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From Legacy to Digital: How InsurTech Is Reshaping the Insurance Value Chain and Regulatory Landscape

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Abstract: This paper explores the transformative impact of InsurTech on the traditional insurance industry, focusing on changes across the technological infrastructure, risk management, customer interaction, product design, and regulatory frameworks. Leveraging emerging technologies such as artificial intelligence, big data, the Internet of Things, and blockchain, InsurTech enables personalized services, real-time risk detection, and automated claims processes. A detailed comparative analysis highlights key differences between InsurTech and legacy insurance models. Additionally, the study examines the regulatory challenges arising from rapid digitalization, including data privacy, cross-border oversight, and the implementation of RegTech and regulatory sandboxes. A case study of Allianz illustrates the real-world application of these innovations. The paper concludes that while InsurTech may not entirely replace traditional insurers, the convergence of insurers, tech firms, and regulators is essential to building a fair, efficient, and sustainable insurance ecosystem.

Keywords: InsurTech, traditional insurance, digital transformation.

1. Introduction

In recent years, although the global insurance industry has long been established, it continues to experience steady growth. Data from S&P Global indicates that total direct premiums written in the Life & Health (L&H) and Property & Casualty (P&C) sectors have risen consistently, reflecting heightened awareness of risk protection and the increasing complexity of global risk environments. A key driver behind this trend is the accelerated integration of FinTech into the insurance sector, giving rise to a new innovation pathway: InsurTech, which refers to "an insurance company, intermediary, or insurance value chain segment specialist that utilizes technology to either compete or provide value-added benefits to the insurance industry" [1]. The technologies involved typically include blockchain, big data analytics, artificial intelligence, and cloud computing.

Within today's InsurTech landscape, three main business models have emerged: full-stack InsurTechs that hold insurance licenses and independently underwrite and process claims; distributors that operate digital platforms to connect consumers with insurers and improve operational efficiency; and enablers that provide technical solutions, such as automated claims processing, risk modeling, and AI-driven underwriting, to support the digital transformation of traditional insurers.

Notably, although there are concerns that InsurTech might disrupt the traditional insurance model, McKinsey & Company [2] reveals that only 9 percent of InsurTech firms aim to fully replace

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incumbents, while 63 percent seek to provide technological support to existing insurers. This suggests that InsurTech represents a process of "technological convergence" rather than outright disruption.

However, the rise of InsurTech raises a series of critical questions: how can traditional insurers adapt to these changes? What are the potential risks of rapid digitalization in terms of regulation, data protection, and fairness? And how should regulators respond to ensure both innovation and stability? To address these questions and offer practical insights, this report will explore five key dimensions: the definition and evolution of InsurTech, the fundamental differences between traditional insurers and InsurTech, the impact of InsurTech on product and service optimization, risk assessment and monitoring, and claims management, its implications for regulatory frameworks, and finally, a case study of Allianz's digital transformation journey with insights for the industry.

2. Difference between InsurTech and traditional insurance

2.1. Technological infrastructure and data processing

Traditional insurance companies typically rely on closed, vertically integrated legacy IT systems. And they are costly to maintain and lack the flexibility to support rapid innovation [3]. In terms of data processing, they often depend on batch processing of historical data and manual analysis, resulting in low decision-making efficiency. In contrast, InsurTech firms adopt cloud-native, modular architectures that integrate AI and real-time data streams, enabling more powerful data integration and system scalability. This infrastructure supports dynamic pricing, automated underwriting, and intelligent claims processing [4].

2.2. Risk management approach

As an insurer once remarked, "the role of an insurance company is to get a man out of trouble—that's what he's paid you for" [5]. Traditional insurers usually rely on actuarial models and lagging indicators, emphasizing post-event compensation. This often delays response to emerging risks in a timely manner, increasing overall claims costs. In contrast, InsurTech leverages IoT, behavioral data, and machine learning to establish real-time risk identification and proactive intervention. For instance, insurers can continuously collect customers' driving behaviors, health indicators, or home safety data via smart devices, enabling early detection and dynamic risk mitigation.

2.3. Customer interaction and service experience

Traditional insurers mainly interact with customers through physical branches and agents, resulting in time-consuming processes and slow response times. This model struggles to meet modern customers' expectations for efficiency and convenience. As Millennials and Gen Z gradually become the dominant consumer groups in the insurance market, they increasingly prefer to access information and complete purchases online [6]. InsurTech aligns with this trend by introducing digital platforms, mobile apps, and online comparison tools, offering on-demand services that significantly enhance user experience and customer loyalty.

