DIGITALISATION OF THE INSURANCE SECTOR: TRENDS AND TECHNOLOGIES

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Abstract

This paper aims to analyse the digitalisation processes in the insurance industry, which is undergoing transformation under the influence of modern technologies and changing consumer expectations. InsurTech is attracting more and more attention as an important factor in the transformation of the insurance industry. Key trends are discussed, including the introduction of artificial intelligence (AI), Big Data, blockchain, the Internet of Things (IoT) and telematics, as well as their impact on optimising business processes, increasing customer focus and reducing operational risks. Particular attention is paid to the application of AI to automate underwriting, risk assessment and claims processing, as well as the use of blockchain to ensure transparency and security of transactions. The article analyses the benefits and challenges of digitalisation, including cybersecurity, regulatory issues and the need to adapt traditional business models.

Keywords: Digitalisation, insurance sector, insurtech, artificial intelligence, machine learning, big data, blockchain, Internet of Things (IoT), telematics, cybersecurity, digital transformation.

Introduction

In recent decades, financial technology has become one of the key drivers of digital transformation of almost all economic sectors, including the insurance market. The emergence of InsurTech (insurance technology) has influenced the traditional business model of insurance companies, shifting the focus to process automation, product personalisation and broader provision of insurance services to a wider audience. The insurance industry is evolving: Insurtech is being actively incorporated into insurance company business processes. Insurance market players are implementing various IT solutions to improve the delivery of quality services to consumers in a digital environment, as almost all potential insurance customers are already using innovative financial products.

Digitalisation, artificial intelligence, big data, the internet of things - the use of advanced technologies in the insurance industry has become the norm. Moreover, machine learning, blockchain and other new technologies can be magnified, both by the complexity of customer data processing and, most profitably, by the level of customer trust. At the same time, unlike developed countries where the insurance market can be described as digital, developing

countries still face numerous challenges, including cybersecurity, regulation and the reluctance of many traditional players to embrace the changed competitive landscape[1].

Methods
This study aims to examine the impact of financial technology and assess the impact of various technologies on the transformation of the insurance market, analyse the major automated technologies and their significance in insurance service innovation, and assess the growth prospects of the InsurTech niche.
The study uses a comprehensive methodological approach including the following research methods:
- System analysis method- used to transform the structural changes in insurance as a result of the development of modern financial technologies. This method allows controlling the insurance market as a system, where technological innovations lead to modification of its main elements.
- Economic and statistical method- was used to analyse statistical information on the performance of financial technologies in the insurance sector. By analysing statistical values, it was possible to assess the digital dynamics of the growth trend of insurance business products and the degree of customer interaction with digital services.

Literature Review
The transformation of the insurance market over the past few years has been driven primarily by the spread of financial technology (fintech). This section analyses the available literature on the impact of fintech on insurance, focusing on key technological innovations.
Such foreign and domestic scientists as P.Huckstep[2], O.Vers, K. Schwarzbach[3], G.A.Nasyrova [4], Sh.U. Zhonodilov [5], E.N. Pashkova [6], Y.G. Stupicheva [7], N.A. Melnik [8] etc. were engaged in the study of theoretical data and peculiarities of insurance activity development through financial technologies. Current research confirms the need to study and theoretically justify the tools that promote the development of innovative technologies in the insurance sector.
For insurance companies in the domestic market, the introduction of innovations becomes not only an indicator of competitiveness, but also a necessary condition for sustainable development. The key role of innovative solutions is to increase the flexibility of insurance products, their adaptation to modern market conditions, as well as to increase the profitability of business. Recently, researchers and analysts have focused on various aspects of transformation, such as technological innovation, digitalisation of processes, the growth of the IT sector and changes in consumer behaviour. A report prepared by a team from Swiss Re, Deloitte and McKinsey provided extensive research and analyses on this topic.
According to Swiss Re Institute (2023)[9] that digitalisation has the potential to increase the efficiency of insurance companies. In particular, the introduction of artificial intelligence, advanced underwriting and smart claims handling systems leads to a reduction in loss ratios by 3-8 percentage points and a reduction in transaction costs by as much as 20 per cent. Moreover, digital technologies enable the creation of new insurance products adapted to modern standards, such as cyber threats and disruptive processes.

