



Predictive Analytics in Insurance

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Abstract

At its heart, the insurance industry depends on the ability to predict outcomes and behavior changes. Predictive analytics is all about forecasting the likelihood of future events. This technology, leveraging advanced statistical algorithms, machine learning, and artificial intelligence, enables insurers to forecast future events and behaviors with unprecedented accuracy. Predictive analytics in insurance uses statistical models, machine learning techniques, and historical data to forecast future outcomes, such as claims frequency, customer churn, and fraud likelihood. It uses historical and real-time insurance data to forecast risks, optimize underwriting, detect fraud, and enhance customer satisfaction. By analyzing patterns in vast datasets, insurers gain actionable insights for smarter decision-making. Predictive analytics in insurance help increase profits and mitigate risk. It is a data-centric approach to predicting the future and making smarter insurance products and service decisions. This paper delves into how predictive analytics is revolutionizing the insurance sector.

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Keywords: data, data analytics, predictive analytics, artificial intelligence, insurance, insurance industry

Introduction

The insurance industry, traditionally reliant on historical data and actuarial science, is currently undergoing a profound transformation, moving away from traditional, reactive business models toward a proactive, data-centric approach. At the heart of this evolution is predictive analytics, which uses historical data, statistical algorithms, and machine learning techniques to estimate the likelihood of future outcomes. Predictive analytics provides helpful, competent assistance to insurance companies. It replaces old, cumbersome methods insurers used to calculate risks, premiums, and policies. It helps companies understand customer behavior, enabling them to spot customers who are unhappy with their insurance or are planning to switch ^[1].

Insurers have already been using the basics of predictive analysis for years. It is the cornerstone of every health, life, property, or auto insurance company. All industry players, from carriers to insurance agencies and brokerage firms, can benefit from effective predictive analytics.

Data is becoming one of the most valuable assets for any organization. It has become the bread and butter of insurers. Insurers are generating and collecting more data than ever before. With so much data available, the biggest challenge facing insurers is turning data into insights. Insurance companies need to make data-driven decisions and maintain a competitive edge. Predictive analytics in insurance are reshaping how insurers operate by turning vast data into actionable insights to forecast risks, improve customer experiences, and more. It lets you work smarter – not harder – by guiding every choice with real, actionable data. It looks at past data to find patterns to forecast the future. Training a predictive model means feeding it with clean data, so it learns patterns and can spot issues before they cause trouble ^[2]. For example, models trained in medical history, prescription fills, and socioeconomic data can flag members likely to develop chronic conditions such as diabetes or cardiovascular disease.

2. Methodology

This study utilized a qualitative research method of predictive analytics in insurance, integrating a systematic literature review with the assessment of real-world studies. The objective is to apply predictive analytics techniques to insurance data to improve risk prediction, enhance pricing strategies, detect fraudulent claims, and support data-driven decision-making.

3. Literature Review.

3.1. Predictive Analytics

Descriptive analytics examines what has happened over the years. They can detect trends in historical data. Analytics can uncover trends and hypothesize probable reasons for change by comparing the same data across different periods. It can be seen as the industry baseline, which assesses past and current data to deliver more meaningful insights and empowers people to use their own intelligence and knowledge to make decisions. Predictive Analytics helps businesses anticipate what might happen and the impact of various situations, such as potential supply chain bottlenecks. Managers can be proactive rather than reactive by pushing them to evaluate these prospective circumstances before they occur. Predictive analytics may be used to identify patterns and trends as well as anticipate breakdowns that may impact suppliers and, consequently, production processes. Predictive analytics for the supply chain leverages data, statistical

algorithms, and machine learning techniques to identify the likelihood of future outcomes. At the same time, prescriptive analytics builds on predictive analytics and dives deeper to provide future insights into what can be done next. Prescriptive analytics uses the findings of descriptive and predictive analytics to recommend what measures a business should take to achieve its objectives. Because prescriptive analytics is increasingly complicated, they need more powerful software capable of rapidly processing and interpreting large amounts of data. Further, cognitive analytics attempt to mimic human thought and behavior and can assist companies in addressing challenging, complex problems. Cognitive analytics does this by leveraging artificial intelligence (AI), which enables it to improve over time. With the use of AI in the industry, it is possible to answer complex questions and draw out contextual conclusions on how humans would have interacted with the situation. It helps with more meaningful data and scales experience and knowledge to better inform decisions.

