 12 (<https://www.vlinkinfo.com/blog/integrating-artificial-intelligence-in-insurance-apps/>)

The study also highlighted the growth in investment in AI technologies by insurance companies globally as shown in the below figure. It also added that more and more deep integration of AI in the core business of the Insurance domain such as policy distribution, claim management, and underwriting will be better day by day.

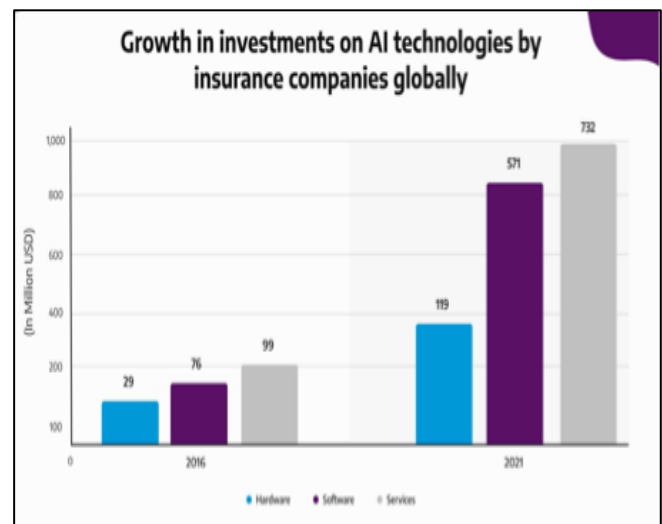


Fig 13 (<https://www.vlinkinfo.com/blog/integrating-artificial-intelligence-in-insurance-apps/>)

➤ *Balance Between External Oversight and Self-Regulation*

(Walters and Wiseman, 2023) discussed the key challenges of implementing AI technology by sharing facts about customer data protection requirements for the insurance domain. Also, a research study by (Deloitte, 2024) discussed briefly about global insurance outlook of 2024 and highlighted the greater social impact of implementing AI technology to evolve insurers' operating environment. The study also explained the need to adopt new technology in the insurance domain and to mitigate the gaps between external oversight factors and self-regulatory factors through the following way shown in the below figure.

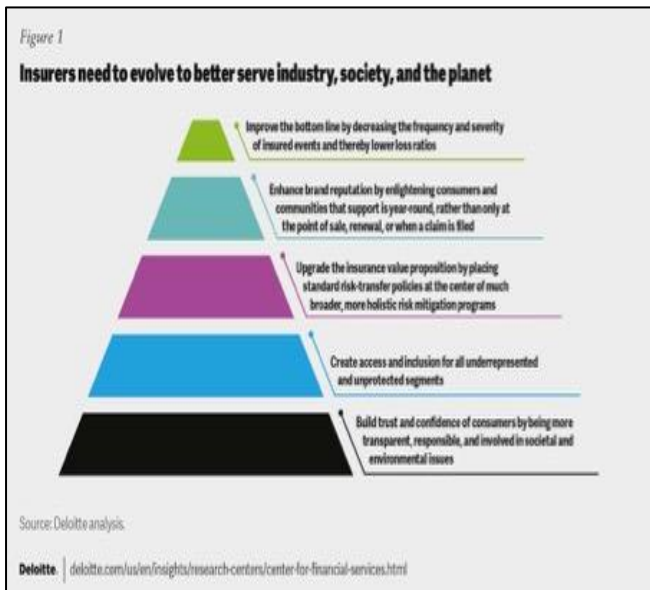


Fig 14 (Deloitte Analysis:

<https://www2.deloitte.com/us/en/insights/industry/financial-services/financial-services-industry-outlooks/insurance-industry-outlook.html>)

However, the study also critically analyzed and confirmed that non-life insurance has higher growth than the advanced insurance market based on the real-time view of 2024 globally as shown in the below figure. The analysis result also confirmed the current challenge of implementation of AI in the insurance domain. However, traditional non-life insurance consists of high risk comparatively with AI-implemented auto insurers.

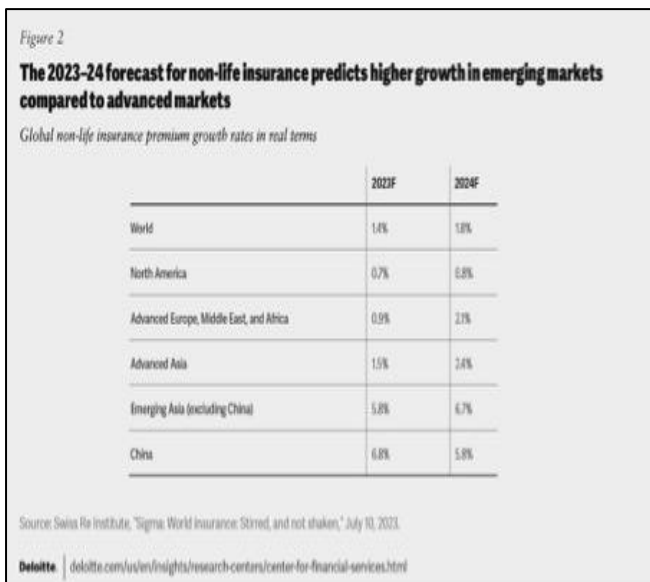


Fig 15 (Deloitte Analysis: <https://www2.deloitte.com/us/en/insights/industry/financial-services/financial-services-industry-outlooks/insurance-industry-outlook.html>)

