Research on InsurTech and the Technology Innovation Level of Insurance Enterprises

Jie Liu 1, Shujun Ye 1,* , Yujin Zhang 1,2 and Lulu Zhang 1

1 School of Economics and Management, Beijing Jiaotong University, Beijing 100044, China; 20113025@bjtu.edu.cn (J.L.)
2 Department of Humanities and Management, Hebei University of Chinese Medicine, Shijiazhuang 050200, China
* Correspondence: shujun_ye1@163.com

Abstract: New technologies are integrating and deeply influencing people’s work and life, and have become a key factor leading the continuous innovation of the insurance industry. The application of InsurTech has attracted widespread attention in the industry, and it is necessary to conduct in-depth deconstruction and analysis of its impact on insurance enterprise innovation to ensure the sustainability of technological innovation in insurance enterprises. Based on the panel data of Chinese insurance enterprises from 2011 to 2020, this paper empirically examines the relationship between InsurTech and enterprise technological innovation level and the mechanism of action by using the fixed effect model and the intermediary effect model. The empirical research results are as follows: (1) The development of InsurTech has significantly improved the technological innovation of insurance companies. (2) From the perspective of mechanism, InsurTech mainly improves the technological innovation level of insurance companies by alleviating financing constraints. (3) Furthermore, we also found significant differences in the promotional effect of InsurTech’s development on enterprises of different sizes and properties. At the same level of development, InsurTech has a greater and more significant “incentive effect” on the technological innovation level of non-state-owned enterprises and small and micro insurance enterprises. The research conclusion of this article not only enriches the literature on InsurTech and the technological innovation level of insurance companies, but also has significance for China’s insurance companies to help them formulate digital transformation policies and promote the “sustainable development” of technology empowerment insurance strategies.

Keywords: InsurTech; enterprise technological innovation; financing constraints; sustainable development

1. Introduction

During the transition of China’s economy from rapid growth to high-quality growth, the financial and insurance field is facing challenges from Fintech, which has prompted the insurance industry to have a deeper understanding of the importance and urgency of digital transformation. At the same time, the technological revolution and industrial transformation represented by the application of digital technologies such as big data, blockchain, cloud computing, and artificial intelligence are emerging [1]. Against the backdrop of the booming digital economy, most traditional enterprises are facing the challenge of restructuring their development models and operational strategies [2]. InsurTech, as an important strategic deployment for insurance companies to respond to this unprecedented digital revolution [3], is becoming a core driving force for economic growth. In order to ensure that the insurance industry can meet the needs of digital transformation and achieve high-quality development of the insurance industry, it is necessary to position the InsurTech development strategy on “sustainable development” [4].

Citation: Liu, J.; Ye, S.; Zhang, Y.; Zhang, L. Research on InsurTech and the Technology Innovation Level of Insurance Enterprises. Sustainability 2023, 15, 8617. https://doi.org/10.3390/su15118617

Academic Editor: Wen-Hsien Tsai
Received: 27 April 2023
Revised: 22 May 2023
Accepted: 22 May 2023
Published: 25 May 2023

Copyright: © 2023 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.org/licenses/by/4.0/).
In the entire financial field, the insurance industry has relatively low consumer satisfaction and a relatively backward digital level [5,6]. The arrival of InsurTech may significantly stimulate the development of the insurance industry, and it may even be significantly larger than other branches of the financial field. Therefore, InsurTech has attracted the enthusiastic attention of domestic and foreign technology companies [7]. With increasing market attention, our observation and reflection on new technologies should be calm. InsurTech has provided more support for innovation and high-quality development of insurance industry enterprises, but InsurTech itself has not entered a period of productivity stability, and some technologies are even at the “peak of expectation inflation” described by Gartner. Eling and Lehmann (2018) state that digital innovation affects most insurance industry activities, including the insurance value chain, product development and insurance policies, underwriting and claims, sales and distribution, pricing and asset liability management, and risk management. Therefore, in order to raise the company’s competitiveness, insurance companies must expand their technical hardware and software to facilitate the transformation of the value chain, process optimization, and operational efficiency [8]. Lusch and Nambisan (2015) also pointed out that the application of digital technology can play a role in enterprise technological innovation [9]. At the same time, technological innovation and changes in business models have also brought new management risks [10] and moral hazards to the insurance industry [11,12]. Wilamowicz (2019) also pointed out the need to strengthen research on InsurTech and pay attention to the regulation of InsurTech [13]. In the face of this controversy, what impact will the rapidly developing InsurTech have on the technological innovation of insurance companies? What are the ways to contribute to technological innovation in insurance companies? These all require detailed theoretical and empirical analysis to provide a basis for judgment. Technological innovation empowers insurance and provides favorable conditions for the innovative development of insurance enterprises. By combining mobile Internet, cloud computing, and big data with traditional financial services, InsurTech has brought new opportunities for innovation for Chinese insurance companies with its advantages of high efficiency, omnidirectionality, stronger customer reach, and geographic penetration [14]. For example, artificial intelligence can reduce human errors that may occur during the insurance underwriting and claims stage through machine-learning capabilities, and can also automatically identify certain risks and information to improve business efficiency [15]. Blockchain can significantly reduce the cost of information acquisition in insurance businesses [16,17]. The Internet of Things synchronizes a large amount of personalized information to the backend of insurance operations through intelligent wearable devices, which can also help insurance companies better identify risks and improve the accuracy of insurance pricing [18]. Data and analytics can deeply align with the operational characteristics of the insurance industry and improve the multi-dimensional analysis ability and efficiency of insurance companies [19]. In practice, it can also be seen that InsurTech is empowering the insurance industry and promoting its high-quality development in areas such as product development, marketing, risk control, underwriting and claims verification, and fund utilization [20,21]. According to the “Peking University Digital Inclusive Finance Index (2011–2020)”, the provincial digital insurance sub-index has grown at an average annual rate of 53.56%, and its index value has nearly doubled from 2011 to 2020. So, can the leapfrog development of InsurTech help insurance companies innovate?