2.4. Product design and personalization capabilities

Traditional insurers generally follow a standardized, one-size-fits-all approach in product design, with fixed coverage terms and pricing structures. This makes it difficult to cater to individual customer differences and provide precise services in a highly diversified market. For instance, traditional risk assessment methods often assume that young male drivers are more reckless than females of the same age group, leading to higher premiums for the former. However, InsurTech develops highly personalized insurance products and services based on user behavior data such as health conditions

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[7]. It not only achieves dynamic pricing and flexible adjustment of coverage but also significantly enhances market responsiveness, thereby gaining a competitive edge.

3. The impacts of InsurTech

The rise of Insurtech is fundamentally redefining the core functions of the insurance industry. It not only promotes the digital upgrade of specific links such as product recommendation and claims processing, but also brings a qualitative leap in the efficiency and accuracy of service models and risk management. The following sections will explore these four dimensions to illustrate how technology not only improves efficiency but also drives the transformation towards a more customer-centric and data-driven insurance ecosystem.

3.1. Optimization of service models

With the rise of InsurTech, the insurance industry has shifted from traditional offline branches to a digital ecosystem, including mobile apps, online aggregators, and intelligent price comparison engines. Through using apps, customers can manage policies, file claims, and track progress in real time, greatly enhancing convenience. Aggregation platforms and comparison tools integrate products from multiple insurance companies, enabling agents and consumers to compare and select the best insurance plans. Additionally, by using natural language processing (NLP) and intelligent recommendation algorithms, the system can automatically and precisely recommend highly personalized insurance products based on user preferences and historical behaviors. And platforms also integrate electronic signature systems and identity verification technologies, achieving a fully online insurance process. According to J.D. Power [8], more than half of new customers establish contact with insurance companies through digital channels, indicating that the digital sales model has a significant advantage in attracting new customers. This transformation boosts insurers' efficiency and enhances customer engagement. It shifts the industry from passive, product-focused service to proactive, customer-centric interaction, strengthening loyalty and brand attachment.

3.2. Risk identification and control

Driven by insurance technology, the industry is accelerating the establishment of an intelligent risk management system based on behavioral data and driven by algorithms, gradually achieving a profound transformation from "reacting after the fact" to "real-time early warning and monitoring". Specifically, insurance companies can access diversified data sources such as wearable devices, health monitoring systems, and mobile applications to collect high-frequency data on customers' health conditions, driving behaviors, and activity trajectories in real time. The data is fed into machine learning models, enabling the system to detect potential risk patterns, assess customer risk levels dynamically, and trigger warnings or interventions as needed. This transformation has enhanced the timeliness and accuracy of risk identification, improved operational efficiency and reduced operational costs. Meanwhile, this transformation reduces adverse selection and moral hazard.

3.3. Personalized insurance products

With the aid of dynamic risk identification, control systems, and big data analysis, truly personalized insurance products have become possible. First, dynamic pricing allows companies to adjust premiums in real time using machine learning models that combine customer risk profiles, behavioral data, and external variables, ensuring a precise risk-price match. Second, dynamic coverage adjustments are now achievable, as systems can automatically or semi-automatically optimize coverage during the policy period based on customer behavior, allowing flexible upgrades. According

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to Pingili [9], customer satisfaction rose by 38% after adopting dynamic pricing. Furthermore, big data helps companies identify new demands and design products for emerging risks. For example, PICC found that gamers risked property loss when buying virtual products online, leading to a tailored insurance product [10]. The broad use of personalized products has significantly boosted customer retention, renewal rates, and brand reputation.

3.4. Claims process optimization

The dynamic risk management system and digital ecosystem play a key role in the claims process, driving the upgrade of the insurance industry. Firstly, in fraud detection, AI models can effectively identify high-risk characteristics, such as exaggerated losses, by cross-referencing various data. Suspicious cases are automatically flagged as "high-risk applications" and pushed to the manual review process, thereby reducing the occurrence of fraudulent claims. Secondly, in process efficiency optimization, InsurTech's self-service claims system and mobile claims platforms greatly enhance the user experience. Customers can upload materials online, track progress in real-time, and receive feedback on results, significantly shortening the claims cycle. According to Komperla [11], AI-driven automation can reduce processing time by more than 30%, significantly lowering manual workload and improving the speed and accuracy of claims management. This significantly enhances customer trust and favorability toward insurance institutions.