These changes are further supported by Deloitte's 2022 report[10], in which, incidentally, fintech solutions were a prominent indicator of change in the insurance industry. The proposed report presents the main four changes: access to sales channels, the use of machine learning in underwriting, the creation of flexible and personalised insurance policies, and process optimisation in life insurance. Particular attention is given to appliance insurance, where cover can be switched on and off depending on the customer's wishes at any time.

As McKinsey & Company (2023)[11] notes, insurance companies are already responding to customer vulnerability with a focus on digital customer experience. This is due to the integration of insurance companies into digital ecosystems and platforms. Additionally, increased competition from technology companies with big data and advanced analytics infrastructure is emphasised. Insurtech companies are seen not only as sources of innovation, but also as potential partners for traditional insurers.

An important area of transformation is increasing access to insurance in developing countries. According to the World Bank (2021), the use of mobile technology and digital wallets is fuelling financial inclusion to reach previously uninsured populations, including those in rural and remote areas. The EIOPA report (2022) [12], highlights challenges related to cybersecurity, personal data protection and the need to update regulations in the face of rapid technological advances.

Research Objective and Methods

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• Economic and statistical method - was used to analyze statistical information on the implementation of financial technologies in the insurance sector. Having analyzed the statistical values, it was possible to assess the digital dynamics of the growth trend of insurance business products and the degree of customer interaction with digital services.

Analysis of research.

Fintech in the insurance market is witnessing significant growth driven by the increasing integration of technology into traditional insurance processes. This transformation aims to improve customer service, streamline operations and reduce costs. The global insurance market currently employs modern innovative and digital technologies as presented in Table 1.

Table 1 **Modern digital and innovative technologies in the field of insurance.**

№	Technology	Mechanism of use and application in the insurance market
1	Web-sites	Websites A set of web pages available on the Internet, united in content and navigation under a single domain name. The sites host individual elements of digital technologies: an insurance calculator, online payment, an insurance services store, links to mobile applications.
2	Social networks	An Internet program that helps individuals communicate and establish connections with each other using a set of tools.
3	Chatbots	A computer program that is developed on the basis of neural networks and conducts a conversation using auditory or text methods.
4	Web forums	An application for organizing communication between site visitors; the term corresponds to the content of the original concept of "forum"; a forum offers a set of sections for discussion; the work of the forum consists of users creating topics in sections and subsequent discussion within these topics; a separate topic, in fact, is a thematic guest book.
5	Video telephony	A technology that enables users in different locations to receive and transmit audio and video signals for real-time communication.
6	Video hosting	A service that provides services for hosting video materials on a specific topic.
7	Cloud technologies	Services that include providing disk space for hosting information on a server and providing the ability to store your data, share it with them if necessary, and jointly edit and process information.
8	Automated systems for verifying the authenticity of insurance policies	Computer programs with an extensive database that allow you to verify the authenticity of an insurance contract and its validity period.
9	Blockchain	A decentralized distributed ledger system that provides a high level of transparency, reliability, and automation of insurance processes. Its use helps to increase the efficiency of operations, reduce transaction costs, and minimize the risk of fraud. The immutability of records in the blockchain provides protection against falsification of insurance documents.
10	Aggregators	Aggregators Online platforms that allow users to compare insurance products from different companies and choose the most suitable option. They use digital technologies and artificial intelligence to automatically select offers based on the data entered by the client.
11	Telematics (IoT)	A technical device whose main task is to generate information about the driver's driving style. This information is transmitted online to the insurance company, which may result in an offer of an individual insurance rate.

Source: compiled by the authors

As a rule, modern technologies in the insurance industry are used in combination with each other. S. Eckert (2020) analyses the interrelationships of key IT technologies used in insurance, demonstrating that their complementary use increases the efficiency of implemented solutions [13].

