Literature Review

InsurTech Integration: Reshaping the Insurance Value Chain in the Digital Age

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Abstract: To face the radical changes that characterized the competitive scenario over the last years, the insurance industry is turning to digital transformation, adapting innovative business models like those increasingly seen in other industries. The paper explores the impact of ongoing digitization that is greatly affecting the insurance industry and forcing radical change upon corporate culture, products and processes, customer relationships, and relations with the sector's various competitors. By addressing key research questions, the paper contributes to a nuanced understanding of the relationship between InsurTech start-ups and traditional insurers, the transformative effects of technology on the insurance value chain, and the evolving dynamics of customer relationships in the digital era.

Keywords: Insurtech, Sustainability, Blockchain, Corporate, Business Models

Introduction

In recent years, the landscape of financial services has undergone a profound transformation fueled by technological innovation. The emergence of financial technology, or "Fintech," has revolutionized the way we conduct transactions, manage our finances, and interact with financial institutions (Faith *et al.*, 2020). This disruption has been particularly evident in the banking sector, where traditional banking practices have been challenged by the advent of digital platforms, mobile banking apps, and innovative payment solutions (Li *et al.*, 2023).

However, the impact of Fintech extends beyond banking and has also made significant inroads into the insurance industry. This intersection of insurance and technology has given rise to what is known as "InsurTech." Unlike banking, where the disruption has been swift and dramatic, the transformation in the insurance sector has occurred at a different pace and with distinct characteristics (Kewal and Saxena, 2024).

InsurTech exhibits several defining characteristics. Firstly, the utilization of state-of-the-art technologies such as artificial intelligence, big data and blockchain has empowered insurance companies to enhance operational efficiency and deliver personalized services to customers. For example, artificial intelligence streamlines policy underwriting processes, manages customer inquiries via chat bots and analyzes vast datasets to assess risks more accurately (Machkour and Abriane, 2020).

InsurTech represents the convergence of traditional insurance practices with cutting-edge digital technologies. It encompasses a wide range of innovations, including data analytics, artificial intelligence, machine learning, blockchain and telematics, among others. These technologies have empowered insurers to streamline their operations, enhance risk assessment and underwriting processes, personalize customer experiences and introduce innovative insurance products and services (Papadopoulos, 2015).

One of the key drivers behind the rise of InsurTech is the increasing demand for more efficient, transparent, and customer-centric insurance solutions. Today's consumers expect seamless digital experiences and personalized services and InsurTech companies are leveraging technology to meet these evolving needs. By harnessing data analytics and AI-driven insights, insurers can better understand customer preferences, tailor insurance products to individual needs, and deliver more relevant and timely services (Cosma and Rimo, 2024).

Moreover, InsurTech is reshaping traditional insurance business models and challenging established players to adapt to the digital age. Startups and technology firms are entering the insurance market with innovative solutions that offer greater accessibility, affordability, and flexibility. This has prompted traditional insurers to embrace digital transformation, forge partnerships with InsurTech startups, and invest in technology-driven initiatives to remain competitive in a rapidly evolving landscape (Ma and Ren, 2023).

InsurTech emerges as a crucial strategic initiative for insurance firms amidst an unprecedented digital upheaval, emerging as a pivotal driver of economic expansion. To ensure the insurance sector adequately addresses the demands of digital transformation and attains high-quality development, it is imperative to anchor InsurTech's development strategy on the principle of sustainable development(Kalfin *et al*., 2022).

Within the broader financial landscape, the insurance sector registers comparatively lower consumer satisfaction and lags in digital sophistication. The advent of InsurTech holds the potential to significantly galvanize the insurance domain, potentially outpacing advancements in other financial sectors. Consequently, InsurTech garners keen interest from both domestic and international technology enterprises. Amidst escalating market attention, it behooves us to approach new technologies with a measured sense of observation and reflection (Actuaries Institute, 2016).

In summary, the emergence of InsurTech represents a paradigm shift in the insurance industry, ushering in a new era of innovation, efficiency, and customer-centricity. As technology continues to advance and consumer expectations evolve, InsurTech is poised to play an increasingly influential role in shaping the future of insurance (Srivastava *et al*., 2024).

InsurTech Framework

Before delving into the core of the paper and its specific operational aspects, it seems appropriate to conduct a brief survey and reconstruction of at least two of the most important theories that have focused on the dynamics of InsurTech implementation.