The development of InsurTech may make up for the shortcomings of the traditional insurance industry, not only helping insurance companies integrate existing resources [22], but also helping to alleviate the financing difficulties of enterprises [23,24]. It provides financial support for innovation activities and increases investment in innovation research and development [25–27], thereby enhancing the level of technological innovation of insurance companies. Relying on digital technologies such as artificial intelligence, big data, and blockchain, InsurTech can effectively reduce information asymmetry between supply and demand [28], effectively reduce transaction costs [29], and improve enterprise technological efficiency [30]. At the same time, the development of InsurTech also helps to
promote industrial upgrading and create favorable conditions for the transfer and optimization of technological innovation opportunities, thereby strengthening the spillover effect of technological innovation and improving the level of technological innovation of insurance enterprises [14]. Therefore, the development of InsurTech may help enhance the sustainability of technological innovation in insurance companies.

Based on the above research, this paper empirically tests the relationship between InsurTech and insurance companies' technological innovation level with panel data from Chinese insurance companies. Firstly, this study verifies the impact of InsurTech and digital inclusive finance development on the technological innovation level of insurance companies by constructing a benchmark regression model. Secondly, this article takes the financing constraints of insurance companies as an intermediary variable to deeply explore the possible mechanisms of InsurTech's effect on enterprise technological innovation and elaborates on its internal transmission mechanism. Furthermore, considering that the role of InsurTech in innovation may be influenced by many factors, this article adopts multiple models to further explore the possible nonlinear relationship between the two based on heterogeneity conditions such as index changes, enterprise size, and nature. Finally, this study analyzes the relationship and mechanism of InsurTech on the technological innovation level of insurance companies, explores the limitations, future research directions, and significance of the research, and proposes corresponding policy recommendations in the conclusions.

The innovation of this study is mainly reflected in the following aspects. Firstly, this study differs from the previous literature that examines the impact of traditional insurance models on technological innovation. It explores the relationship between technological development and insurance enterprise innovation from the perspective of InsurTech, a new financial model, and verifies the possible pathways through which InsurTech affects insurance enterprise innovation. This study is the first to examine the role of InsurTech development in the technological innovation of insurance companies, thus providing an important supplement to the literature on innovation in insurance companies. Secondly, based on the changing characteristics of technological innovation activities, in order to avoid possible endogenous errors and other issues, this study comprehensively uses a variety of methods to explore the relationship between the development of InsurTech and the level of technological innovation of insurance enterprises, which fully guarantees the robustness of the research conclusions. Thirdly, unlike the previous literature that mainly examines the “absolute number” of patents, this article uses the number of enterprise patent applications and trademark registrations as proxy variables for the level of technological innovation of insurance companies. It comprehensively examines the impact of InsurTech development on enterprise technological innovation output and efficiency from a new dimension. This article takes some inspiration from selecting innovation indicators and expands the literature in the field of innovation.

The research conclusion of this article has important practical significance. Firstly, for the Chinese insurance industry, the focus of the development plan during the 14th Five Year Plan period is on “high-quality development”, “innovation” and “sustainable development”. Technological innovation is the core strategic support for all three. At this point, exploring the possible breakthrough paths for the technological innovation level of Chinese insurance companies on the financial supply side can provide some reference for the continued implementation of the innovation-driven development strategy. Secondly, for the global insurance industry, implementing sustainable insurance means innovating insurance businesses. ESG (environmental, social, and governance)-related factors should be fully considered in the development, design, and underwriting process of insurance products to reduce underwriting risks. At the same time, by developing innovative solutions, we benchmark and integrate our diversified insurance business with the United Nations Sustainable Development Goals (SDGs), contributing to environmental, social, and economic sustainability and promoting global sustainable development. Therefore, studying the impact of InsurTech on the technological innovation level of insurance companies can provide a certain reference for the sustainable development of global insurance.
2. Literature Review and Research Hypotheses

2.1. Literature Review

InsurTech is a new word that combines insurance and technology [30]. It is a product of the combination of emerging technology and insurance and is a specific branch derived from, but different to, Fintech [31–33].

