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The Role of InsurTech in Transforming Corporate Insurance: A Review of Underwriting, Claims, and Customer Relationship Management Precisely if it's related to medical insurance

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Abstract

InsurTech is revolutionizing the health insurance industry by incorporating digital technology into underwriting, claims processing, fraud prevention, and customer relationship management. AI, machine learning, big-data analytics, cloud computing, application programming interfaces and automation are transforming medical insurance processes, this review explores. Digital data analysis, automated risk assessment and personalised classification are supported by InsurTech-enabled underwriting, while digital claims platforms enable online submission, automated document processing, claim verification, and quicker settlements. The advanced analytics and machine learning also help identify abnormal claims and possible fraud. Mobile applications, online portals, chatbots, and automated notification systems and digital grievance systems enhance accessibility and communication in customer relationship management. However, issues with privacy of health data, cybersecurity, data quality, interoperability, algorithmic bias, regulatory compliance, and digital exclusion continue to be concerns. Responsible adoption of technology, explainable systems and human oversight for the development of efficient, secure and customer-centred health insurance is emphasised in the review.

Keywords; *InsurTech; Health Insurance; Artificial Intelligence; Claims Management; Fraud Detection.*

INTRODUCTION

InsurTech, which combines "insurance" with "technology," is an umbrella term for the use of digital technology solutions to reimagine the insurance products, processes and services. While there is no universally accepted definition for the term, academic research indicates that the common characteristic of all of these is the use of technology to enhance the insurance business and customer-focused services [1]. Health insurance is well suited to this transformation because it relies on a wealth of medical, financial and administrative data, regular communications between insurers, hospitals, healthcare providers and policyholders, and intricate processes including risk assessment and claims processing. The digital shift of health insurance, in other words, is a journey from manual and disconnected systems to connected, data-driven and automated systems [2]. Artificial intelligence (AI) and machine learning (ML) can help process huge amounts of data to assess risk, forecast costs, detect fraud and manage claims, and big-data analytics can help uncover patterns that can help to make better insurance decisions. AI has recently been found to have a wide range of applications in the health insurance sector, including underwriting, fraud detection, claims processing, risk management, and customer engagement [3].

Technology plays a key role in enhancing speed, efficiency and responsiveness of insurance processes due to increasing complexity and volume of health related information. Cloud computing can offer scalable storage and processing solutions for insurance data, and application programming interfaces (APIs) can enable connectivity and data sharing between various digital systems and stakeholders [4].

APIs are seen as one of the key enablers for interoperability and integration in digital insurance ecosystems, and AI and cloud computing are identified as key technologies that are transforming insurance operations in studies on insurance digitalisation. Additionally, automation eliminates repetitive administrative tasks and can aid streamlined policy servicing and claims handling [5]. In this big picture of InsurTech, these technologies are closely tied to the core pillars of health insurance—underwriting and risk assessment, claims processing and fraud detection, and customer relationship management and engagement—via digital platforms, chatbots and connected services. Therefore, InsurTech is more than just the digitalization of current processes, it is the evolution of how health insurers evaluate risk, claim management, and how they communicate with policyholders [6].

INSURTECH-ENABLED UNDERWRITING AND RISK ASSESSMENT IN HEALTH INSURANCE

The health insurance sector needs to adopt intelligent underwriting. Traditional models are frequently inefficient, expensive, and prone to mistakes. Customers today want quick, individualised digital services.

The amount of health data, such as lifestyle information and medical records, is growing at an exponential rate. AI is necessary to properly analyse this data. The market for AI in health insurance is expected to increase dramatically, highlighting a general trend in the sector toward intelligent automation [7].

In the health insurance industry, competent underwriting is a competitive need. Customer expectations are changing, necessitating quickness and customisation. AI is already being used by insurtech businesses to provide services like rapid quotations. Traditional insurers that rely on antiquated manual procedures will have difficulty. It is therefore essential to use intelligent underwriting for health insurance.

A change in the way the health insurance sector utilises data is reflected in the rise of AI in the sector. AI is used in smart underwriting to evaluate enormous volumes of data for better risk assessment. The "predict and prevent" concept of proactive risk knowledge and prevention is replacing the industry's reactive claims processing. One important factor facilitating this change in health insurance is smart underwriting [8].