4. The implications for regulators

Historically, insurance regulation is intended to protect consumers and ensure the stability and competitiveness of the insurance market [12]. However, with the rapid rise of InsurTech, regulatory authorities are facing challenges and adjustment pressures.

4.1. Challenges

Firstly, the rapid pace of InsurTech innovation has outstripped the capacity of many regulatory frameworks, leaving certain emerging models unregulated and increasing systemic vulnerabilities [13]. Secondly, InsurTech relies on collecting and processing large-scale real-time data. This makes the security of data and the protection of privacy an urgent problem that regulatory agencies must solve. Thirdly, the increase of multinational insurtech enterprises shows the necessity of regulatory coordination. According to the OECD [14], over 72% of the world's top 50 insurance companies have subsidiaries in more than three countries. Differences in regulatory standards across countries may confuse multinational insurers and create opportunities for companies with ulterior motives. Fourthly, Some InsurTech companies enter the market as start-ups or tech platforms, avoiding regulatory obligations like capital and risk reserves required of traditional insurers [15]. This regulatory asymmetry can lead to "regulatory arbitrage," undermining market fairness. For example, some companies sell embedded insurance products without formal licenses, bypassing key compliance and regulatory requirements.

4.2. Actions

However, regulatory authorities are actively seeking response strategies. First, the introduction of regulatory technology, such as automated compliance checks and real-time risk warning systems, is enhancing information processing and risk identification. For example, the UK’s FCA developed a “Regulatory API” to automate compliance monitoring and adapt to industry changes [16]. Second, many countries have introduced regulatory sandbox mechanisms, allowing InsurTech firms to test innovations in controlled environments, balancing innovation and risk control. This reduces

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regulatory barriers in the early stages and lowers market entry thresholds. The World Bank [17] defines this as "a framework established by financial regulatory authorities that allows private enterprises to conduct small-scale, real-scenario tests of innovations under the supervision of regulatory authorities." For example, Kenya's Insurance Authority launched Africa's first InsurTech sandbox platform, piloting projects like "BIMA" to improve rural insurance coverage. In a global context, cross-country information sharing and collaborative supervision are increasingly crucial. However, in practice, both willingness and capacity remain limited. The AfCFTA Secretariat [18] noted that although the African Continental Free Trade Area promotes cross-border regulatory cooperation, some member states, limited by regulatory resources and protectionist tendencies, still struggle to implement the coordination framework uniformly.

The effectiveness of a regulatory system depends not only on the rationality of its rules but also on its flexibility and ability to adapt to technology. Achieving fair and sustainable development in the insurance industry requires combining modernized regulation with technological integration. A key challenge for regulators is striking the right balance between effective oversight and fostering innovation: overly rigid systems can slow progress, while weak regulation can lead to risks.

5. Case study

Allianz is a representative enterprise of Insurtech applications. Facing increasingly complex customer demands and fierce market competition, Allianz has comprehensively upgraded its insurance value chain by building a digital ecosystem, introducing intelligent technologies, and optimizing service processes. Leveraging big data and artificial intelligence, Allianz personalizes products like health insurance, using "behavioral pricing" based on wearable device data, for example, exercise and heart rate, to adjust premiums, which enhances fairness and encourages healthy behaviors. It has also built a digital customer platform offering one-stop services such as policy management, applications, and recommendations, where Natural Language Processing and AI-driven support improve response speed and customer satisfaction. Research shows that over 50 percent of customers prefer digital insurance platforms, underscoring the need for service model digitalization. In property insurance, Allianz employs Internet of Things technology and dynamic monitoring systems, for example, smoke detectors and water sensors, to enable real-time risk tracking and preemptive intervention, which reduces compensation and embodies the early-warning concept.

6. Conclusion

Insurtech is reshaping the business processes and product service models of the insurance industry. Big data analytics has become an indispensable tool in modern insurance. This paper shows InsurTech's advantages in terms of tech systems, risk detection, customer service, and customized products, and leads to more efficient claims processing, more precise risk control, and higher customer satisfaction. The wide application of dynamic pricing and flexible protection structures shows the potential of data-driven personalized insurance in offering fairer solutions. Meanwhile, the rapid development of insurtech has also posed severe challenges to the existing regulatory system, such as lagging regulation, data security and privacy protection issues, forcing regulatory authorities to accelerate responses and changes at the institutional and technical levels. While InsurTech may not fully disrupt the traditional insurance industry, companies must innovate and adapt to stay competitive in a changing landscape.

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