➤ *Pragmatic Hybrid Approach of Decision-Making*

Complete automation of decision-making processes can be risky for customers. It also can lead customers to confusion in the case of choosing insurance products which

can be solved by a pragmatic hybrid approach of decision-making by AI and ML-based technology (Chen, et al., 2023). AI cannot fully replace humans as AI has some limitations in practical implementation. Hence, it should be always safe to be verified or scrutinized by human expertise to make a better decision when choosing any insurance product suggested by new technologies. A recent study by (Baranauskas, and Raišienė, 2021) on Baltic Insurance cited interactive multi-step logic, the complexity of perceived risks, personal bias, contextual variables in decision-making, the influence of the marketing domain, and the feedback-repurchase loop.

(Baranauskas, and Raišienė, 2021) confirmed that, within new digital insurance platforms, the behavior and purchase behind the decision-making process of insurance customers can be continuous, but not a simultaneous, sequence of three-stage processes as explained in the following figure.

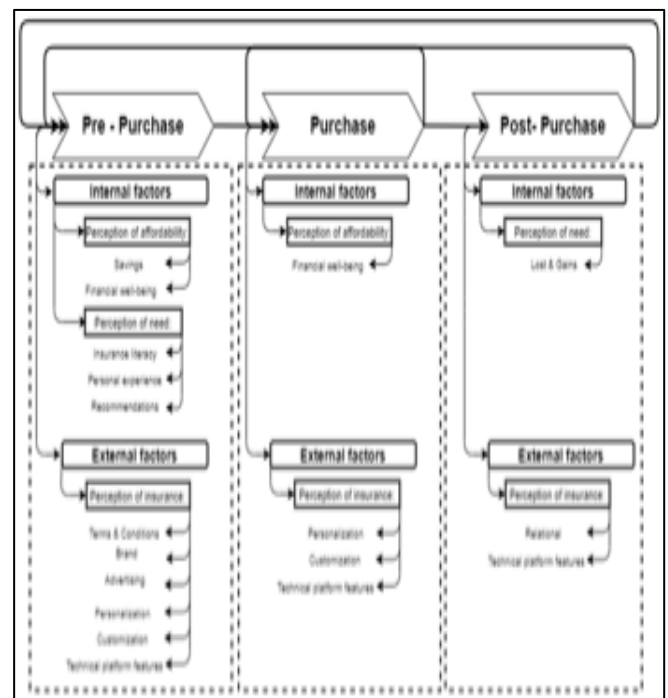


Fig 16 (Baranauskas, and Raišienė, 2021)

Additionally, the research analysis confirmed that the combination of three internal and external factors can influence the insurance purchase–decision-making in digital insurance platforms. The study found a strong Pearson correlation among internal factors of personal evaluation, external factors of new technological features, and combined factors of insurance knowledge, product customization, and service personalization.

The research analysis also confirmed socio demographic factors, such as age group, gender, and country, have no statistically significant relationships with any types of factors related to insurance evaluations, personalization, digitalization, and customization levels within the Baltic insurance market and digital insurance platforms.

➤ *Trustworthy AI Implementation*

(Pisoni and Díaz-Rodríguez, 2023) identified challenges in AI implementation, emphasizing the critical role of big data training and learning through AI and ML to build trust in customers with better and more efficient output fetched by AI-driven solutions.

The study confirmed that the trust factors also depend on processing time, claim resolution rates, or customer satisfaction scores as already discussed earlier briefly in this white paper.

Secondly, as we previously discussed already confirmation, validation and verification process needs human expertise after implementing advanced technology as well, in the insurance sector which is a challenging factor in gaining trust from customers.

Thirdly, data accessibility and interrogatability such as data storage, data infrastructure, and data processing speed are other factors which can influence gaining the trust of customers through the implementation of new technologies in insurance.

➤ *Budget Constraints and Legacy Technology: Persistent Challenges*

The research study conducted by (Balasubramanian et al., 2020) confirmed that the budget is another challenge required for implementing AI, ML, or automation like new technology in the insurance domain. However, the research study by Precedence disclosed a growing market size of **4.59 billion USD in 2022** and also predicted to have a budget size of **79.86 billion USD by 2032**, for the implementation of AI and ML in the Insurance domain which has a **growth rate of 33.06% for 2023 to 2032** as shown in the below figure.