Although the focus of the paper is broader, it seems impossible to avoid at least a cursory mention of the so-called "Innovation Diffusion Theory"(Everett, 1962) and "Disruptive Innovation Theory" (Feng *et al*., 2022), if only to provide a coherent understanding of what remains, even today, an ongoing and largely incomplete process of innovation and implementation.

Innovation Diffusion Theory provides a valuable lens through which the adoption of InsurTech innovations can be understood. According to this theory, innovations diffuse through social systems over time, following a process where innovators, early adopters, early majority, late majority and laggards sequentially embrace new technologies. In the context of InsurTech, this theory helps explain how insurance companies and consumers gradually adopt technological innovations, such as AI-driven underwriting, blockchain for claims processing, and digital platforms for policy management. Understanding the diffusion process is crucial for stakeholders aiming to accelerate the adoption of these innovations and reach a critical mass (Wonglimpiyarat and Yuberk, 2005).

Disruptive Innovation Theory is instrumental in analyzing the impact of InsurTech on traditional insurance markets. Disruptive innovations typically start by offering simpler, more affordable solutions to underserved segments before gradually improving and displacing established market leaders. InsurTech exemplifies this by introducing digital platforms, peer-to-peer insurance models, and AI-driven analytics that initially targeted niche markets or segments underserved by traditional insurers (Christensen *et al*., 2018). Over time, these innovations have gained momentum, threatening to disrupt established players by offering superior customer experiences, lower costs, and greater accessibility (Ma and Ren, 2023).

Incorporating these theories into the analysis of InsurTech allows for a deeper understanding of the underlying dynamics driving the transformation of the insurance industry. These frameworks not only provide insights into the adoption patterns of new technologies but also highlight the potential for InsurTech to fundamentally reshape the competitive landscape (Halima and Yassine, 2022).

A New Blockchain Approach Through Digital Transformation and Competitiveness

InsurTech has indeed bolstered innovation and the high-quality development of insurance industry enterprises.

InsurTech has profoundly impacted the insurance industry, giving rise to significant trends and changes. Traditional insurers confront the challenge of adapting to these new technologies and business models, striving to innovate and maintain competitiveness in the market (Marino *et al*., 2019). Simultaneously, InsurTech has opened doors for startups and emerging companies, offering innovative and agile solutions to meet the demands of digital consumers (ZareRavasan *et al*., 2021).

However, InsurTech itself has yet to achieve stable productivity, with some technologies even experiencing what Gartner describes as the "peak of expectation inflation" (Hung LeHong, 2014). According to Eling and Lehmann (2018), digital innovation impacts various facets of the insurance industry, spanning the insurance value chain, product development, underwriting, claims processing, sales and distribution, pricing, asset liability management, and risk management.

The transformation of the insurance sector brings forth significant implications and challenges that necessitate attention (Merello *et al*., 2023). An analysis of the key drivers behind this transformation yields valuable insights into its ramifications (Raveendra and Satish, 2021). The advent of digitalization, particularly InsurTech, has precipitated a paradigm shift in the insurance landscape, impacting various industry facets. One primary implication of this digital transformation is the reshaping of traditional insurance business models (de Ferrieres, 2021). InsurTech startups and

digital platforms introduce innovative approaches (Cappiello, 2020a) to product development, distribution, and customer engagement, disrupting the traditional value chain and prompting established insurers to reassess strategies and adapt to evolving market dynamics (Ma and Ren, 2023).

To enhance competitiveness, insurance firms must expand their technical infrastructure to facilitate value chain transformation, process optimization and operational efficiency (Alhasan *et al.*, 2021; Zarrouk *et al.*, 2021) also highlight how digital technology application fuels enterprise technological innovation (Zarrouk *et al.*, 2021). Nonetheless, technological innovation and evolving business models introduce new management risks and moral hazards to the insurance sector. Marsal-Llacuna underscores the importance of strengthening InsurTech research and regulatory oversight (Marsal-Llacuna, 2018).