What is the relationship between InsurTech and the technological innovation of insurance enterprises? At present, academia has given a variety of views. On the whole, there are three main views. The first viewpoint is that InsurTech can promote technological innovation and mode innovation of insurance enterprises. For instance, Jia and Wan (2019) believe that InsurTech empowers the insurance industry, promotes its development, and improves the efficiency and production capacity of the insurance business through innovative technologies such as artificial intelligence, blockchain, cloud computing, and big data [34]. Albrecher et al., (2019) argue that the key to InsurTech is to improve process efficiency, improve underwriting and product development, reshape customer interaction and distribution strategies, and develop new business models [35]. Pushmann (2017) found through research that InsurTech not only optimizes existing business processes, but also promotes innovation in service processes and business models [33]. InsurTech can be seen as innovations that have disrupted, accelerated, and enhanced the transformation of the insurance sector [36], Greineder et al., (2018) and Marano et al., (2019) consider that InsurTech provides innovative or disruptive solutions for the market [37,38]. The second view is that InsurTech can innovate the application of technology in the field of insurance. For example, Svetlana (2018) believes that InsurTech is a strong incentive for the development and innovation of Fintech [39], and Stoeckli et al., (2018) propose that InsurTech is an innovative phenomenon in which one or more traditional or nontraditional market participants use information technology to provide specific solutions for the insurance industry [30]. InsurTech emphasizes the application of information technologies such as blockchain, artificial intelligence, the Internet of Things, and social networks in the insurance business [40]. The third view is to explore the improvement of the efficiency of insurance activities from the perspective of InsurTech. Bun and Sopot (2018) believe that InsurTech refers to the use of technological innovation to promote the existing insurance model and save costs and improve efficiency [41]. Frick and Barsan (2020) insist that InsurTech is a professional means of collecting and analyzing data, assessing risk, calculating risk exposure, and premium payment, and its main application fields include e-commerce, point-to-point, digitalization, pay-per-view, supporting marketing, licensing, etc. [42]. It can promote innovation in traditional insurance activities through the combination of technology and flexible business practices. Davide and Laura (2021) believe that InsurTech has improved the efficiency of insurance companies, driven by technologies such as artificial intelligence and blockchain [43,44]. Bohnert et al., (2018) show in their study that digitalization activities have a significantly positive impact on the business performance of insurance companies [45].

Further research shows that InsurTech can innovate insurance product development and services, and optimize the insurance market environment. With the help of various technological advancements, InsurTech is also empowering insurance companies with product innovation [46], service innovation [16,47], and process innovation [48]. At the same time, InsurTech provides insurance customers with multiple scenarios and increasingly flexible, personalized, and diversified insurance products and services [49]. The unique digital customer experience it brings is an important condition for industry-leading growth [50]. For instance, advanced technology underpins insurance models ranging from behavior-based pricing, widely studied in the car insurance industry [51,52], to personalization linked to data retrieved from wearable devices [53]. Simultaneously, InsurTech can effectively promote the distribution of insurance products [54], boost the profound changes in insurance market operation, service mode, profitability, and investment means, and help create a market environment for fair competition among all kinds of
subjects [55]. InsurTech can also effectively prevent risks and eliminate fraudulent behavior. Its main benefit is that InsurTech and other technologies can help insurance companies better calibrate data, improve the accuracy of risk assessment and prediction capabilities of insurance companies [56], reduce moral hazard, and reduce fraud [31].

However, the current technological innovation-oriented insurance companies are facing serious financing constraints, which can be roughly attributed to the following reasons. Firstly, technological innovation projects have the characteristics of long investment cycles, high capital investment [57], high risk, and high financing costs in traditional financial markets [58]. This may lead to innovative projects of enterprises missing the optimal research and development time due to the breakage of the capital chain. Secondly, the problem of asymmetric information between the supply and demand of funds has not only restricted the ability of enterprises to finance their technological innovation projects through external financing channels such as traditional financial intermediaries [59], but has also failed to prevent possible moral hazard problems of enterprises by establishing an effective mechanism of pre-review, in-process tracking, and post supervision [60]. Finally, for technological innovation activities, the lack of effective financial support may lead to a large number of innovative projects being forced to “miscarry”, curbing the improvement of innovation efficiency within the enterprise [61].