Core Techs Powering Smart Underwriting in Medical Insurance

The change in medical insurance underwriting is being driven by linked smart technologies [9].

- i. **AI for Health Underwriting - The Intelligent Core:** AI is fundamental. AI in health insurance makes it possible for systems to carry out jobs that call for human intelligence. Complex datasets are processed by AI algorithms, which automate decision-making and reveal hidden patterns.
- ii. **Machine Learning (ML) - Learning, Adapting, and Predicting:** Systems can learn from data thanks to machine learning. ML applications in health insurance smart underwriting include process optimisation, predictive capabilities, dynamic risk modelling, and customised pricing. Accuracy is improved by ongoing learning.
- iii. **Natural Language Processing (NLP) - Deciphering the Data Deluge:** Computers can comprehend human language thanks to NLP. Because NLP improves data quality by extracting insights from unstructured data, such as EHRs and physician notes, it is essential for smart underwriting in the medical insurance industry.
- iv. **Predictive Analytics - Illuminating Future Risks and Opportunities:** Predictive analytics forecasts results using machine learning and algorithms. It is essential to smart underwriting in health insurance since it allows insurers to predict health risks, identify high-risk individuals, optimise pricing, and facilitate preventative actions.
- v. **Process Orchestration (PO) - Harmonizing the Underwriting Workflow:** Technologies are coordinated using Process Orchestration (PO) tools. PO platforms improve efficiency and consistency by combining systems for data collection, AI execution, and decision engines to expedite end-to-end underwriting procedures.

The synergistic integration of these technologies, coordinated by PO, is what gives them their strength in smart underwriting for health insurance. In order to achieve dynamic, predictive risk awareness, health underwriting must transition from rule-based systems to ML-driven AI. Because of ML's flexibility, smart underwriting in health insurance is kept strong and current.

Table 1: Traditional vs Smart Underwriting in Health Insurance

Feature	Traditional Underwriting	Smart Underwriting in Health Insurance
Data Sources	Limited, manual entry	Vast, diverse (EHRs, lifestyle), real-time
Processing Time	Days, weeks	Minutes, hours

Risk Accuracy	Moderate, subjective	High, objective, AI-enhanced
Automation Level	Low, manual	High, AI-powered
Customer Experience	Lengthy, impersonal	Fast, personalized
Cost Efficiency	High operational costs	Reduced operational costs
Scalability	Difficult	Easily scalable
Fraud Detection	Reactive	Proactive, AI-driven
Decision Consistency	Variable	Consistent

Source: <https://spsoft.com/wp-content/uploads/2025/06/Table-1-650x569.webp>

Automated Underwriting and Personalised Risk Classification

AI-powered underwriting can assist insurers in reviewing health data, uncovering pertinent medical conditions, and categorizing applicants based on their estimated risk. This is especially important for pre-existing diseases, which are already a factor in health-insurance underwriting. IRDAI defines pre-existing disease in India by diagnosis, medical advice or treatment in the specified period prior to the policy commencement, and coverage is dependent on insurer's underwriting policy and product design. Data-driven risk classification may thus help to make more consistent decisions relating to premiums, waiting periods or other policy conditions. Increased use of personal health data does, however, pose significant privacy and security concerns [10].

INSURTECH IN HEALTH INSURANCE CLAIMS MANAGEMENT AND FRAUD DETECTION

InsurTech is revolutionizing health-insurance claims management by replacing many manual, paper-based activities with digital, automated and data-driven processes. Claim submission online enables policyholders and healthcare providers to submit claim forms, medical bills and supporting documents online, which decreases paperwork and enhances communication with insurance companies. Document processing, claim verification and identifying unusual claim patterns are further supported by technologies like artificial intelligence (AI) and machine learning (ML), optical character recognition and data analytics. These capabilities can be useful during the claims process to make the process more efficient, as well as help insurers deal with the rising volume and complexity of medical claims [11][12].

Digital and Automated Claims Processing

AI-backed systems can review medical records, invoices and policy information to confirm submitted data aligns with policy requirements, and digital platforms can automatically gather and store claim details. The evaluation of routine claims can be done more automatically, with full and standardised claims data, which helps to minimize repetitive administrative workloads and facilitate faster settlement. Finally, automated workflows can be used to detect missing documents or inconsistencies at an earlier stage in the claim process.