Given these debates, it's essential to analyze in detail the impact of rapidly evolving InsurTech on the technological innovation of insurance companies (Landini, 2023) and identify avenues for fostering innovation (Cosma and Rimo, 2024). The transformation of the insurance sector brings forth significant implications and challenges that necessitate attention (Ramada, 2017). An analysis of the key drivers behind this transformation yields valuable insights into its ramifications (Johnson *et al.*, 2022). The advent of digitalization, particularly InsurTech, has precipitated a paradigm shift in the insurance landscape, impacting various industry facets. One primary implication of this digital transformation is the reshaping of traditional insurance business models (La Barbera, 2023). InsurTech startups and digital platforms introduce innovative approaches to product development, distribution, and customer engagement, disrupting the traditional value chain and prompting established insurers to reassess strategies and adapt to evolving market dynamics (Saxena and Kumar, 2022).

Technological innovation empowers the insurance sector and creates favorable conditions for the innovative development of insurance enterprises. By integrating mobile Internet, cloud computing, and big data with traditional financial services (Makhdoom *et al.*, 2019), InsurTech presents new opportunities (Nazzaro and Landini, 2020) for innovation to global insurance companies. Its advantages include heightened efficiency, expanded customer reach, and broader geographic penetration (Weyll Abijaude *et al.*, 2021).

The digital transformation also significantly influences the customer experience in the insurance industry (Pertot, 2018; Sandhu *et al.*, 2023). InsurTech facilitates the development of user-friendly interfaces, seamless interactions, and personalized services (Tereszkiewicz and Cichowicz, 2024). Customers now anticipate a streamlined and intuitive experience across their insurance journey, from policy purchase to claims management (Rawat *et al.*, 2021). Insurers must invest in digital technologies and data analytics to enhance customer engagement strategies and deliver personalized experiences. However, this necessitates addressing challenges related to data privacy, security, and regulatory compliance, critical considerations in the digital era.

For instance, artificial intelligence can mitigate human errors in insurance underwriting and claims processing through machine learning, while also automatically identifying risks to enhance business efficiency. Blockchain technology significantly reduces information acquisition costs in insurance operations (Pagano *et al.*, 2019). The Internet of Things leverages intelligent wearable devices to synchronize personalized information with insurance backend systems, aiding risk identification and improving insurance pricing accuracy (Zhao *et al.*, 2023). Data analytics aligns deeply with insurance industry operational characteristics, enhancing insurers' multidimensional analysis capabilities and efficiency. Big data has revolutionized risk assessment by enabling insurance firms to analyze diverse information from sources like telematics data, social media, and wearable devices. This data-driven approach facilitates policy customization based on individual policyholders' profiles and behaviors, enriching the customer experience while mitigating fraud risks (Cappiello, 2018).

Conversely, blockchain technology has ushered in heightened levels of transparency and security within the insurance sector as its decentralized and immutable structure enables secure recording and sharing of insurance information, simplifying policy management, claims processing, and fraud prevention (Cousaert *et al.*, 2021).

Moreover, the adoption of InsurTech and the implementation of new technologies pose several challenges and obstacles for insurance companies as legacy systems, rigid organizational structures, and cultural resistance to change hinder the seamless integration of digital solutions (Pauch and Bera, 2022). Insurers must navigate complexities associated with legacy infrastructure, data, and interoperability issues to fully leverage InsurTech benefits. Additionally, they must address concerns regarding data security, privacy, and ethical use of customer data, pivotal in building trust and maintaining regulatory compliance (Cappiello, 2020).

In practice, InsurTech empowers the insurance industry and drives high-quality development across various domains such as product development, marketing, risk control, underwriting, claims verification, and fund utilization.

InsurTech and Advantages. A Real Syllogism?

The advancement of InsurTech offers a potential remedy for the deficiencies of traditional insurance practices. It does not only assist insurance firms in leveraging existing resources but also aids in mitigating enterprises' financing challenges. By providing financial backing for innovation endeavors and increasing investment in research and development, InsurTech elevates the technological innovation prowess of insurance companies (Bonvino and Giorgino, 2024).

By harnessing digital technologies like artificial intelligence, big data, and blockchain, InsurTech effectively bridges information gaps between supply and demand, reduces transaction costs, and enhances enterprise technological efficiency. Moreover, InsurTech's evolution fosters industrial upgrades and facilitates the transfer and optimization of innovation opportunities, thereby amplifying the spillover effect of technological (Manta *et al.*, 2023) innovation and bolstering the technological innovation capacity of insurance enterprises. Consequently, the evolution of InsurTech holds promise for bolstering the sustainability of technological innovation within insurance companies (Landini, 2022).