As a new format, InsurTech, with its “inclusive” concept and “grassroots” characteristics, may be in line with the financing demand characteristics and innovation environment of technological innovation of insurance enterprises [14]. The new model formed by the combination of digital technology and traditional financial services is gradually changing the financial service model and providing new ideas for enterprise investment and financing [28]. Domar and Solow believe that the development of financial markets has a positive relationship with the technological innovation of enterprises. InsurTech can reduce the moral risk of enterprises [23,62]. The lower the moral risk of enterprises, the smaller the external financing constraints faced by enterprises, so the higher the level of technological innovation of enterprises [24]. Correspondingly, the role of “technology empowerment” can alleviate the financing constraints of enterprises by reducing the degree of information asymmetry, reducing the financing cost between the supply and demand of capital [29], and providing diversified financing methods for enterprises. It can solve the problems of broadening financing channels, accelerating the availability of funds, financing difficulties, and financing flows, and provide effective financial support for enterprises to achieve technological upgrading. It can also improve the risk tolerance of enterprises, encourage them to invest more effectively in high-risk and high-return projects, and improve investment efficiency [63].

The above literature provides a useful reference for the research carried out in this paper, but in the key period of digital transformation of the insurance industry, the empirical test of the impact of the development of InsurTech on the technological innovation level of insurance enterprises is still blank. Under the general trend of financial science and technology supporting the sustainability of financial innovation, it is necessary to conduct in-depth research on the sustainability of insurance science and technology supporting enterprise innovation.

2.2. Research Hypotheses

Through combing the literature, it is found that the impact of the application of InsurTech on the insurance market runs through the whole process, including product research and development, publicity and sales, contract underwriting, policy management, claim processing, asset operation, customer service and so on, which can have a revolutionary impact on the insurance value chain. From the perspective of customers, insurance customers can obtain insurance-related financial services anytime and anywhere with the help of related technologies, find the best or cheapest insurance company as soon as possible, and obtain a better consumer experience. InsurTech is a buzzword for disruptive technology and the latest wave of digital innovation aimed at replacing the traditional
insurance industry’s market operations and products and bringing more convenience and cost-effectiveness to customers [64]. From the perspective of InsurTech companies, the application of InsurTech can strengthen the interaction between brokers and sales networks, making it more convenient to find and explore potential customers and strategic partners before applying for insurance [65]. It can quickly achieve preliminary risk assessment for insured users, and achieve rapid response to claims after applying for insurance, making claim management methods more transparent, flexible, and efficient. Therefore, it can enhance the core competitiveness of insurance companies. Especially with the arrival of deep learning technologies such as convolutional neural networks, insurance will evolve from the current “detection and maintenance” model to the “prediction and prevention” model, and InsurTech will overturn and reshape all aspects of insurance companies [66,67]. First of all, by relying on digital technologies such as mobile Internet, cloud computing, big data, and blockchain, insurance enterprises can have more unique and efficient information collection and processing capabilities, which can effectively alleviate the problem of information asymmetry between supply and demand [68,69]. Second, InsurTech simplifies the underwriting and claim settlement process, improves the customer audit and evaluation system, and provides enterprises with “accurate” and “efficient” services [70]. Finally, InsurTech has not only had a substantial impact on domestic traditional insurance institutions through “competitive effect” and “demonstration effect”, but also accelerated the process of digital transformation and upgrading, and significantly improved the efficiency and quality of technological innovation of traditional insurance institutions. With the gradual maturity of Internet technology and the gradual improvement of the service function of InsurTech, its role in promoting technological innovation activities will be increasing. To sum up, this paper puts forward the following hypothesis:

**Hypothesis H1.** InsurTech has an “incentive effect” on the improvement of the technological innovation level of insurance enterprises in China.

Specifically, the development of InsurTech alleviates the financing difficulties of insurance enterprises and increases the investment intensity of innovation and R&D, which is conducive to the development of technological innovation projects of insurance enterprises and promotes the improvement of the technological innovation level of enterprises. On the one hand, the development of InsurTech will increase external financing opportunities for enterprises and greatly reduce financing costs for enterprises. A large number of studies show that information asymmetry is one of the key factors leading to the poor financing of insurance enterprises [69]. Due to the widespread information asymmetry in the internal and external financing markets of enterprises, resulting in a waste of resources, the application of InsurTech will achieve efficient matching of information, which is more conducive to investors understanding the innovative financing decisions of insurance enterprises, affirm the future development of insurance enterprises, increase investment in insurance enterprises, and promote the orderly development of R&D and innovation activities of insurance enterprises. On the other hand, the acceleration of the digital process will promote the establishment and improvement of the financial credit system, effectively alleviate moral hazard and adverse selection in financial loans, and InsurTech will better shape insurance enterprises. Therefore, insurance enterprises will have easier access to funds for innovative activities, alleviate financing constraints, and improve the level of R&D and innovation investment [23,62]. Based on this, this paper puts forward the second hypothesis:

**Hypothesis H2 (a).** InsurTech can alleviate the financing constraints of insurance companies.

**Hypothesis H2 (b).** Relieving financing constraints for insurance companies can promote the improvement of their technological innovation level.
3. Sample, Variable, and Model Settings

3.1. Samples and Data Sources

This study selects the panel data of Chinese insurance enterprises from 2011 to 2020 for empirical research. The sample selection criteria of insurance enterprises are as follows: (1) Insurance companies that have been established for 10 years or more. (2) Enterprises with more than 100 employees, because insurance companies with a population of less than 100 are greatly affected by environmental factors. (3) Insurance companies that have released annual information disclosure reports for more than 10 consecutive years, because the annual information disclosure report of insurance companies contains the necessary data for this study. The exclusion criterion was insurance companies that disclose abnormal information in their reports, due to abnormal phenomena such as missing information in individual years in the information disclosure reports released by some insurance companies. After sorting, this article selected a total of 77 sample companies (including 37 property insurance companies and 40 life insurance companies) and obtained a total of 770 valid sample data points. This article selects the sub-index of insurance business in the China Digital Inclusive Finance Index compiled by the Digital Finance Research Center of Peking University as the explanatory variable. Due to the fact that the index only publishes data from 2011 to 2020, according to the principle of consistency, the sample time span selected in this article is from 2011 to 2020.

The sample data selected for this study come from CSMAR, CNRDS, the wind database, the China Insurance Yearbook, the official website of the China Banking and Insurance Regulatory Commission, the official website of the China Insurance Industry Association, data obtained through manual or Python crawler software from websites such as “Qichacha” and “Qixinbao”, and the official websites of enterprises.

3.2. Variable Description

3.2.1. Explained Variable

Enterprise Technology Innovation (Inno): Currently, common measurement methods include the authorization and application volume of enterprise patents. Due to the lag in the application and approval of patents, this article uses the number of patent applications to measure the level of technological innovation of enterprises. In order to better study the impact of cutting-edge technologies such as big data, blockchain, and intelligence on the level of enterprise technological innovation, we have borrowed the existing literature practices [71] to increase the number of trademarks as an innovation indicator. This article uses the sum of the annual number of patents and trademarks applied by enterprises as a technical innovation indicator for insurance companies.

3.2.2. Core Explanatory Variables

InsurTech Development Index (Insurance): This article uses the insurance sub-item in the Peking University Digital Inclusive Finance Index compiled by the Peking University Digital Finance Research Center to represent the level of development of InsurTech. The specific calculation method is detailed in the “Peking University Digital Inclusive Finance Index”. The insurance business sub-index is based on the massive underlying transaction account data of the insurance business of Ant Technology. First, select three Internet insurance business indicators, namely, “the number of insured users per 10,000 Alipay users”, “the number of insurance transactions per capita” and “the amount of insurance per capita”, and then conduct dimensionless processing on these three insurance business indicators. Then, determine the weight of specific business indicators according to the AHP variation impact coefficient weighting method. Finally, calculate the sub-index of the insurance business. It can be said that this index fairly reflects the development process and characteristics of InsurTech, and it is reasonable to use it as a proxy variable. At the same time, the reliability of the regression results was tested using the Digital Inclusive Finance Development Index (FI), which depicts the level of China’s financial development
from multiple dimensions. By integrating the new characteristics of traditional financial services and Internet services, it comprehensively reflects the overall development and changing trends of technology-assisted finance [72].

In order to solve the endogenous problem, this paper refers to the practice of Qiu et al., (2018) and Xie et al., (2018), and selects the Internet penetration rate published by the China Internet Network Information Center (CNNIC) as the tool variable of the InsurTech development index to test the robustness of the results of this paper [73,74].

3.2.3. Mediating Variables

Financing Constraints (SA): The KZ index [25], WW index, and SA index are mainly used to measure corporate financing constraints. To avoid endogeneity interference, Hadlock & Pierce (2009) used the KZ method to classify the types of corporate financing constraints based on corporate financial reports, and then constructed an SA index using only two variables that do not change significantly over time and have strong exogeneity, namely firm size and firm age: $-0.737 \times \text{Size} + 0.043 \times \text{Size}^2 - 0.040 \times \text{Age}$ [75]. This article uses the SA index to measure the financing constraints of insurance companies for the following reasons: Firstly, the SA index does not include financing variables with endogenous characteristics. Secondly, the SA index is easy to calculate, and this article uses data from insurance companies, some of which are non-listed companies, without dividend payments or Tobin Q. Finally, the SA index is relatively stable, and the level of corporate financing constraints classified based on this is relatively reasonable.