On the other hand, diagnostic *analytics* enables the identification of the root cause. It is characterized by techniques such as drill-down, data discovery, data mining, and correlations. It involves analyzing overall performance and figuring out why errors, mistakes, and delays occur. It lets the manager know about delays, breakdowns, and disruptions in the demand and supply processes, along with the reasons behind them.

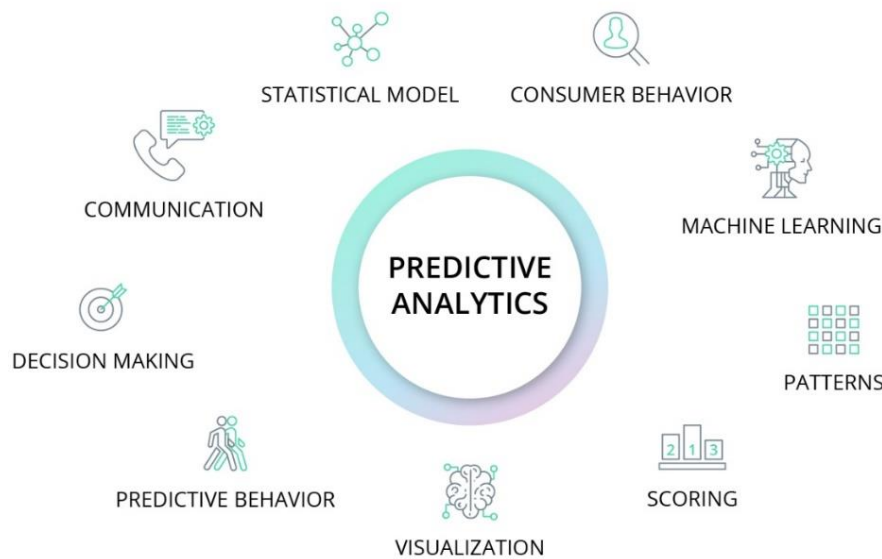


Fig 1: Predictive analytics [4].

Figure 3 shows these major types of data analytics [7]. Unlike diagnostic and descriptive analytics, which analyze situations after they occur, predictive analytics uses advanced data analytics techniques to forecast future outcomes. In the supply chain, the time has come to shift from mere descriptive and diagnostic analytics to predictive and

prescriptive analytics. Predictive analytics is a branch of data analytics that uses historical data, along with statistical modeling, data mining, and machine learning, to predict future outcomes. Figure 4 shows how predictive analytics works [8].

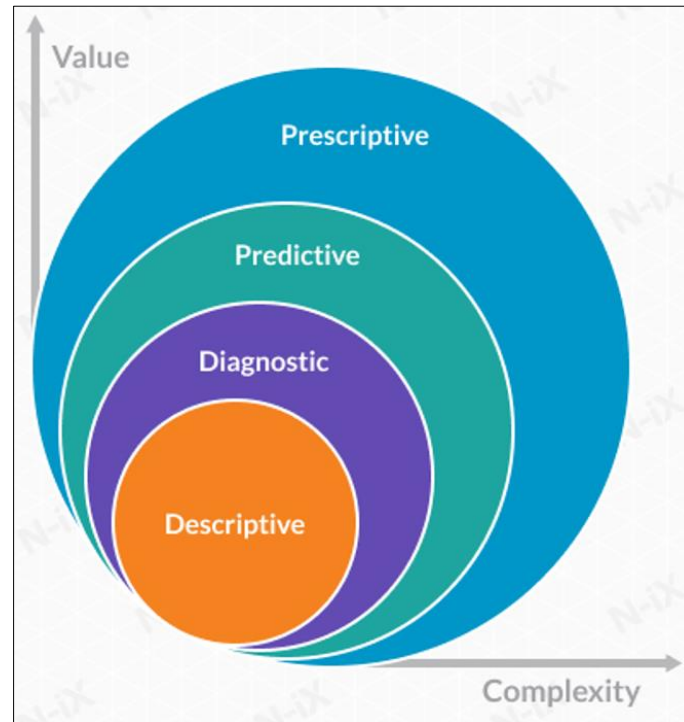


Fig 3: Types of data analytics [7].