The convergence of finance and technology has given rise to innovative solutions that meet the changing needs of both consumers and businesses. Insurers are increasingly using advanced technologies such as artificial intelligence (AI), machine learning, and big data analytics to improve risk assessment and operational efficiency. The use of these technologies allows insurers to quickly analyze vast amounts of data, leading to more accurate underwriting and personalized policy offerings. For example, the implementation of predictive analytics not only

helps in risk mitigation but also facilitates the development of customized insurance products, which are increasingly in demand in Fintech in the insurance sector.

In the insurance market, "Insurtech". Insurtech refers to the use of technological innovations designed to improve and optimize the insurance industry. It includes various technologies such as mobile apps, telematics, and blockchain. Insurtech has become a hub for both established insurance companies and new entrants looking to disrupt the market. As the demand for Insurtech solutions grows, investment in this sector is also growing. In 2020 alone, global Insurtech investment reached US$7.1 billion and global Fintech in the insurance market is projected to reach approximately US$10 billion by 2026, at a compound annual growth rate (CAGR) of 25.4% from 2021 to 2026, highlighting its importance in changing the insurance landscape.

Above all, the widespread adoption of smartphones and improved access to digital services have significantly changed consumer behaviour, driving demand for digital insurance solutions. According to a report conducted by the Telecommunication Union (ITU), the global number of users is expected to reach 4.9 billion in 2021, representing 63% penetration. This rapid digitalisation is enabling insurers to reach a wider audience and provide a seamless customer experience. Customers are increasingly looking for customised insurance plans that cater to their specific needs. Insurers using advanced analytics and customer data can create personalised offers, resulting in higher levels of customer satisfaction.

The active adoption of technologies such as artificial intelligence (AI), machine learning, and blockchain is transforming traditional insurance models, facilitating innovative products and services. The global market for artificial intelligence technologies in insurance has shown significant growth.
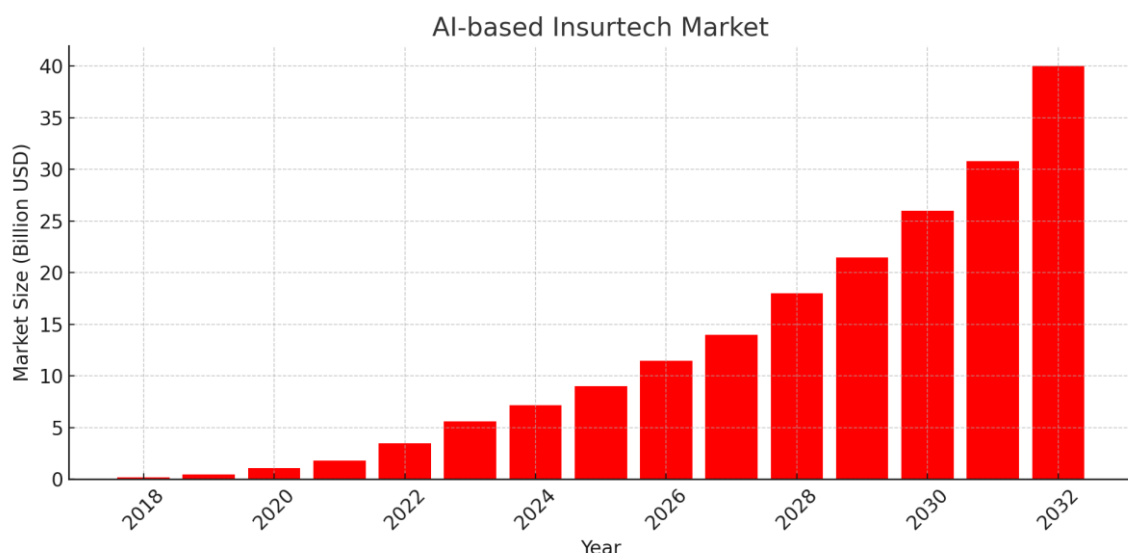

Fig.1 Intelligence technologies in the insurance sector.
(The bar chart below shows the growth of the Artificial Intelligence based Insurtech market from 2018 to 2032, measured in US$ billions. The market is witnessing steady growth, emphasising the growing importance of artificial intelligence in insurance)

By the end of 2023, global spending on AI solutions in the insurance sector will reach US$5.87 billion, up 25 per cent from US$4.74 billion in 2022. Such data is presented in the Market Research Future study published in November 2024. According to the report, the rapid development of this segment is attributed to the increasing demand for effective risk management and personalised customer experience. The introduction of artificial intelligence in the insurance industry allows companies to optimise business processes, reduce costs and improve the quality of decision-making.