3.2.4. Control Variables

In order to more comprehensively analyze the impact of the development of InsurTech on the technological innovation ability of insurance enterprises, this paper chooses the following control variables: (1) total assets (As), which refers to all assets owned or controlled by insurance companies, used to measure the scale and strength of insurance companies; (2) insurance business income (Inc), which refers to the annual premium income of an insurance company, used to measure its business income; (3) investment income (Inv), which refers to the investment income of insurance companies, such as interest and dividends, used to measure the investment income of insurance companies; (4) compensation expenses (Ce), which refer to the original insurance contract compensation payments and reinsurance contract compensation payments paid by insurance companies, used to measure the risk control of insurance companies; (5) business management fee (MI), which refers to the management fee incurred by an insurance company in organizing its business activities, which is used to measure the business management fee of the insurance company; (6) age, which refers to the year of establishment of an insurance company, used to measure its viability as shown in Table 1.

<table>
<thead>
<tr>
<th>Type</th>
<th>Variables</th>
<th>Symbol</th>
<th>Measurement Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explained Variable</td>
<td>Technological innovation</td>
<td>Inno</td>
<td>Add 1 to the sum of patent and trademark applications</td>
</tr>
<tr>
<td></td>
<td>InsurTech index</td>
<td>Insur</td>
<td>Natural logarithm of The InsurTech index</td>
</tr>
<tr>
<td>Explanatory Variable</td>
<td>FinTech index</td>
<td>FI</td>
<td>Natural logarithm of The FinTech index</td>
</tr>
<tr>
<td>Instrumental Variable</td>
<td>Internet penetration rate</td>
<td>Inter</td>
<td>Data released by the CNNIC</td>
</tr>
<tr>
<td>Intermediary Variable</td>
<td>Financing constraints</td>
<td>SA</td>
<td>$-0.737 \times \text{Size} + 0.043 \times \text{Size}^2 - 0.040 \times \text{Age}$</td>
</tr>
<tr>
<td>Control Variable</td>
<td>Establishment year</td>
<td>Age</td>
<td>(Observation Year establishment year) plus 1 to take logarithm</td>
</tr>
<tr>
<td></td>
<td>Total assets</td>
<td>As</td>
<td>Natural logarithm of Total assets</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Insurance income</th>
<th>Inc</th>
<th>Natural logarithm of annual premium income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investment income</td>
<td>Inv</td>
<td>Natural logarithm of The annual investment income</td>
</tr>
<tr>
<td>Compensation expenditure</td>
<td>Ce</td>
<td>Natural logarithm of The annual compensation expenditure</td>
</tr>
<tr>
<td>Management fee</td>
<td>Mf</td>
<td>Natural logarithm of The annual business management fee</td>
</tr>
</tbody>
</table>

3.3. Model Settings

Considering that there may be endogenous problems caused by measurement errors of missing variables or surrogate variables, this paper establishes a two-way fixed effect benchmark model for enterprises and years to verify the research hypothesis H1:

\[
Inno_{it} = \alpha_0 + \beta_1\text{Insur}_{it} + \Sigma Y_i^{\prime}\text{Control}_{it}^{\prime} + \theta_i + \mu_t + \epsilon_{it}
\]  

(1)

Among them, \(Inno_{it}\) represents the technological innovation level of insurance enterprises, that is, the sum of the number of patents and trademark applications produced by insurance enterprises; \(\text{Insur}_{it}\) is the InsurTech development index; \(\text{Control}_{it}^{\prime}\) represents a series of control variables, including year of incorporation (Age), total assets (As), insurance business income (Inc), investment income (Inv), compensation expenditure (Ce), and business management fee (MI); \(\theta_i\) is the fixed effect of the enterprise; \(\mu_t\) is the fixed effect of the year; \(\epsilon_{it}\) is a random error term. Considering heteroscedasticity and autocorrelation, robust standard errors are used in this paper. If \(\beta > 0\), the development of InsurTech can bring about a significant improvement in the innovation ability of enterprises.

In order to further investigate the internal development mechanism of InsurTech and enterprise technological innovation level, this paper refers to the intermediary effect model of Wen et al. [76], \(\text{Mediatour}_{it}\), as an intermediary variable, and the following logical transmission model is constructed to test the mechanism path between the two.

\[
Inno_{it} = \alpha_1 + \beta_1\text{Insur}_{it} + \Sigma Y_i^{\prime}\text{Control}_{it}^{\prime} + \theta_i + \mu_t + \epsilon_{it}
\]

(2)

\[
\text{Mediatour}_{it} = \alpha_2 + \beta_2\text{Insur}_{it} + \Sigma Y_i^{\prime}\text{Control}_{it}^{\prime} + \theta_i + \mu_t + \phi_{it}
\]

(3)

\[
Inno_{it} = \alpha_3 + \beta_3\text{Insur}_{it} + \delta\text{Mediatour}_{it} + \Sigma Y_i^{\prime}\text{Control}_{it}^{\prime} + \theta_i + \mu_t + \omega_{it}
\]

(4)

Among them, \(\text{Mediatour}_{it}\) is financing constraint (SA); \(Inno_{it}\) represents the technological innovation level of insurance companies; \(\text{Insur}_{it}\) is the InsurTech development index; \(\text{Control}_{it}^{\prime}\) represents a series of control variables.