Initially, it delves deeper into the potential mechanisms by which InsurTech impacts enterprise technological innovation, particularly considering insurance companies' financing constraints as an intermediary variable (Min, 2019).

Furthermore, recognizing that InsurTech's role in innovation may vary based on numerous factors, the study employs multiple models to explore potential nonlinear relationships, considering factors such as index changes, enterprise size, and nature. Finally, the paper analyzes the relationship (Ferilli *et al.*, 2024) and mechanisms of InsurTech on insurance companies' technological innovation level, discusses limitations, outlines future research avenues, and proposes pertinent policy recommendations in the conclusions.

The Current (and Future) Relationship Between Insurance and InsurTech. The State of the Art

Currently, global academics and scholars present a variety of perspectives on InsurTech, with three main viewpoints prevailing. Firstly, InsurTech is viewed as a catalyst for technological and mode innovation within insurance enterprises. Jia and Wan (2019) assert that InsurTech empowers the insurance industry, fostering development and enhancing efficiency and production capacity through innovative technologies like artificial intelligence, blockchain, cloud computing, and big data (Actuaries Institute, 2016; Halima *et al.* contend that InsurTech's key lies in enhancing process efficiency, underwriting, product development, reshaping customer interaction, distribution strategies and developing new business models (Halima and Yassine, 2022). Von Leipzig finds that InsurTech not only optimizes existing business processes but also drives innovation in service processes (von Leipzig *et al.*, 2017). InsurTech is seen as a disruptive force that accelerates and enhances the transformation of the insurance sector (Zarifis and Cheng, 2022) as (Ma *et al.* assert that InsurTech offers innovative or disruptive solutions for the market (Ma and Ren, 2023).

Secondly, InsurTech is seen as innovating the application of technology within the insurance domain

and, on this matter, Merello suggests that InsurTech acts as a strong driver for the development and innovation of Fintech (Merello and Barberá, 2022). Gupta *et al.* propose InsurTech as an innovative phenomenon where traditional or non-traditional market participants utilize information technology to provide specific solutions for the insurance industry (Gupta *et al.*, 2022). InsurTech emphasizes the application of information technologies such as blockchain, artificial intelligence, the Internet of Things, and social networks in the insurance business (Kewal and Saxena, 2024).

Thirdly, there's a perspective focusing on improving the efficiency of insurance activities through InsurTech. Pauch assesses that InsurTech utilizes technological innovation to enhance existing insurance models, reducing costs and improving efficiency (Pauch and Bera, 2022).

Cao *et al.* maintain that InsurTech serves as a professional means of collecting and analyzing data, assessing risk, and calculating risk exposure and premium payments, with applications in e-commerce, digitalization, pay-per-view, and supporting marketing and licensing (Cao *et al.*, 2020; Halima *et al.* suggest that InsurTech enhances the efficiency of insurance companies, driven by technologies like artificial intelligence and blockchain (Halima and Yassine, 2022). Couasaert *et al.* assess that digitalization activities significantly enhance the business performance of insurance companies (Cousaert *et al.*, 2021).

Further research indicates that InsurTech innovates insurance product development and services, optimizing the insurance market environment. Among other things, with technological advancements, InsurTech empowers insurance companies with product, service, and process innovation. Additionally, according to Bodò *et al.*, InsurTech facilitates the distribution of insurance products, leading to profound changes in the insurance market operation, service mode, profitability, and investment means, fostering fair competition among various market players (Bodó, 2018).

Technologically innovative insurance companies currently encounter significant financing constraints, primarily due to several factors:

- Projects focused on technological innovation often entail long investment cycles, substantial capital requirements, high risks, and elevated financing costs in conventional financial markets as these factors may result in innovative projects missing optimal research and development opportunities due to disruptions in the capital chain (Palamara, 2017)
- Asymmetric information between fund suppliers and demanders restricts enterprises' ability to finance their technological innovation projects through traditional financial intermediaries (Pagano *et al.*, 2020)
- It fails to mitigate potential moral hazard issues within enterprises through effective mechanisms

- The absence of effective financial support for technological innovation activities may lead to the termination of numerous innovative projects, hindering innovation efficiency within enterprises (Gatteschi *et al*., 2018)