This segment is currently valued at around USD 6.1 billion and is projected to grow at a 25.4% CAGR between 2023 and 2030 [10]. This growth is driven by increasing investments in Insurtech startups. Moreover, the changing regulatory environment aimed at increasing transparency and trust is accelerating the adoption of innovative technologies in the insurance industry.

Another of the key aspects in insurance is blockchain technology. Originally developed to support cryptocurrencies, blockchain technology is increasingly being used in the insurance industry. Blockchain technology is a tamper-proof, well-structured and decentralised system that assumes full control and security of data storage through data distribution. The implementation of blockchain is contributing to the digital transformation of the insurance industry as well as providing increased security. By utilising distributed registers as part of document management, companies can detect errors and identify suspicious activities in a timely manner.

Blockchain systems provide a direct link between policyholders and insurers. This eliminates the need for unreliable third-party systems or labour-intensive manual claims management. At the same time, data processing costs are reduced. In addition, blockchain enables the automation of everyday tasks, such as payments, to speed up transactions and, as a result, increase customer satisfaction. Blockchain enables new financial models that were previously too difficult to implement.
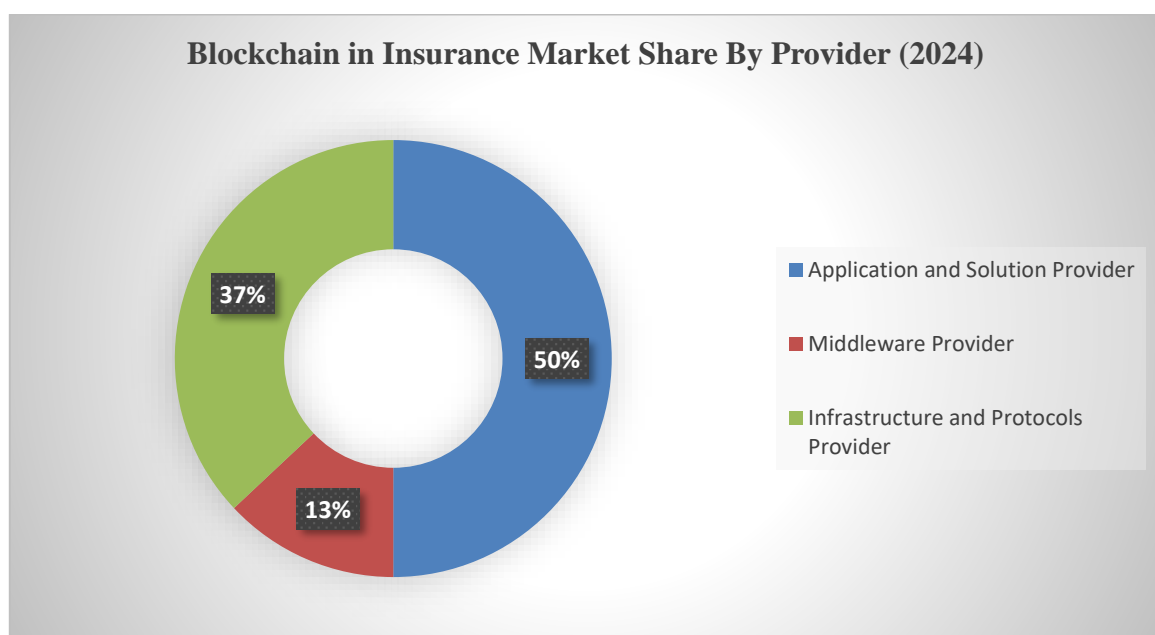

Fig.2 Blockchain in insurance market share by vendor type in 2024.