Data Integration and Human Oversight

Correct information exchange between insurers and hospitals and healthcare providers is essential for effective claims automation. The sharing of relevant claim information and healthcare data can be improved through APIs and compatible digital systems, but there are challenges due to data format differences and system compatibility. Therefore, the human review is still very important for complicated, controversial or fraudulent claims. Using automated processing combined with human judgment can enhance the efficiency of the operation, but also enable the proper review of sensitive health-insurance decisions [13].

Insurtech tools power the next-generation health insurance fraud detection

In essence, current health insurance fraud detection goes beyond simple anomaly flags. The top insurers are increasingly using multi-layered Insurtech tool stacks, which basically integrate automation, explainability, graph analytics, and artificial intelligence to quickly and accurately detect fraud [13]. Explore how cutting-edge Insurtech models are revolutionising the detection of health insurance fraud:

1. AI-driven Anomaly Detection Engines

In order to identify insurance fraud tendencies that mostly deviate from historical norms, these technologies generally employ "unsupervised and semi-supervised machine learning models". These systems operate by continually learning from treatment patterns, provider behaviour, and claims. In addition to the predetermined rule violations, they also spot minor deviations.

2. Predictive risk scoring and fraud propensity models

Real-time fraud risk scores are assigned to "claims, providers, members, and the hospital network via

sophisticated Insurtech platforms". These systems are basically unique due to their constant recalibration utilising the fresh data signals, risk tiering for inquiry prioritisation, and probability-based fraud prediction. This has the effect of allowing the insurers to virtually concentrate their investigative efforts on high-risk situations, which greatly lowers false positives and speeds up the payment of valid claims.

3. Network and Graph Analytics for Collusion Detection

Health insurance fraud is frequently organised and cooperative. Members, middlemen, and suppliers are all heavily involved in this. These technologies allow the insurers to map linkages between members, providers, claims, and locations. In addition, the insurers will be able to spot circular billing patterns and hidden links, which will lead to the detection of fraud rings and recurring misuse among companies.

4. Real-time, pre-payment fraud detection platforms

Fraud intelligence is fundamentally embedded in the claims adjudication process by the sophisticated insurtech instruments. Real-time claim validation, automatic notifications prior to claim clearance, and risk-based dynamic threshold modifications are the main features of these systems. In essence, this allows the insurers to switch from pay-and-chase to paying-and-preventing models. As a result, it significantly lowers financial leakage.

INSURTECH AND CUSTOMER RELATIONSHIP MANAGEMENT IN HEALTH INSURANCE

InsurTech is transforming the patient/insurer relationship with the aim of creating a more digital, accessible and seamless experience. Policyholders can use mobile health-insurance apps and online policy-management platforms to access policy information, documents, payment and access services, and coverage management without being forced to use physical locations or intermediaries. Additionally, digital platforms can offer claim status tracking, assisting customers in keeping track of the development of their submitted claims and supplying them with applicable updates. Notifications and reminders can be automated to facilitate timely premium payments, policy renewals, document submission and other policy-related activities. These digital interactions can make everyday interactions more convenient and easier for

policyholders. Important areas of the insurance relationship where digital applications are playing a role in simplifying the routine tasks and enhancing customer interaction are identified in the research on digital applications in insurance [14].

Chatbots and virtual assistants can offer instant answers to frequently asked questions, clarify policy details, and help with simple requests. Meanwhile, data-driven systems can deliver personalised communication by providing customers with the information from policies that is relevant to them, with reminders and services. Online complaints, acknowledgements, and tracking of resolution can be offered via digital grievance-handling systems. Such services can help make it easier for customers to engage with insurers via their mobile phones and web platforms at their convenience. But customer satisfaction and trust are also critical components of effective digital CRM, especially when dealing with sensitive customer data, such as health and financial information. As a result, health insurers must also provide easy-to-use digital tools and communication, data security, and reliable service and support for complex and/or sensitive topics [15].

CHALLENGES AND FUTURE DIRECTIONS OF INSURTECH IN HEALTH INSURANCE

While the use of InsurTech in health insurance presents opportunities for improved speed, data-driven and personalised services, it also poses technological, ethical and regulatory challenges. Health-data privacy, security and cybersecurity are concerns because health insurers deal with sensitive medical and financial data. There can also be incomplete, inconsistent or poorly standardised information in large, diverse datasets, which can affect the reliability of automated systems, and present interoperability challenges for insurers, hospitals, and healthcare providers.