The emerging model, combining digital technology with traditional financial services, is gradually reshaping the financial service landscape and offering novel approaches to enterprise investment and financing. Lower moral hazard levels reduce external financing constraints, thereby enhancing enterprise technological innovation levels (Rumson and Hallett, 2019). In turn, the role of technological development can alleviate enterprise financing constraints by diminishing information asymmetry, reducing capital supply-demand financing costs (La Barbera, 2023), and offering diverse financing opportunities for enterprises (Liu *et al*., 2023). It addresses challenges such as expanding financing channels, accelerating fund availability, overcoming financing difficulties, and facilitating fund flows, thereby providing effective financial support for technological upgrades and, on the same level, it enhances enterprise risk tolerance, incentivizing more effective investment in high-risk, high-return projects, thereby improving investment efficiency.

InsurTech Start-Ups. A Sustainable Change?

The market context appears to favor the continued growth of InsurTech start-ups, despite the high level of regulation in the insurance sector. On the contrary, the existence of entry barriers hinders market access for global digital giants such as Google, Facebook, and Amazon. Without dominant players, the sector can develop gradually and extensively, providing InsurTech companies with the time and space needed to secure funding and develop new solutions (Cappiello, 2024).

InsurTech start-ups typically adopt very linear business models, focusing on specific areas and heavily incorporating technological content dedicated almost entirely to insurance innovation (Sosa and Montes, 2022). Most of these start-ups leverage artificial intelligence, particularly machine learning, and possess substantial capabilities in analyzing and processing big data. Due to their significant digitalization, these start-ups can more quickly seize market opportunities compared to traditional companies. Consequently, they often embody a culture that seeks and values innovation and a mindset that positions them at the forefront of industry change (Zhao *et al*., 2020).

Companies have begun to see new start-ups not as market disruptors but rather as potential partners, much like what has occurred in the banking sector, where traditional banks and various Fintech companies work synergistically to provide the best possible customer experience (Duane, 2022). Traditional banks handle the

relational phase while innovators manage the customer-centric approach (von Leipzig *et al*., 2017).

To enhance their offerings and relationships with policyholders, while simultaneously mitigating the threats posed by new market entrants, insurance companies have initiated agreements with InsurTech start-ups (de Andrés-Sánchez and Gené-Albesa, 2024). These collaborations aim to build profitable partnerships and safeguard or possibly increase their market share. Such initiatives indicate that insurance companies have started to appreciate the potential of the InsurTech sector and view the increasing digitalization of their business model positively (Vidhya, 2023).

An increasing number of insurers now consider technological investments a priority, especially given that the sector has historically lagged behind financial services in adopting digital technologies. This lag is due to regulatory and legislative constraints, high costs, and a certain underlying resistance to innovation (Njegomir and Demko-Rihter, 2023).

Future business models will therefore be characterized by close collaborations, where traditional players will focus on developing customer relationships, while InsurTech companies, as innovators and purveyors of new technologies and applications, will act on the value chain by providing technological support to the transformation process (Eling *et al*., 2022). The result of this collaboration will be the reorganization of the traditional insurance value chain, which will tend to segment along lines that favor greater efficiency and process flexibility, enabling quicker responses to market needs (Kewal and Saxena, 2024).

The Current Spread and Development

Before examining any potential future implementations of InsurTech and the underlying technology more broadly, it is essential to consider its current spread (Marsal-Llacuna, 2018) and how it is establishing itself in the global market, particularly as it faces the challenges posed by traditional insurance.

The first notable insight for analysis is the relationship between funding and the number of contracts signed. The graph clearly shows a rising trend between 2018 and 2021, with a peak observed in 2021, followed by a gradual decline. However, the last quarter of 2023 revealed a significantly higher sum of money raised compared to 2018, suggesting that the overall trend remains positive and possibly natural.

On the other hand, what is particularly surprising is the drastic decrease in the number of deals signed. This trend seems to indicate that, following an initial surge of enthusiasm and a substantial injection of funds immediately after the severe COVID-19 pandemic (Pagano *et al*., 2021; Pagano *et al*., 2022), the sector has shifted towards a clientele that is qualitatively higher (in terms of money raised) but quantitatively smaller. A future challenge will likely be to

reconcile these two needs and attempt to re-engage the so-called average consumer (Pauch and Bera, 2022) for more cost-effective deals. Figure (1), titled 'Evolution Insurance Funding-Money Raised and Number of Deals,' presents the quarterly trends in total funding (in USD) and deal volume from Q1 2018 to Q4 2023. The data highlights a significant surge in both metrics, peaking in Q2 2021, followed by a steady decline. This trend reflects the evolving dynamics of the insurance funding landscape, with the post-2021 period characterized by reduced investment activity and fewer deals.

