INSURANCE ENTREPRENEURSHIP IN THE DIGITAL AGE: TRANSFORMATION THROUGH TECHNOLOGY

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Abstract: As early as 1754 BC. Hammurabi's Code, the well-known collection of laws of the Babylonians, regulated, among other things, the status of insurance. Also, both ancient Greece and the Romans had forms of insurance to protect those who remained alive after the death of the insured relative. Since then, human society has been in a permanent evolution, facing unprecedented challenges and opportunities. In today's digital age, information technologies have become essential in many sectors of the economy; of course, insurance, an important component of the financial market, benefited to the full from computer "fingerprinting". This is driving entrepreneurs in this field to look at a wide range of innovations, from artificial intelligence (AI) and machine learning (ML) to blockchain and the Internet of Things (IoT), transforming the way insurance is designed, delivered, managed and consumed. The use of information technologies has become an essential catalyst for innovation and growth in this sector. From big data processing and predictive analytics to intuitive customer interfaces and process automation, information technology is transforming the way insurance companies operate and interact with their customers. Therefore, insurance entrepreneurs need to perceive the use of information technologies not just as a simple trend, but as a strategic necessity that paves the way for innovation and sustainable success.
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INTRODUCTION

Insurance is one of the world's largest industries, with a global market value larger than the gross domestic product (GDP) of many countries. Thus, as an example, for the year 2022, only the USA and China had a GDP greater than the total of subscribed insurance premiums (Statista.com, 2023). The evolution of life and non-life insurance premiums had a

predominantly increasing evolution on the global level, if we look at the graph in the figure 1.

Figure 1. Life and non-life insurance direct premiums written globally from 2006 to 2022 (in trillion U.S. dollars)

Source: (Rudden, 2024a)
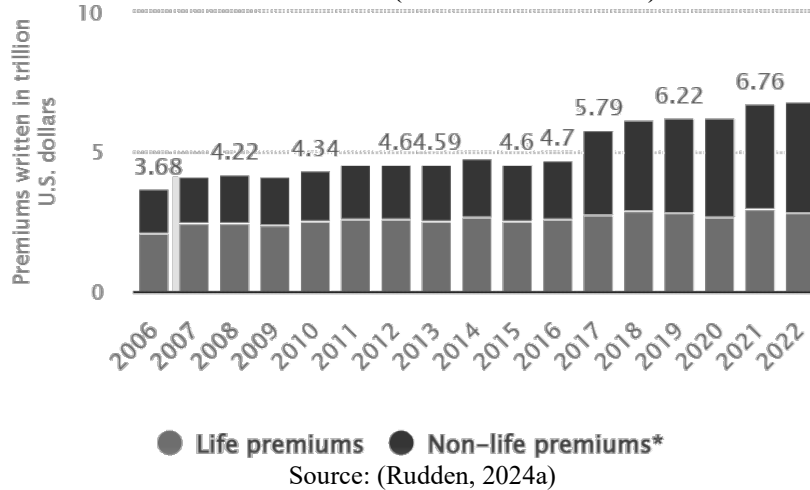
As we can see, the period of the economic crisis in the first decade of this millennium did not generate a very pronounced decline. The fast evolution of technology in the digital age has influenced many industries, and the insurance sector is no exception. Since the information technologies appeared, insurance entrepreneurs have been able to use them for a deeper customization of insurance offers, adapting to the specific needs of customers and the risks associated with each situation. Over the last decade, insurance entrepreneurship has become a central driver of innovation in the industry, powered by emerging technologies such as artificial intelligence (AI), blockchain, big data and the Internet of Things (IoT). Therefore, we will highlight how digital transformations have redefined insurance entrepreneurship, but also the impact of these changes on the market, players and consumers. We will also reflect on the challenges and opportunities emerging in this new digital landscape.

According to PWC.com (2022, p. 7) there are five trends that will shape the growth trend of insurers: (1) a widening trust gap in an uncertain world; (2) rapidly evolving customer needs and preferences; (3) an increasingly digital and artificial intelligence-based world; (4) climate risk and focus on sustainability; (5) convergence, collaboration and competition. At least from our point of view, the third point is the one that requires an approach through the prism of the opportunities and challenges it generates.

The entrepreneurial spirit can facilitate several relevant aspects:

1. Consultant-Entrepreneur: a new approach to the financial consultant (Dragomir, 2018), allowing to build his own business. This approach involves flexibility, dynamism and challenges, providing an active work environment.
2. Partnerships with the big players: the life insurance industry has become a relevant partner for all advisors age segments. Big companies in this field are open to innovation, technology and collaboration with consultant-entrepreneurs.