Major Challenges

Limited transparency and algorithmic bias may impact automated underwriting, claims assessment and risk classification, where models are based on biased data or lack of transparency or where decisions are hard to explain. Therefore, regulatory compliance is essential to set the right requirements for data protection, data accountability and responsible AI use. Meanwhile, insurers could be faced with a lack of technical knowledge to create, test, oversee and sustain advanced digital systems. Digital transformation can also lead to digital exclusion for customers who have poor internet access, technical skills or accessibility requirements [16].

Future Directions

Going forward, the key areas of focus for the development of InsurTech will be enhanced data governance, digital systems that are interoperable, explainable AI, cybersecurity, and ongoing monitoring of automated models. AI, analytics and digital services can be increasingly combined on health-insurance platforms, while being supervised by humans, especially for complex, disputed or high-impact decisions. Collaboration with insurers, technology providers, healthcare organisations and regulators will be key to responsible implementation and will focus on privacy, fairness, transparency, accessibility and accountability [17].

LITERATURE REVIEW

K. N. & B.C., (2026) [18] highlight the primary motivators for utilising the Insurtech-based platform based on behavioural, technological, and demographic factors (age, income, education, trust, digital experience). Additionally, it acknowledges the main obstacles related to platform challenges, data privacy, and regulatory constraints. Using just secondary data and questionnaires, the study's use of descriptive statistics, Chi-Squared tests, and the Garrett ranking approach shows how important demographics, trust, security, and prior digital experiences are to adoption behaviour. The findings might be crucial for politicians and insurers to help people obtain health insurance more easily, affordably, and effectively by leveraging technology.

Panesar et al., (2026) [19] With augmented reality (AR) being integrated into InsurTech, the insurance sector is witnessing a dramatic revolution that will make insurance more efficient, accessible, and interesting. Due to urbanisation, economic expansion, and growing knowledge of unanticipated hazards like pandemics and climatic calamities, insurance, which was formerly considered a luxury for the rich, is now necessary for financial stability. Artificial intelligence (AI), blockchain, and augmented reality (AR) have made procedures like underwriting and claims more efficient. AR, on the other hand, offers a new dimension by improving risk visualisation and streamlining complicated policies. This chapter explores how AR-powered solutions are enhancing consumer experiences, promoting diversity, and filling holes in conventional insurance models. InsurTech is changing the way occupational hazards are managed in addition to reaching underserved areas by emphasising human-centered designs (HCDs) and utilising digital tools. The goal is to demonstrate how these developments are opening the door for an

insurance ecosystem that is more inclusive and responsive to the changing demands of both individuals and companies.

du Preez et al., (2025) [13] provides a thorough assessment of the literature on machine learning methods used for health insurance fraud detection. Our goal is to provide insights into research possibilities and difficulties by analysing the data and methodology recorded in the literature during the previous 20 years. For the final qualitative and quantitative evaluations, 137 of the evaluated publications were chosen. There are a number of difficulties in utilising machine learning to identify fraud in healthcare claims. These include a small number of labelled fraudulent instances to train models on, inconsistent data, a lack of data standardisation and integration, and privacy issues. Research on health insurance fraud detection may also be greatly advanced by using novel approaches to data sampling, feature encoding techniques for machine learning model training, and investigating the most recent developments in deep learning.

Bhabhrawala & Bootwala, (2025) [20] comprehend insurtech investment and growth in the Indian market. It delves further into the technologies used by general insurance businesses to improve the quality of services and client experience. Insurtech's prospects and problems are covered in the paper's last part. According to the study's findings, general insurance policies are mostly distributed by individual agents and brokers, and new internet commerce is still in its infancy in the Indian insurance sector. The incumbents, insurtech start-ups, and regulatory agencies should work together to achieve the Viksit Bharat Goal—"Insurance for All" by 2047—in order to maintain the momentum in the insurtech sector.