Figure (2) highlights the overall trend in the insurance market, divided into major sectors. It is quite clear that certain sectors, particularly due to the implementation of various technological tools, have experienced and continue to experience significant growth. The challenge for InsurTech will be to determine how to make its product attractive in areas where the insurance market is not particularly widespread and where the standard customer is not inclined to embrace a radical change in the way insurance contracts are outlined and signed.

Fig. 1: Evolution insurance funding-money raised and N deals (Takashi *et al.*, 2024)
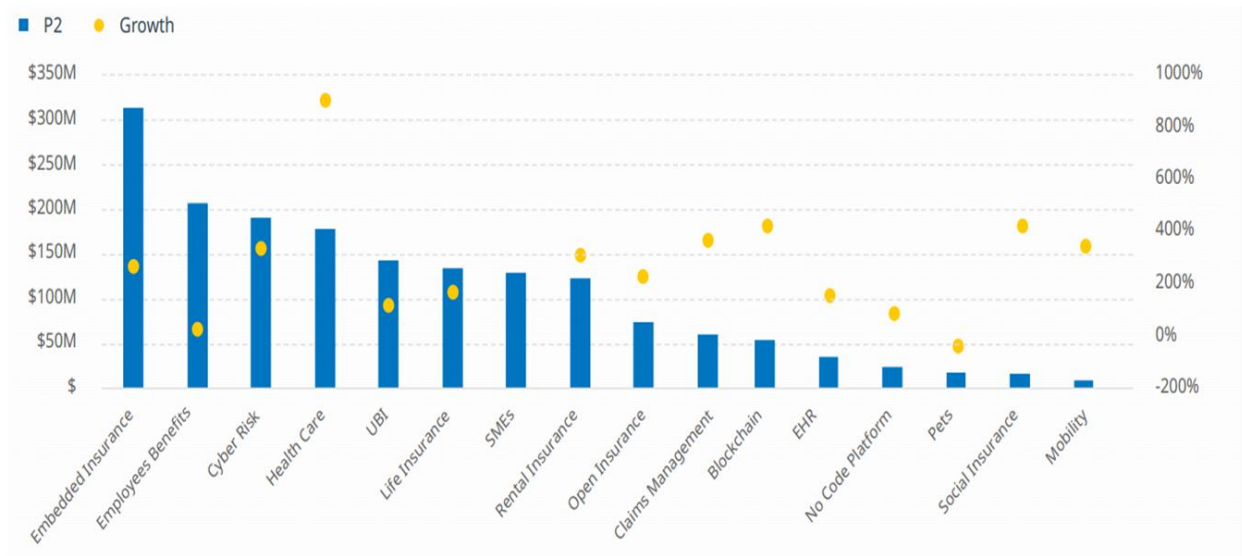

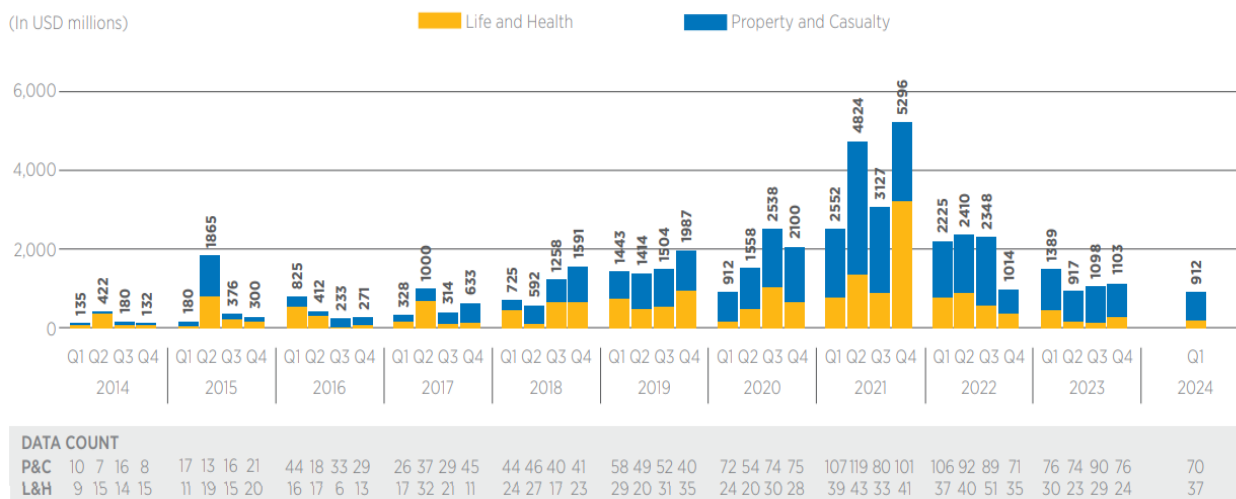**Fig. 2:** Insurance bets by keyword (Takashi *et al.*, 2024)