In 2024, the global blockchain market for insurance was valued at $1.86 billion. Despite the significant opportunities for blockchain in the insurance industry, the market is still in its infancy as of early 2025. Restraints include lack of standardisation, high initial costs and security concerns. Restraining factors include lack of harmonised standards, significant initial capital investment, and security concerns. The market is segmented into application (solution) providers, connectivity software providers, and infrastructure (protocol) providers. The infrastructure solutions segment accounted for the largest revenue share of 37% in 2024, with the applications segment contributing a comparable level of revenue.

The key application areas for blockchain technology include risk and compliance management, claims processing, identity management, fraud detection, payments, smart contracts, and other specialised applications. Among these segments, claims management solutions account for the largest market share, owing to the increasing popularity of automated systems that promote efficiency, transparency, and speed in processing claims.

In terms of geographical distribution, North America holds the dominant position in terms of market size due to its high level of technological infrastructure, significant investments in research and development, and wide adoption of blockchain technology in the financial, healthcare, and logistics sectors. Asia-Pacific is the fastest growing region, driven by the rapid digitalisation of the economy, an increasing number of blockchain-focused startups, and support from government programmes aimed at fostering innovation. Europe is witnessing a steady positive trend due to stringent regulations that promote the adoption of secure and reliable blockchain solutions, as well as growing interest in these technologies in the financial and government sectors.

As fintech technologies evolve and become ubiquitous, we can expect to see a significant shift in traditional insurance models, resulting in improved service quality, reduced fraud and increased customer trust. In this context, insurers that adopt and invest in AI and blockchain early on will be better positioned to compete in the evolving digital landscape and meet the needs of the next generation of policyholders.

Conclusion

The introduction of innovative technologies in the insurance industry radically changes traditional business models, creating more flexible, personalised and efficient insurance products. In the course of the research work the conclusions were drawn:

1. New financial technologies have become the initial factor that is changing the insurance market. The integration of a digital solution has optimised business processes, reduced transaction costs and increased the availability of insurance products. The application of InsurTech has led to the creation of new business models focused on flexibility, responsiveness and personalised customer service.

2 The integration of technology solutions such as artificial intelligence, machine learning, blockchain and the Internet of Things (IoT) has helped improve underwriting accuracy, automate insurance claims and enhance risk management. These technologies not only contribute to the operational efficiency of insurance companies, but also provide an opportunity to introduce innovative products that meet new customer requirements.

3. big data analytics and processing have enabled insurers to move away from classical pricing and risk assessment and towards personalised insurance offers. This has given customers more personalised insurance services, which increases trust and satisfaction, and promotes greater coverage of insurance products among citizens.

4. Despite the strong development of InsurTech globally, the pace of digital transformation of the insurance sector varies significantly depending on the level of economic development of a country. In developed economies, digital technologies are already deeply integrated into insurance processes, while in developing countries the digitalisation process faces a number of barriers, including imperfect regulatory frameworks, lack of digital infrastructure and low levels of financial literacy.

5. While the digitalisation of the insurance market creates significant competitive advantages, it also brings new challenges related to cybersecurity, regulatory compliance and the adaptation of traditional insurance companies to the digital economy. Further development of InsurTech will require active co-operation between government regulators, financial institutions and technology companies. At the same time, the growth of investment in insurance technologies, improvement of legislation and enhancement of the level of consumers' digital culture will be the determining factors for the sustainable development of the insurance industry in the context of digital transformation.

In conclusion, financial and educational institutions are increasingly aware of the importance of Fintech solutions as a tool to promote financial inclusion, which plays a key role in making financial services accessible to different social groups, including underserved and marginalised communities. The potential of these technologies lies in their ability to streamline processes, reduce transaction costs and increase transparency of operations, which helps to remove barriers to financial inclusion. In response to these opportunities, institutions are actively developing and implementing supportive policies and regulatory mechanisms to create an enabling environment for Fintech innovation. These measures include improving regulatory frameworks, supporting digitalisation initiatives and fostering public-private collaboration, all of which contribute to the sustainable development of the financial ecosystem and strengthening its inclusiveness.

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