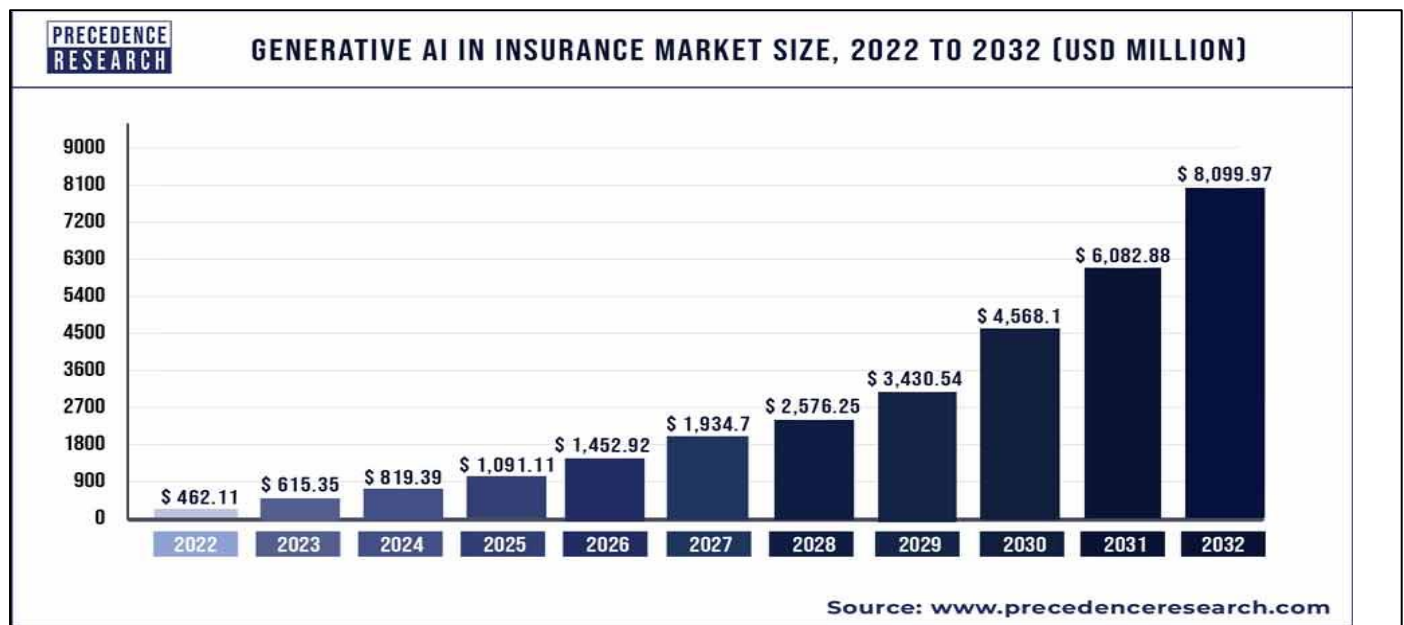


Fig 17 (<https://www.precedenceresearch.com/artificial-intelligence-in-insurance-market>)

Report Coverage	Details
Market Size in 2023	USD 6.11 Billion
Market Size by 2032	USD 79.86 Billion
Growth Rate from 2023 to 2032	CAGR of 33.06%
Largest Market	North America
Base Year	2022
Forecast Period	2023 to 2032
Segments Covered	By Offering, By Deployment Mode, By Technology, By Organization Size, By End User, and By End User
Regions Covered	North America, Europe, Asia-Pacific, Latin America, and Middle East & Africa

Fig 18 (<https://www.precedenceresearch.com/artificial-intelligence-in-insurance-market>)

The above table also highlights the growth rate of North America and forecasts and confirms the budget for AI implementation in the Insurance domain based on the North American region.

V. CONCLUSION

The implementation of AI, ML, or automation like new advanced technology in the insurance industry marks many challenges and factors which the report already discussed briefly above. Jonathan Rusby's view about the need for digitalization in his working area at Nordics region reflects a global need which is predicted to have a budget of **35.77 billion USD by 2030**. This report discussed briefly the positive and negative challenges of AI implementation for decision-making, customer satisfaction, and product development area concerning the insurance domain. As the global Insurance industry improves day by day through various pragmatic hybrid new technological approaches, to get a better world in future depending on efficient



implications of AI and ML technology, which need to be more resilient, customer-centric, and trustworthy. Using generative AI technology in the case of underwriting has the possibility of getting biased results due to various dependent factors like age, gender, and ethnicity. These factors have a high potential for wrong decision-making which is a negative impact of AI implementation. On the other hand, the positive impact of using advanced technology or AI is that can identify primary fraud customers easily increasing the risk of losing existing customers.

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