3. Insurance market growth: in Romania, the life insurance market is growing, representing 20% of the total insurance market. The development of this segment offers opportunities for entrepreneurial consultants.

The insurance entrepreneurship perspective could be analyzed from several angles, including product and service innovation, adaptation to technological and regulatory changes, risk management and exploration of new market opportunities; the technological changes are the ones discussed in this article.

Insurance digital transformation from traditional models to Insurtech

Historically speaking, the insurance industry has been one of the most inflexible (conservative) in adapting to technological change. The traditional business model was based on face-to-face interactions, manual risk assessment processes, and premium setting based on limited data sets. But digitization forced insurance companies to rethink their strategies. InsurTech (combination of the words "insurance" and "technology") involves the application of new technologies and innovations in insurance, resulting in new insurance products, new ways for consumers to obtain insurance policies, and new ways to manage insurance claims (American Academy of Actuaries, 2020).

Today, insurtech entrepreneurs (companies that innovate at the intersection between technology and insurance) are creating solutions that remove traditional barriers and bring a customer-centric approach. For example, technologies based on Big Data allow companies to offer personalized insurance, and Artificial Intelligence automates the processes of evaluating claims. According to KPMG (2024, p. 17), in recent quarters, insurtechs have increasingly focused on providing solutions to the market of small and medium-sized enterprises (SMEs) to innovate the offering of personal insurance lines in previous years. This digital transformation has changed the insurance market from a conservative field to a dynamic ecosystem open to innovation. The United States had the supremacy regarding transactions through insurtech in the first quarter of 2024, with a weight of 51%, far behind being the United Kingdom with 9% (Rudden, 2024b).

The role of entrepreneurs in the reconfiguration of the insurance industry

Entrepreneurs have played a crucial role in reshaping the insurance industry in the digital age. In the context of this change, many insurtech start-ups have emerged, using disruptive technologies to provide innovative and affordable solutions. Among other things, the choice of digital technologies stimulates innovative activity of all forms of entrepreneurship and slows the growth of etatism (Makarov, Ivleva, Shashina, & Shashina, 2020, p. 23). Unlike traditional insurance companies, which are often constrained by rigid organizational structures, start-ups benefit from the agility and flexibility to test and implement new technologies. If the year 2022 was considered very weak, later, global investments in insurtech began to increase, as can be seen in figure 2, where private equity (PE), mergers and acquisitions (M&A) and venture capital (VC) were considered.

Figure 2. Total global funding activity (VC, PE and M&A) in insurtech 2020–2023
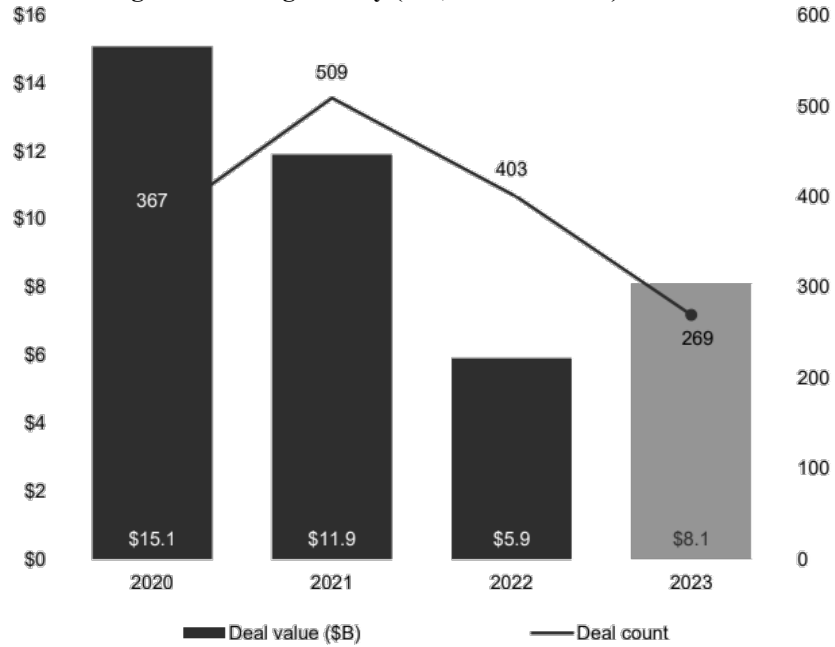

Source: (KPMG International, 2024, p. 17)