3.2. Predictive Analytics in Insurance

The old methods of insurance just do not cut it anymore. The insurance industry, traditionally built on risk assessment and actuarial calculations, is undergoing a seismic transformation driven by AI and data scraping technologies. As global insurers face rising customer expectations and complex risk landscapes, the strategic adoption of advanced analytics has become a critical driver of growth, efficiency, and competitive advantage. Predictive analytics transforms raw insurance data into valuable insights, helping insurers reduce

risks, streamline operations, and stay competitive in a dynamic market. Across various domains, predictive analytics reshaping insurance models, empowering insurers to operate with greater precision, transparency, and customer-centricity. AI-driven predictive analytics is transforming the insurance industry by delivering numerous competitive advantages. Figure 5 shows an insurance professional [2], while Figure 6 shows a representation of predictive analytics in insurance [9].

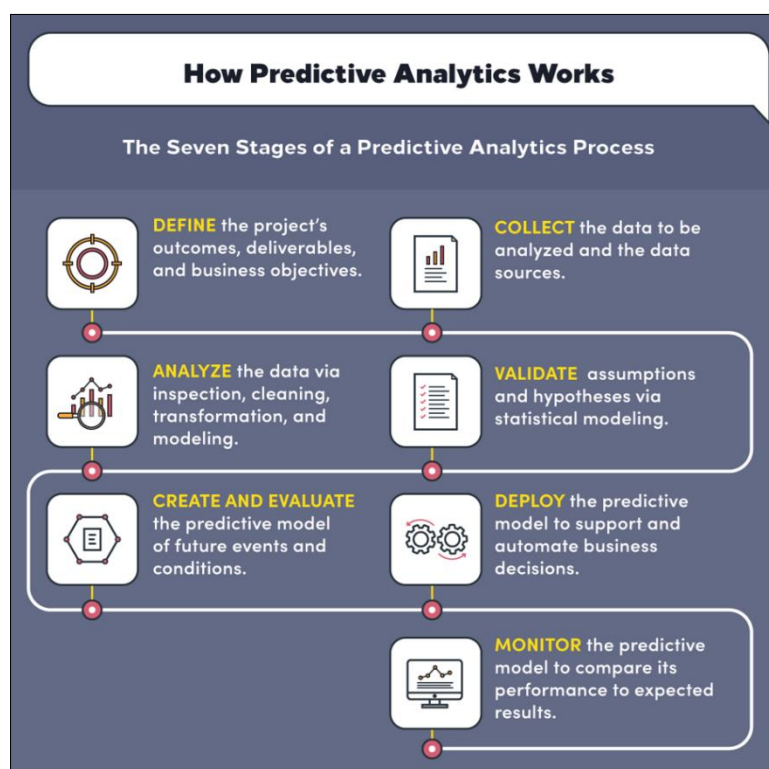


Fig 4: Predictive analytics process [8].



Fig 5: An insurance professional ^[2].

In today's insurance market, predictive analytics enables carriers to move beyond "what happened" to "what will happen," delivering granular accuracy that legacy tables simply cannot match. While traditional methods rely heavily on demographic buckets (such as age, zip code, or credit score), predictive modeling in insurance takes a "high definition" approach. The traditional thirty-day waiting period for a policy is now a relic. Underwriting analytics allows for risk assessment in insurance that goes far beyond basic demographics ^[10]. Predictive analytics allow insurers to anticipate claims, optimize pricing, detect fraud, and manage risk more accurately. It transforms historical and real-time data into actionable insights that improve both operational efficiency and profitability. The insurance industry is based on a simple equation ^[8]:

Better data = more accurate risk calculations = higher profits. The reliance on data analysis makes insurance uniquely suited to the use of predictive analytics.

3.3. Applications for Predictive Analytics in Insurance

Predictive analytics (PA) has emerged as a powerful force reshaping the insurance industry, promising enhanced underwriting accuracy, more precise fraud detection, streamlined claims processing, and improved customer retention. Its applications span from enhancing risk assessment and underwriting to revolutionizing fraud detection, claims management, customer retention, and market expansion. Figure 7 shows some top applications of PA in insurance ^[11]. Common applications of predictive analytics in insurance include the following ^[1,12-16]:

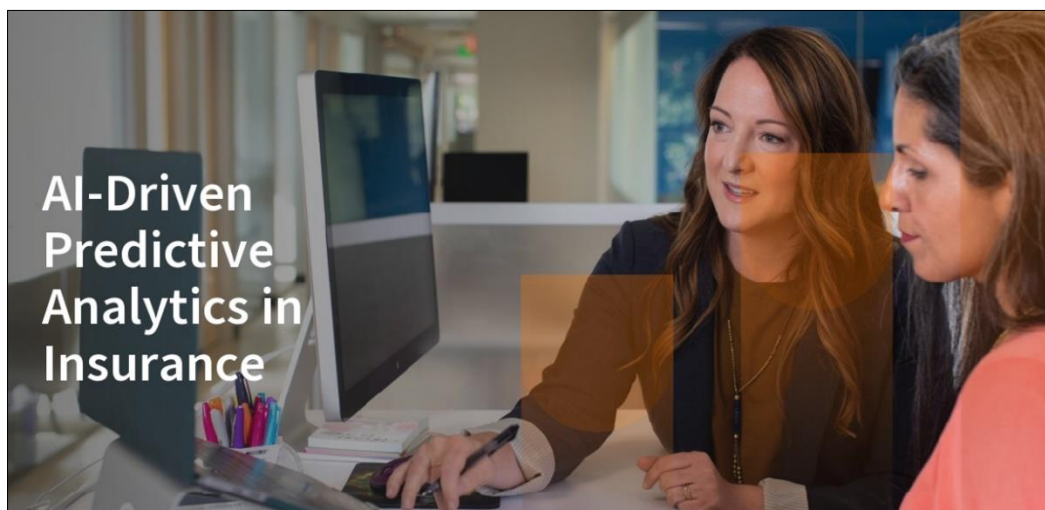


Fig 6: A representation of predictive analytics in insurance ^[9].

The health insurance industry is experiencing significant transformation driven by technological advancements and data-driven decision-making. Health insurers manage enormous claim volumes while balancing member care, risk pools, and reserves. The integration of predictive analytics into health insurance has revolutionized risk assessment and

policy customization, leading to greater efficiency, reduced costs, and more personalized coverage plans. Predictive analytics adds precision to this balancing act by surfacing high-risk members before their conditions escalate into costly claims. This insight allows insurers to design proactive

intervention strategies that encourage preventive healthcare measures and reduce the frequency of high-cost claims. By leveraging advanced AI models, insurers can predict potential health risks and suggest wellness programs,

ultimately improving both customer health outcomes and cost efficiency. Figure 8 shows the key applications of predictive analytics in healthcare ^[17].



Fig 7: Some top applications of PA in insurance ^[11].

Applications include but are not limited to:

- Auto Insurance:** In auto insurance, predictive analytics has revolutionized the way insurers evaluate risk and set premiums. Telematics data, gathered from connected devices in vehicles, allows insurers to monitor driving behavior, including speed, braking habits, and mileage. These insights enable the creation of usage-based insurance policies tailored to individual driving habits. Additionally, predictive models analyze geographic and behavioral data to forecast accident-prone zones, allowing insurers to adjust risk models dynamically and improve claim predictability.
- Life Insurance:** Mortality risk is the foundation of life insurance pricing, but traditional actuarial methods rely heavily on static data sets. For life insurance, predictive analytics enhances traditional actuarial models by introducing AI-powered mortality models. These systems analyze vast datasets, including lifestyle habits, medical records, and demographic information, to calculate life expectancy with greater accuracy. Intensifying competition and raising customer expectations are driving investment in predictive analytics in life insurance. Companies offering individual life insurance and group life insurance are expected to lead to the adoption of predictive analytics in the industry. Furthermore, insurers can offer personalized policy recommendations based on individual risk profiles, ensuring that customers receive coverage plans aligned with their specific needs.
- Property Insurance:** Predictive analytics is used to assess and mitigate risks from natural disasters, theft, and other property-related incidents. By analyzing geographic, weather, and historical claims data, insurers can predict disaster-prone areas and adjust premiums accordingly. AI-driven image recognition tools further streamline the claims process by assessing property damage from photos and videos, enabling faster claim settlements and reducing fraud risks. ML models can predict property insurance risk by applying AI to climate data, geographic information, and claims history. Beyond catastrophe modeling, the property and casualty insurance industry is moving toward IoT integration.
- Risk Assessment:** One key benefit of predictive analytics is accurate risk assessment, where data from customer demographics, claim histories, and IoT devices refine pricing models and prevent over- or under-insurance. The fundamental core of the insurance industry has always been the evaluation and pricing of risk. Insurers are moving beyond traditional demographic and historical claims data to incorporate richer, real-time information from diverse sources, such as telematics, smart home devices, and even social media interactions. It allows for more granular risk profiling and dynamic pricing models that accurately reflect individual policyholder behavior and potential risks. The ultimate goal of insurance risk assessment analytics is to enable more sophisticated and dynamic pricing strategies. In a competitive market, the ability to accurately differentiate risk is the primary driver of profitability.
- Fraud Detection:** Fraud detection represents another critical area where predictive *Fraud Detection*: Fraud detection represents another critical area where predictive analytics delivers substantial value. Insurance fraud is a persistent challenge that imposes a significant financial burden on industry and its customers. It is a pervasive and costly problem, with an estimated \$80 billion in fraudulent claims annually in the United States alone. Fraud detection would reduce the risk of data exploitation, and they would proactively manage vulnerabilities. Using old-school methods to catch red flags and detect insurance fraud no longer works. Predictive models analyze vast datasets to identify suspicious patterns, anomalies, and connections that human investigators might miss. By monitoring social media activity post-claim or cross-referencing data from third-party vendors, insurers can detect and prevent fraudulent activities more effectively, lead.
- Claims Management:** In claims management, predictive analytics revolutionizes the process from initial reporting to final settlement. It enables claims triage and prioritization, allowing insurers to identify