4. Main Empirical Analysis
4.1. Descriptive Statistics

Table 2 reports descriptive statistics using regression samples in this article. We have found that there is a stratification phenomenon in the marketization process of enterprise technological innovation achievements. The average of the InsurTech index is 5.949, with a standard deviation of 0.799. The average Internet penetration rate is 52.79, with a standard deviation of 9.525. The InsurTech index and Internet penetration rate indicators used in this sample have a certain volatility and can be used for regression analysis. At the same time, it also indicates that the construction of China’s Internet platform is gradually improving, and the rapid development of InsurTech and other application fields is being promoted. The maximum value of financing constraints (SA) is ~1.910, and the minimum value is ~4.510, indicating that the sample insurance companies have varying degrees of financing constraints. The higher the absolute value of the SA index, the greater their financing constraints.
Table 2. Descriptive statistics of main variables.

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>p50</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inno</td>
<td>770</td>
<td>0.699</td>
<td>0</td>
<td>1.277</td>
<td>0</td>
<td>6.740</td>
</tr>
<tr>
<td>Insur</td>
<td>770</td>
<td>5.949</td>
<td>6.230</td>
<td>0.799</td>
<td>3.850</td>
<td>6.540</td>
</tr>
<tr>
<td>FI</td>
<td>770</td>
<td>5.228</td>
<td>5.415</td>
<td>0.625</td>
<td>3.690</td>
<td>5.830</td>
</tr>
<tr>
<td>Inter</td>
<td>770</td>
<td>52.79</td>
<td>51.75</td>
<td>9.525</td>
<td>38.30</td>
<td>70.40</td>
</tr>
<tr>
<td>SA</td>
<td>770</td>
<td>−3.397</td>
<td>−3.440</td>
<td>0.327</td>
<td>−4.510</td>
<td>−1.910</td>
</tr>
<tr>
<td>Age</td>
<td>770</td>
<td>11.02</td>
<td>10</td>
<td>5.837</td>
<td>38</td>
<td>38</td>
</tr>
<tr>
<td>As</td>
<td>770</td>
<td>9.654</td>
<td>9.410</td>
<td>1.878</td>
<td>3.860</td>
<td>15.26</td>
</tr>
<tr>
<td>Inc</td>
<td>770</td>
<td>8.077</td>
<td>8.290</td>
<td>2.778</td>
<td>13.32</td>
<td>13.32</td>
</tr>
<tr>
<td>Ce</td>
<td>770</td>
<td>6.678</td>
<td>7.115</td>
<td>2.796</td>
<td>−2.810</td>
<td>12.64</td>
</tr>
<tr>
<td>Inv</td>
<td>770</td>
<td>6.267</td>
<td>6.120</td>
<td>2.121</td>
<td>0</td>
<td>12.24</td>
</tr>
</tbody>
</table>

4.2. Benchmark Regression Results

To validate research hypothesis H1, empirical testing was conducted on model (1), and the results of benchmark regression are shown in Table 3. The first column reports the univariate regression results of InsurTech on enterprise technological innovation. The regression coefficient of the InsurTech index is 0.231, which is significant at the 1% level ($\beta = 0.231$, $t = 4.1654$). The second column reports the univariate regression results after adding the bi-directional fixed effects of enterprises and years. The regression coefficient of the InsurTech index is 0.277, which is significant at the 1% level ($\beta = 0.277$, $t = 4.0284$). The third column includes some control variables, and the regression coefficient of the InsurTech index is 0.233, which is significant at the 1% level. The fourth column shows the regression results of the Digital Inclusive Finance Total Index on enterprise technological innovation, with a regression coefficient of 0.353, which is significant at the 1% level. The regression coefficient of column 5, which includes all control variables, two-way fixed effects of enterprise and year, is 0.234 and is significant at the 1% level, indicating that for every 1% increase in the InsurTech development index, the insurance company’s technological innovation ability increases by 0.234%. Therefore, it is falsely established that the development of InsurTech is conducive to improving the technological innovation ability of insurance enterprises. This result also indicates that InsurTech has indeed provided a driving force for enterprise innovation in an effective way, verifying hypothesis H1 in this article. From the perspective of control variables, the establishment years, asset size, investment returns, and premium income of a company have a significant impact on its technological innovation, with establishment years and compensation expenses having a negative impact.