Fig. 3: Insurtech funding volume (*Global InsurTech Report Q3 2024*, 2024)

DATA COUNT																																											
P&C	10	7	16	8	17	13	16	21	44	18	33	29	26	37	29	45	44	46	40	41	58	49	52	40	72	54	74	75	107	119	80	101	106	92	89	71	76	74	90	76	70
L&H	9	15	14	15	11	19	15	20	16	17	6	13	17	32	21	11	24	27	17	23	29	20	31	35	24	20	30	28	39	43	33	41	37	40	51	35	30	23	29	24	37

Building on the analysis of the sectors just discussed, while the trend in transactions is decreasing, the same cannot be said for funding, which continues to attract more and more investors (both public and private) year after year.

Figure (3) displays the quarterly insurTech funding volume across all stages, divided into two main sectors: Life and Health (yellow) and Property and Casualty (blue), covering the period from Q1 2014-2024.

The chart shows a generally increasing trend in funding, with significant peaks between 2021 and 2022, indicating heightened investor interest in the insurTech sector during this period. The highest peak occurred in Q4 2021, reaching approximately USD 6.046 billion, with funding more evenly distributed between the two sectors compared to other periods. After this peak, there is a noticeable decline in funding starting in 2022.

The periods of marked growth likely correspond to significant events or developments in the insurTech industry, while the declines might reflect a cooling interest or market adjustment.

InsurTech Industry. Trends and Implications

If up to this point, the concept of InsurTech has been analyzed primarily from a theoretical perspective, it now becomes necessary to briefly point out how, in practical terms, the insurance industry as a productive and entrepreneurial sector has been affected by the technological implementation and its pragmatic implications.

In recent years, the insurance industry has been facing dual pressures. On one side, the widespread adoption of tools that monitor clients is driving down premiums, as the industry's role has shifted from merely providing risk coverage to actively mitigating risk through additional services alongside traditional offerings. These measures aim to reduce the likelihood of claims. On the other side, the costs associated with digital transformation are substantial, and many companies, still reliant on outdated legacy systems, are struggling to transition to more flexible and agile solutions. This has resulted in shrinking profit margins, compelling industry incumbents to rethink their business models and explore more profitable areas.

Additionally, the emergence of Big Data is enabling insurers to better connect with customers, making them the central focus of their offerings. Cybersecurity is presenting new business opportunities with vast potential, while also introducing significant threats. Meanwhile, new social phenomena like the Sharing and Gig Economy are altering consumer behavior and creating new demands for insurance coverage.

Future (Potential) Developments

Insurance companies should deepen the implementation of the InsurTech strategy by increasing investment in IT infrastructure research and development across various aspects, including product design, webpage design, backend services, and more. By prioritizing the development and enhancement of core technologies within the industry, companies can acquire more intelligent and digital patents, as well as register (Brighi and Ferrari, 2018) their trademarks in critical links of the insurance industry chain, thereby continuously augmenting their brand influence.

This can be accomplished by optimizing intelligent underwriting, claims (Landini, 2017) settlement, customer service, and risk (Chen *et al.*, 2021) control system management software tailored specifically for

insurance companies, thereby consistently enhancing operational and management efficiency.

Additionally, small and micro-insurance companies should actively leverage InsurTech to address financing constraints while boosting the success rate of product innovation. For instance, they can strengthen communication with banks, regularly submit financial statements and innovative achievements information enhance corporate credit ratings (Zhao *et al.*, 2023), eliminate financing information asymmetry between banks (Schulte, 2018) and enterprises and actively expand endogenous and exogenous capital sources.