high-cost or outlier claims early in the process. This early detection allows for proactive intervention, reducing the likelihood of escalating costs and accelerating resolution times. This leads to more efficient resource allocation and improved customer satisfaction through faster processing.

- **Customer Retention:** Customer retention and experience are profoundly enhanced by predictive analytics. By analyzing customer interactions, feedback, and behavioral patterns, insurers can identify policyholders at risk of churn and proactively address their concerns. This allows for personalized communication, tailored product offerings, and proactive problem-solving, fostering stronger customer loyalty.
- **Market Expansion:** Predictive analytics plays a crucial role in market expansion and product development. By analyzing demographic trends, behavioral patterns, and emerging risks, insurers can identify underserved markets and develop innovative products that cater to

- evolving customer needs. This data-driven approach allows for strategic marketing efforts and the creation of highly targeted insurance solutions, fostering growth and competitive differentiation.
- **Underwriting Processes:** It is easy to see how insurers make money – the premiums they collect comprise their revenue, and processing claims incurs a cost. Underwriters are tasked with assessing the risks associated with onboarding clients. Evaluating risk and determining the right pricing for each client is a constant challenge for insurance companies. The underwriting process is a ripe opportunity for insurance companies seeking AI and machine learning use cases. AI and ML systems are underwritten based on risk predictions, third-party data, and publicly available datasets. With increased automated underwriting, the manual process is reduced, enabling companies to gain maximum benefits. Figure 9 shows how predictive analytics enhanced underwriting^[8].



Fig 8: Key applications of predictive analytics in healthcare^[17].

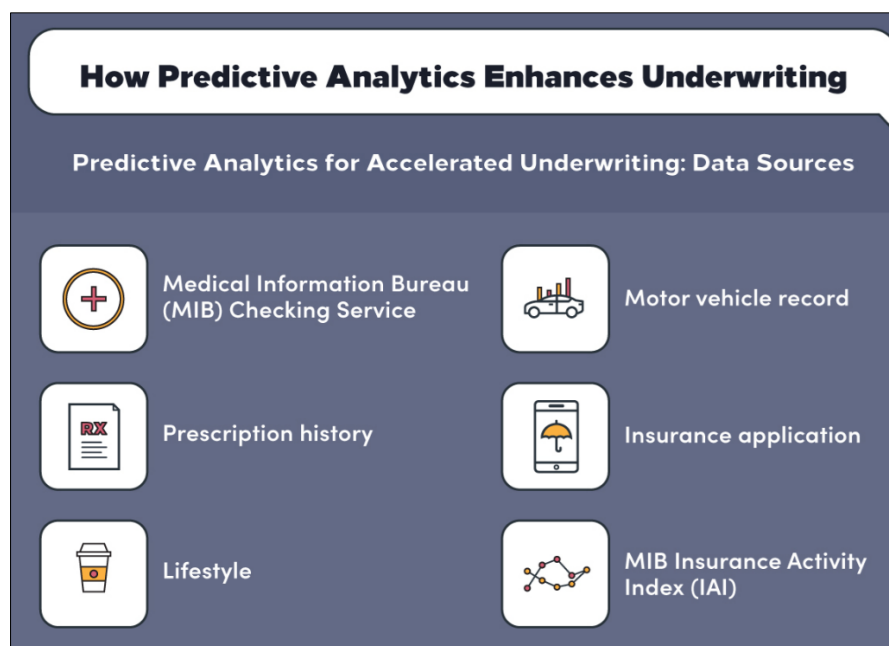


Fig 9: How predictive analytics enhanced underwriting^[8].