Insurtech start-ups introduced new business models such as on-demand and peer-to-peer insurance. These models have allowed customers to access insurance products in more flexible and efficient ways. For example, mobile applications developed by insurtechs allow customers to purchase temporary policies, report incidents or manage claims in real time. This kind of innovation has redefined not only how insurance products are marketed, but how they are perceived by consumers. In 2021, the Romanian insurance market continued the digitization process, recording an increase in the volume of gross written premiums (Econmedia.ro, 2021). It should be noted that, although we previously noted the year 2022 as not being too good for global investments, Romania continued to offer opportunities for venture capital investors, especially in the technology start-up sector (Schöb, 2023).

Regarding Europe, the share in insurtech transactions reaches 35% in the 2nd quarter of this year, being a record level for this continent, as can be seen in figure 3.

Figure 3. Global quarterly transaction distribution
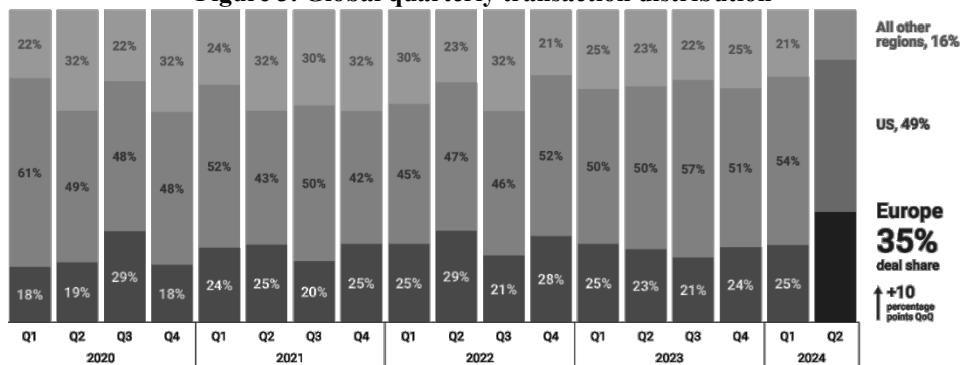
Source: (CBinsights.com, 2024)

Emerging technologies and their impact on insurance entrepreneurship
Digital transformation would not be possible without the contribution of emerging technologies that have revolutionized the traditional processes in insurance. We can already list the classic IT components used for a while in insurance:

- customer relationship management systems (CRM): can help insurance agents organize and manage customer data, track interactions, and provide more personalized service.
- e-commerce platforms: allow insurance agents to sell policies online, making the purchase process more convenient for customers.
- mobile apps: can provide customers access to policy information, enable claims submission and facilitate premium payments.

Among the most influential technologies that have transformed entrepreneurship in this field are artificial intelligence, blockchain, internet of things, big data and machine learning. For example, blockchain can provide a secure and transparent solution for managing policies and payments, reducing costs and improving data security, while IoT can facilitate real-time monitoring of risks and events, allowing for faster and more efficient and effective response in case of disaster. Using blockchain technology, big data obtained through data analysis can be stored in the blockchain network, so it will not be misused previously used data and will not perform the same data analysis as other teams (Taherdoost, Moosavi, & Mohamed, 2024). Therefore, digital technologies manifest themselves through numerous and constantly growing technological flows (Artificial Intelligence, Big Data, Cloud Computing, Blockchain, etc.) (D'Angelo, Cavallo, Ghezzi, & Francesco, 2024).

Artificial Intelligence (AI)
AI is used in insurance to improve the underwriting process (risk assessment), to analyze large volumes of data and to automate claim processing and repetitive tasks, to provide customer support and to detect fraud. Insurtech start-ups use AI to deliver faster and more accurate solutions. Weterings (2019) noted that artificial intelligence can be used for: insurance advice, signing policies, claims processing, fraud prevention, risk management, direct marketing.
Sullivan (2024) noted five key cases of using generative artificial intelligence in insurance distribution:

1. *"Clients like you" analysis* – identifying customers with similar profiles but different insurance solutions.
2. *Submission preparation and client portfolio QA*: this technology can help guide the broker/agent on the types of questions to ask based on what is known about the insured, the industry the insured operates in, the profile of risk of the insured company compared to others and what is available in third party data sources.
3. *Intelligent Placements*: provides the account team with placement recommendations that are in the best interest of the client and the agency or broker, while reducing marketing time, both in terms of finding optimal markets and avoiding markets where a risk would not be accepted.
4. *Revenue loss avoidance*: guidance to the employee regarding fees should be invoiced based on contractual obligations.