Furthermore, the European Union and each Nation should verify how to bolster the promotion and guidance of InsurTech policies, mostly providing, at first, financial support (Pagano, 2019) to foster product innovation within the insurance sector.

In summary, insurance companies should effectively harness InsurTech as a tool to achieve technological advancement, transformation, and breakthrough. By integrating various resources and strategies, they can foster sustainable growth (Cappiello, 2020) and the development of insurance companies.

Conclusion

Looking ahead, the future implications of InsurTech and the transformation of the insurance sector are promising and multifaceted as the ongoing integration of technology and innovation is poised to shape the industry's landscape and redefine traditional business models (Tran *et al.*, 2023). As digital platforms and InsurTech startups gain momentum, traditional insurers face the imperative to adapt and embrace new approaches to maintain competitiveness and this aspect may entail forging partnerships, collaborations, or even acquisitions to leverage the strengths and capabilities of emerging Insurtech players (Chang, 2023).

Furthermore, the utilization of emerging technologies like artificial intelligence, machine learning, and the Internet of Things is expected to expand, empowering insurers to develop more sophisticated risk assessment models.

This dynamic environment necessitates continuous adaptation and agility from insurers, alongside the ability to differentiate through customer-centric strategies (Cappiello, 2018), enhanced user experiences, and the adept utilization of data analytics for improved risk assessment and pricing.

In conclusion, this study has provided an overview and a systematic literature review of the InsurTech revolution and several of the deep transformative impacts on the insurance sector (Ma and Ren, 2023).

Considering the future implications, it is evident that the continued integration of InsurTech will reshape the industry, driving advancements in business models,

customer experiences, and risk management practices (Marsal-Llacuna, 2018). However, challenges associated with legacy systems, data security, and regulatory compliance must be effectively addressed to fully realize the potential benefits (Tereszkiewicz and Cichowicz, 2024).

This evolution, which is redefining traditional operational paradigms, reshaping business models, altering strategies, and reconfiguring processes and services delivered by entirely new entities, necessarily transforms traditional risks. These risks may manifest differently than in the past and simultaneously generate a series of emerging risks, particularly those arising from relationships with third parties, necessitating robust governance and internal control measures.

Primarily, the conscious management of technological leverage must extend to Information and Communication Technology (breviter, ICT) risk control, whose strategic importance is underscored by supervisory authorities' guidelines highlighting its cross-cutting nature. These guidelines call for an adequate internal control system, including the potential activation of a second-level control function dedicated to IT risks. Intermediaries must adopt diversified strategies to ensure technical competencies within the control function. These strategies could involve hiring new resources, enhancing internal competencies, outsourcing, or seeking specialized consultancy, based on the intermediary's size, organizational complexity, business model, and ICT and security risk exposure, while also considering available resources (Tereszkiewicz and Cichowicz, 2024).

It is crucial for intermediaries to be aware of the weaknesses in the technological solutions they employ and to make informed decisions regarding robust governance and internal control measures. Artificial intelligence significantly enriches intermediaries' opportunities by actively enhancing their data analysis and exploitation capabilities. However, alongside these benefits, continuous involvement of control functions is required. It is essential to avoid situations of uncritical approval of the outcomes of new processing techniques, maintaining the objectivity of the decision-making process and the clear attribution of roles and responsibilities (Bokadarov *et al.*, 2020).

The increasing complexity of the financial system underscores the need to ensure the quality of corporate governance to protect the long-term sustainability of the operational model and prudent risk management (Lechman and Marszk, 2019). Effective governance is not only a necessary risk control measure but also a competitive factor that allows for exploiting market opportunities offered by digitalization. It enables the adaptation of strategies to the new context and leverages technology to overcome constraints to business sustainability.

Overall, the future of InsurTech presents opportunities for insurers to embrace innovation, enhance customer value propositions, and thrive in an increasingly digital and customer-centric insurance landscape.

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Author's Contributions

Andrea Jonathan Pagano: Coordinated the work and assigned the duties.

Antonella Cappiello: Designed the research plan and organized the study.

Emanuele Vannucci: Focused on IoT developments.

Chiara D'Elia: Literature review.

Ethics

This article is original and contains unpublished material. The corresponding author confirms that all of the other authors have read and approved the manuscript and no ethical issues involved.

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