Bhabhrawala & Bootwala, (2025) [21] employs Graph Neural Networks (GNNs) to address the critical challenge of fraud detection in medical insurance claims, a pervasive issue that induces substantial financial losses in the healthcare sector. By modelling the connections between different entities—such as patients, healthcare providers, diagnoses, and services—as a heterogeneous graph, we investigate how well GNNs can detect false claims. Millions of medical actions from real-world claims databases of various sizes are used to test the models. The HINormer and RE-GraphSAGE architectures obtained the greatest F-scores (84% and 83%, respectively) for the small-size claims dataset. RE-GraphSAGE and HINormer had the greatest F-scores for the medium-sized claims dataset (84% and 81%, respectively), while HINormer and RE-GraphSAGE had the highest F-scores for the large-size claims dataset (82% and

79%, respectively). We also use explainability tools, such as GNNExplainer and PGExplainer, to analyse the models' medical importance and offer insights into their decision-making processes.

Stanly, (2025) [22] The research identifies the factors that cause Indian health insurance customers to utilise online health insurance portals. The "Unified Theory of Acceptance and Use of Technology (UTAUT)" serves as the foundation for this exploratory investigation. Simple random sampling was used to collect the data, and the opinions of 300 Indian consumers of online health insurance were examined. The data was collected using a standardised questionnaire. Cronbach's Alpha, KMO Bartlett's Test, and Principal Component were used to examine the data. Seven factors were shown to have a substantial impact on consumer adoption behaviour: performance expectancy, effort expectancy, conducive conditions, social influence, faith in Insurtech, and behavioural intention. Long-term usage of Insurtech by various Indian demographic segments can be explained by more research.

Gupta et al., (2024) [23] By combining blockchain technology and machine learning algorithms, this research paper presents a novel method of health insurance fraud detection in health insurance claims. While machine learning algorithms improve the detection of fraudulent trends and anomalies within claims data, the blockchain architecture offers a safe, transparent, and unchangeable ledger for health insurance data. The design, development, and deployment of a blockchain-based system for handling health insurance claims that is combined with cutting-edge machine learning algorithms for fraud detection are all covered in depth in this paper. The suggested models' mathematical underpinnings are meticulously described, and a thorough experimental study is used to assess the system's performance. According to our research, the integrated method greatly increases the precision and dependability of fraud detection in health insurance claims, providing stakeholders in the healthcare industry with a useful solution.

DISCUSSION

The literature reviewed and the analysis above show that InsurTech is transforming the health insurance industry from fragmented, manual and paper-based processes towards integrated, data-driven and automated processes. In the underwriting and claims sector, AI and ML can handle complex medical and policyholder data, detect patterns and assist with quicker decision-making, which is especially

relevant for these fields. Likewise, automated claims processing and sophisticated fraud-detection software can eliminate tedious administrative tasks and alert insurers to any suspicious or unusual claims before they are settled. But it is not enough to say that technological efficiency will remove the need for proper human judgment, especially in the case of complex claims or claims in dispute. CRM is also shifting towards a digital landscape, with mobile apps, web portals, chatbots, customised communication, and digital grievance resolution, enhancing ease of access and usability. Concurrently, the rise in reliance on health data raises issues around privacy, cybersecurity, data quality, interoperability, algorithmic bias and transparency. Such challenges indicate that InsurTech takes more than just technology to succeed – it needs robust governance and regulatory compliance, data protection, explainability and human oversight.

CONCLUSION

InsurTech is proving to be a key part of the health insurance digital transformation, impacting the way that insurers evaluate risk, process claims, combat fraud and manage customer relationships. Operational efficiency, faster underwriting and claims processing, and more convenient digital services can be realized through AI, ML, big-data analytics, cloud computing, APIs and automation. Automated risk classification and claims assessment can minimize repetitive tasks and data analytics can help detect suspicious insurance activity. Digital customer-service platforms can enhance communication, accessibility and policy management even more. Despite this, there are certain challenges associated with the benefits of InsurTech, such as health-data privacy, cybersecurity, data quality, data interoperability, algorithmic fairness and transparency, and regulatory compliance and digital access. There is a need for future development to prioritize secure and interoperable systems, responsible and explainable AI, skilled human oversight, and customer-centred digital services. The integration of automation and human oversight can help health insurers be technologically efficient while maintaining fairness, accountability, trust and protection of policyholders' sensitive information.

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