- **Pricing Optimization:** Most insurance pricing and premium optimization is based on claims history. Predictive analytics enables insurers to develop sophisticated pricing models that consider multiple variables, including customer demographics, claims history, policy coverage, and external factors such as weather patterns and economic indicators. It can help optimize insurance pricing and premiums even more accurately, with less manual intervention. It does so by assessing market trends, customer behavior, associated risk factors, claims data, and more to develop dynamic pricing strategies that ensure profitability and customer satisfaction.
- **Churn Prediction:** The insurance industry is highly competitive, and the majority of customers prefer switching to another provider that offers competitive pricing and benefits. It is particularly the case for auto insurance companies. Hence, it is essential to identify customers at risk of discontinuing their policies. Predictive analytics provide insurers with data about churn rate by analyzing engagement metrics and satisfaction levels. These insights allow insurers to implement. Predictive intelligence is shifting how Insurance companies assess and predict risk. The future of Insurance is not about analyzing what happened yesterday; it is about predicting what is likely to happen tomorrow. Modernizing risk assessment requires technology partners with industry knowledge and a scalable platform.

Humans + AI = Intelligence

AI is not replacing humans. Instead, AI tools augment risk underwriters' knowledge and intelligence. In the age of big data and artificial intelligence (AI), insurance companies compete to have the highest-quality data and analytics tools to convert the data into business intelligence.

4. Discussions of Benefits and Challenges

4.1. Benefits

The widespread adoption of predictive analytics yields numerous benefits for the insurance industry, encompassing operational, financial, and customer-centric advantages. The benefits include increased profitability, improved customer satisfaction, and operational efficiency. Other benefits of predictive analytics in insurance include the following [12,15,18]:

Automation is one of the benefits. Not every claim requires the same level of human intervention. Automation reduces manual, repetitive tasks for underwriters and adjusters, allowing skilled professionals to focus on high-value, complex cases. It reduces manual effort, frees skilled staff for high-value work, and improves speed-to-decision. Automated decisioning accelerates underwriting and claims workflows, improving consistency and lowering operational overhead. In addition, it reduces manual effort, mitigates creeping costs, and ensures claims are routed to the appropriate adjusters. Others include *Improved Risk Management*. The integration of predictive analytics into insurance platforms helps insurers assess historical claims data, behavioral data, and external variables. This data analysis provides them with the ability to quantify risk at the individual and portfolio levels. More accurate risk assessment leads to a healthier portfolio and reduced exposure to unforeseen losses. By anticipating potential risks

and proactively mitigating them, insurers can maintain financial stability and ensure long-term sustainability. Further areas include *Smarter Claims Processing*: Modern predictive models integrated with AI capabilities enable insurers to assess claim severity, authenticity, and settlement potential immediately upon submission. Based on this analysis, insurers can make decisions quickly, minimize manual interventions, and accelerate straight-through processing for low-risk claims. This enables turnaround times and customer satisfaction. *Personalization* is another key benefit. Predictive analytics enhances customer personalization by analyzing behavioral patterns to create tailored insurance plans, improving satisfaction and loyalty. With data-driven insights, insurers can design customized insurance policies aligned with individual customer needs, creating better customer retention rates. When you integrate predictive analytics into your insurance platform, you can also give it access to every customer interaction with it. This enables it to assess customer behavior, interactions, and thus preferences to predict their future needs. *Customer Retention is seen as critical* in insurance, where customer acquisition costs are high. Customer retention improves when churn signals are identified early, allowing proactive outreach before policyholders switch providers. Predictive models flag policyholders are likely to churn, allowing insurers to intervene with personalized offers or service outreach. The use of predictive analytics in insurance platforms enables insurance companies to monitor behavioral patterns, payment history, and engagement trends to identify high-risk churn. This data-driven information helps insurance executives proactively engage at-risk customers through targeted, personalized retention campaigns.