5. *Client-specific marketing materials at speed*: outputs could be customized at a fast pace.

Blockchain

This technology provides solutions for creating smart contracts that are self-executing and reduce the need for intermediaries. Blockchain provides greater transparency and security in managing insurance policies. Fraud and falsified data are prevented because data cannot be changed without the permission of a quorum of the parties. If someone tries to modify the data, all participants will be alerted and they will know who is making the attempt (Oracle.com, 2022). Blockchain can also be used to create contracts, track insurance claims and speed up claims processes (Gendelman, 2024).

Among the types of providers, in 2022 (figure 4) the market was dominated, in a proportion of 42%, by infrastructure and protocol providers (Fortune Business Insights, 2024), but a substantial increase in the adoption of solutions from application and solution providers is expected in the coming years.

Figure 4. Global Blockchain in Insurance Market Share, By Provider, 2022
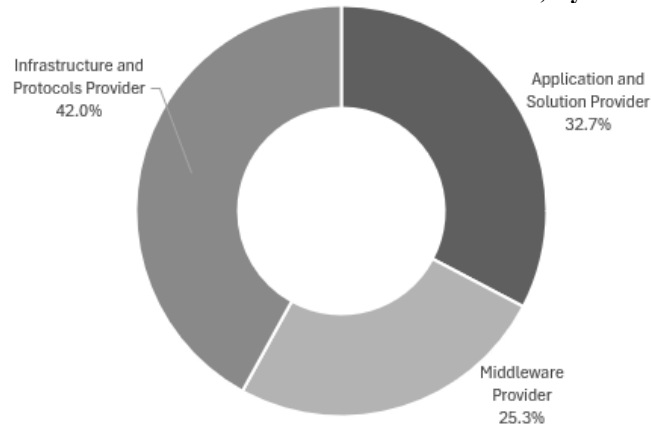
Source: (Fortune Business Insights, 2024)

Internet of Things (IoT)

IoT uses a variety of technologies to connect the digital and physical worlds. Broadly speaking, IoT devices are used in the following nine areas (McKinsey & Company, 2024): (1) *human bodies* (monitor or maintain health and well-being, help manage diseases); (2) *homes* (automatic vacuum cleaners, security systems, etc.); (3) *retail environments* (in stores, banks, restaurants, and arenas to facilitate automatic payment, expand in-store offerings, or help optimize inventory); (4) *offices* (for energy management, building security, etc.); (5) *standardized production environments* (in manufacturing plants, hospitals or farms, to increase operational efficiency or optimize equipment use); (6) *custom production environments* (mining, construction or oil and gas exploration and production, for predictive maintenance or health and safety); (7) *vehicles* (condition-based maintenance - CBM -, use-based design – UBD - or pre-sale analysis for cars and trucks, ships, aircraft and trains; (8) *cities* (adaptive traffic control, smart meters, environmental monitoring or resource management); (9) *outside* (on railways, autonomous vehicles or flight navigation could involve real-time routing, connected navigation or shipment tracking).

In insurance, IoT devices enable the collection of real-time data that can be used to monitor risks and customize policies. For example, telematics devices installed in cars allow auto insurance premiums to be calculated based on the driver's driving behavior.

Big Data and Machine Learning

Big data is used to analyze massive volumes of behavioral and risk data, while machine learning algorithms allow companies to identify trends and predict future behaviors. These technologies not only optimize processes but allow entrepreneurs to create more accessible business models adapted to modern consumer needs. Machine learning and artificial intelligence are commonly used in the insurance industry to use and analyze big data. According to Ellili et al. (2023, p.2) there are several examples of the important role that big data plays in the insurance sector, such as: car insurance, life insurance, health insurance, harvest risk, catastrophe risk (hurricanes, tornadoes, geomagnetic events, earthquakes, floods and fires), climate risks and cyber risks (which is the weakest in terms of security and safety).
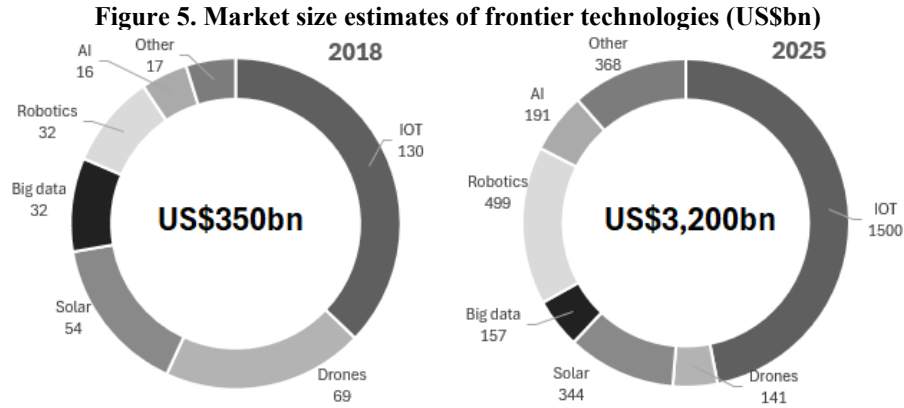
Big Data