Furthermore, business decision-making and action take place through underwriting rules, adjusting policy pricing, escalating flagged claims for deeper investigation, and boosting marketing and retention campaigns for at-risk customers. This data-driven decision-making helps insurers to improve customer loyalty towards your insurance company and, thus, customer lifetime value. *Enhanced Operational Efficiency is unique in Predictive Analytics in Insurance*. As predictive analytics does the groundwork for insurers, like identifying potential customers, at-risk customers, fraudulent claims, and more, they get to focus on higher-value tasks. This enablement helps them improve productivity and eliminate unnecessary operational overhead, ultimately leading to enhanced operational efficiency. *Competitive Advantage is vital for business advantage*. Predictive analytics in insurance platforms enables insurers to stay ahead of the curve with faster innovation cycles, sharper risk insights, and more agile customer strategies. This fosters differentiation in crowded markets, enhances brand trust, and enables quicker adaptation to emerging risks and regulatory changes.

4.2. Challenges

Despite its transformative potential, the application of predictive analytics in insurance is not without its challenges. The ethical and regulatory challenges, particularly regarding transparency, data quality and availability, legacy IT infrastructure, model bias, a shortage of skilled talent, resistance to change, and data privacy, demand careful consideration and proactive solutions. Other challenges of predictive analytics in insurance include the following [12,15,19]:

Ethical Concerns is a challenge: The deployment of AI in sensitive areas like claims processing and risk assessment raises profound regulatory and ethical questions. Issues of transparency, accountability, and privacy are paramount. Regulators increasingly demand that organizations be able to explain AI-driven decisions, which can be particularly challenging for complex, black-box models like deep neural networks. Pricing and underwriting decisions must adhere to ethical guidelines and avoid discriminatory practices. Furthermore, handling vast amounts of personal and sensitive customer data requires strict adherence to data privacy regulations, such as the GDPR.

Data Privacy is a key issue. Data privacy is another paramount concern. The collection of granular personal data, while beneficial for risk assessment, carries significant stewardship responsibilities. The extensive collection and analysis of personal data across various sources raises significant privacy and security concerns. Insurers must navigate complex regulations such as GDPR and CCPA, ensuring customer data is collected, stored, and used responsibly and securely. Data privacy regulations such as GDPR require companies to be responsible with customer data.

Data Quality is another disadvantage. The efficacy of any predictive model hinges critically on the quality and quantity of the data it consumes. In the insurance context, this often translates into a complex landscape of incomplete, outdated, or inconsistent data spread across disparate systems. Biased or insufficient historical data can lead to inaccurate predictions and potentially unfair outcomes. Insurers must invest heavily in robust data governance frameworks to ensure the reliability and integrity of their data inputs.

Bias is one of the most significant ethical concerns, as it involves the potential for bias and fairness issues. Predictive models, trained on historical data, can inadvertently perpetuate or even amplify existing societal biases. The use of proxy variables—data attributes that correlate with protected characteristics such as race or gender—can lead to discriminatory outcomes, even unintentionally. Ensuring that models are fair, equitable, and do not lead to disparate impact on certain groups is a paramount challenge for insurers and regulators alike. Regular audits, fairness checks, and the development of ethical AI frameworks are crucial to mitigate this risk and ensure equitable outcomes for all policyholders.

Digital Divide has some risks. As insurance risk assessment analytics become more sophisticated, there is a risk that certain segments of the population, those who lack a digital footprint or who are deemed high-risk by algorithms, could find it more difficult or expensive to obtain coverage. Balancing the pursuit of mathematical precision with the social mission of insurance to provide a safety net for all is one of the most significant challenges facing industry leaders today. *Integration of I:* Many established insurance companies operate with legacy IT systems that were not designed to accommodate modern AI tools and large-scale data processing. Integrating sophisticated predictive analytics solutions into these older, often siloed, infrastructures present a significant technical and financial hurdle. It requires substantial investment in infrastructure upgrades, data migration, and the development of interoperable systems, alongside comprehensive personnel training.

Resistance to change during adoption is an issue. Human factors play a significant role in the successful adoption of new technologies. Employee and stakeholder resistance to

change can impede the implementation of predictive analytics initiatives. Concerns about job displacement, distrust in automated systems, or a lack of understanding of the technology's benefits can create internal barriers. Effective change-management strategies are needed. They include clear communication, comprehensive training programs, and demonstrating the value proposition of AI, all of which are essential to fostering acceptance and collaboration.

Skill gaps are seen as a challenge. Implementing AI and predictive analytics requires skilled professionals. The insurance industry is full of sales agents, legal teams, and underwriters. As such, it makes it very clear that they have a shortage of skilled professionals with both domain knowledge of insurance and technical expertise in data science, machine learning, and AI.

Regulation is a key issue in Predictive Analytics in Insurance: The insurance industry is highly regulated. There is a slew of regulations governing the insurance pricing and underwriting industry. One of them is the Affordable Care Act (ACA), which introduced norms in the health insurance market, requiring insurers to adhere to community rating rules. When you opt for AI integration services to enable smart decision-making capabilities, especially in underwriting or claims, it is essential to comply with strict fairness, transparency, and auditability standards. That is a big hurdle for the insurance industry to comply with.

Human Element with collaboration is a challenge. Despite the rise of algorithms, the human element remains a critical component of insurance risk assessment analytics. The most effective systems combine the processing power of machines with the judgment and intuition of experienced professionals. This collaboration between man and machine requires a new set of skills for the insurance workforce. Tomorrow's risk professionals will need to be as comfortable with data science as they are with traditional insurance principles. They must be able to interpret algorithmic outputs, identify potential biases, and communicate complex technical concepts to non-technical stakeholders. Human-in-the-loop processes provide additional oversight for high-stakes decisions, ensuring critical judgments remain accountable.

5. Results

The findings of the study show that predictive analytics significantly improve risk prediction accuracy, enhance pricing strategies, and strengthen risk assessment in the insurance sector. It also improves fraud detection and helps identify unusual claim patterns. For example, reductions in fraudulent claims and cost savings lead to lower financial losses and improved competitiveness. Additionally, machine learning models outperform traditional statistical methods in predictive performance. It also provides a better understanding of customer risk profiles, while enabling insurers to improve operational efficiency and customer retention, thereby leading to improved customer satisfaction and loyalty [20-23].

6. Future of Predictive Analytics in Insurance

Predictive analytics holds immense promises for revolutionizing the insurance industry, offering pathways to greater efficiency, accuracy, and customer satisfaction. Insurers are now shifting from reactive analysis to proactive prediction with data and artificial intelligence (AI)-powered insurance technology. Predictive analytics combined with AI

chatbots will offer hyper-personalized customer service experience.

The evolution of predictive analytics for insurance operations is working in insurers' favor. As technology evolves, insurance companies that invest in robust data strategies will emerge as industry leaders. The rise of generative AI introduces concerns around data security, privacy, and the potential for generating synthetic data that, if not carefully managed, could introduce new biases or vulnerabilities. IoT devices will continue to provide insurers with granular insurance data, especially in health and auto insurance.

Predictive analytics in insurance holds tremendous promise for the future. It can not only transform insurance businesses but also improve customer acquisition and retention. The future of insurance belongs to those who act today. With AI becoming a necessity today, predictive analytics has evolved beyond a tool for forecasting risks. Powered by the rapid convergence of ML, AI, and IoT, predictive analytics is unlocking a level of intelligence that was previously impossible. By embracing big data, predictive modeling, and real-time insights, the insurance industry is becoming more precise, efficient, and customer-centric. As these technologies mature, they grant insurers a high-definition view of customer behavior and life patterns. The future belongs to insurers who can thread this needle by using data to drive financial performance while maintaining the ethical governance necessary to maintain their customers' trust^[10]. In the future, the only way to outperform the competition is to leverage predictive analytics tools and other AI products.

7. Conclusion

Predictive analytics has a strong foothold in myriad industries, empowering them to serve their customer 10x better. It has already boomed the insurance industry. The strategic adoption of predictive analytics is no longer a competitive advantage but a fundamental necessity for growth, efficiency, and sustained relevance in a rapidly evolving market. For insurers, adopting predictive analytics is not just about staying competitive, it is about future-proofing their business. Modern insurers use predictive models to improve underwriting precision, reduce fraud, accelerate claims handling, and strengthen regulatory oversight.

Insurance is moving from hindsight to foresight. With rising claims volumes, fraud risks, and customer demands, predictive analytics is no longer a "nice-to-have" but a core capability. Predictive analytics has become foundational for insurers facing climate volatility, margin pressure, and increasing risk complexity. It enables insurers to move from reactive decisions to forward-looking risk, pricing, and claims management across the insurance value chain. Insurers that align predictive analytics with clear business use cases achieve measurable improvements in loss ratios, operational efficiency, and customer experience^[18]. More information on the use of predictive analytics in insurance is available from the books in^[23-27].

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