When we speak about Big Data, we mean collected data that subscribe to the 4V: *volume*, *velocity*, *variety* and *veracity*; initially there were only the first three terms, and now even 5V (*value*) - or even 6V (*variability*) (Qiao & Chen, 2022). The most common uses are descriptive analysis, data-based decisions, data visualization. The analytical capabilities of big data have allowed the insurance market to gain insight into the wider market before updating their offers, providing a more careful and in-depth assessment of risk exposure (Hossein, Unger, & Beneki, 2020, p. 4). Big Data can help insurers increase the level of accuracy in policy pricing due to greater data availability and improve the efficiency of their operations by providing more effective and efficient insight into their customers. In conclusion, the advantages of big data in insurance can benefit both customers who are looking for good products and insurers who want to reduce fraud and expenses, while providing better services to their public (Blanco, 2023).

Machine Learning

Machine Learning is considered a subset of artificial intelligence that allows algorithms to learn from data and make predictions or decisions without being explicitly programmed. Machine Learning algorithms improve system performance through experience, analyzing historical data and developing predictive models. Thus, their usual use is to make predictions, recognize patterns, automate tasks, etc. For example, it can be used in the detection of car insurance fraud using different machine learning models (Aslam, Hunjra, Ftiti, Louhichi, & Shams, 2022, p.2).

Opportunities and challenges in the insurance digital era

Automation and AI are already changing the way insurers interact with consumers across the value chain – from product design to underwriting, pricing and claims. If we compare the distribution of technologies at the level of 2018 with the estimates for 2025, we observe in figure 5 an evolution of frontier technologies (PWC.com, 2022, p.12).

Figure 5. Market size estimates of frontier technologies (US$bn)

Source: (PWC.com, 2022, p.12).

Although digital technologies offer significant opportunities for insurance entrepreneurs, they also come with several challenges.

Opportunities

- ***Accessibility and personalization***: By using AI and big data, start-ups can customize insurance products based on each customer's profile, leading to better customer satisfaction and greater efficiency in risk assessment.
- ***Cost reduction***: Process automation and the use of smart contracts significantly reduce administrative costs and human error, which can lead to lower prices for consumers.
- ***Continuous innovation***: Entrepreneurs have space for continuous innovation, and the rapid pace of technological development means that new business opportunities are constantly emerging.

Challenges

If the opportunities are almost obvious, the challenges are also significant:

- ***Strict regulations***: The insurance industry is one of the most regulated industries, and new technologies such as AI and blockchain raise legal and ethical questions. Entrepreneurs must navigate through a complex legal framework to implement innovative solutions.
- ***Data security***: With large volumes of personal data collected and digitally processed, cyber security risks grow exponentially. Entrepreneurs need to invest significantly in security to prevent data leaks and cyber-attacks.
- ***Lack of trust***: Technological innovations like AI can create reluctance among customers due to a lack of transparency in how algorithmic decisions are made. Confidence building remains a major challenge.

Conclusions

Insurance entrepreneurs can identify business opportunities and develop effective strategies to navigate emerging markets and adapt to regulatory and technological changes. The digital transformation of the insurance industry has provided entrepreneurs with unique opportunities to innovate and reconfigure the way insurance products are delivered. Technologies such as AI, blockchain, big data and IoT have enabled the development of faster, more affordable and more efficient solutions for consumers. However, entrepreneurs

also need to address major challenges such as strict regulations and data security. Going forward, the insurtech sector is likely to continue to grow and redefine the insurance market, but long-term success will depend on entrepreneurs' ability to balance technological innovation with regulatory and security needs. Therefore, the use of IT has become essential for the success of insurance entrepreneurs in the digital age. By implementing effective IT strategies, entrepreneurs can enhance efficiency, improve customer satisfaction, and create new business opportunities.

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