Table 3. Regression results of InsurTech and insurance enterprise technology innovation level.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Excluding Control Variables</th>
<th>Including Control Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>Insur</td>
<td>0.231 ***</td>
<td>0.277 ***</td>
</tr>
<tr>
<td></td>
<td>(4.1654)</td>
<td>(4.0284)</td>
</tr>
<tr>
<td>FI</td>
<td>0.233 ***</td>
<td>0.353 ***</td>
</tr>
<tr>
<td></td>
<td>(3.0669)</td>
<td>(2.9013)</td>
</tr>
<tr>
<td>Age</td>
<td>−0.036 ***</td>
<td>−0.046 ***</td>
</tr>
<tr>
<td></td>
<td>(−4.7513)</td>
<td>(−4.1111)</td>
</tr>
<tr>
<td>As</td>
<td>0.195 ***</td>
<td>0.180 ***</td>
</tr>
<tr>
<td></td>
<td>(1.9529)</td>
<td>(1.9846)</td>
</tr>
<tr>
<td>Inc</td>
<td>0.065 **</td>
<td>0.180 ***</td>
</tr>
<tr>
<td></td>
<td>(0.9020)</td>
<td>(0.8863)</td>
</tr>
<tr>
<td>Inv</td>
<td>0.030</td>
<td>0.018 **</td>
</tr>
<tr>
<td></td>
<td>(0.8063)</td>
<td>(0.8063)</td>
</tr>
</tbody>
</table>
Ce $-0.049^*$ $-0.049^*$ $-0.043$ $-0.043$ $-0.043$
Mf 0.205 0.205 (1.3288) (1.3288)

constant $-0.673^{**}$ $-0.600$ $-2.404^{**}$ $-3.464^{***}$ $-3.064^{***}$
Year FE No Yes Yes Yes Yes
Company FE No Yes Yes Yes Yes
N 770 770 770 770 770
Adj-$R^2$ 0.020 0.485 0.492 0.492 0.492

Note: The brackets indicate the robust heteroscedasticity t-values adjusted for the enterprise cluster; ***, **, * represented at significance levels of 1%, 5%, and 10%, respectively.

4.3. Robustness Test

4.3.1. Replace Explanatory Variables

In the benchmark regression, this research uses the insurance business sub-index in the China Digital Inclusive Finance Index compiled by the Digital Finance Research Center of Peking University as the substitute variable of the InsurTech development index. In the robustness test, this paper uses the Internet penetration rate as the proxy variable of InsurTech’s development. The second column from Table 4 reports the regression results after replacing the dependent variable, with a regression coefficient of 0.024 for Internet penetration rate, which is significant at the 1% level ($\beta = 0.024$, $t = 2.8956$), indicating that the Internet penetration rate has effectively improved the technological innovation ability of insurance companies. The results indicate that after replacing the explanatory variable, the hypothesis H1 in this article still holds.

Table 4. Regression results of robustness test.
4.3.2. Lagged One-Period Explanatory Variables

Considering that InsurTech may have a lag characteristic in its impact on the level of technological innovation of enterprises, and to some extent alleviate the endogeneity problem of reverse causality [77], this article selects the lagged explanatory variable to test the impact of InsurTech on the level of technological innovation of enterprises. The regression coefficients of the Internet penetration rate and inclusive finance index on enterprise technological innovation are 0.236, 0.024 and 0.304, respectively, and are significant at the 1% level, indicating the reliability of the results of this article.

### Table 5. InsurTech, transmission mechanism and technological innovation of enterprises.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Insur as Explanatory Variable</th>
<th>Inter as Explanatory Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>Insur</td>
<td>0.234 ***</td>
<td>0.018 *</td>
</tr>
<tr>
<td></td>
<td>(3.1298)</td>
<td>(3.1298)</td>
</tr>
<tr>
<td>SA</td>
<td>0.046 ***</td>
<td>0.034 ***</td>
</tr>
<tr>
<td></td>
<td>(2.9013)</td>
<td>(2.4573)</td>
</tr>
<tr>
<td>Age</td>
<td>0.180 ***</td>
<td>0.050</td>
</tr>
<tr>
<td></td>
<td>(1.9846)</td>
<td>(1.9846)</td>
</tr>
<tr>
<td>As</td>
<td>0.056</td>
<td>0.002</td>
</tr>
<tr>
<td></td>
<td>(0.8063)</td>
<td>(0.1989)</td>
</tr>
<tr>
<td>Inv</td>
<td>0.018 **</td>
<td>0.038 ***</td>
</tr>
<tr>
<td></td>
<td>(2.051)</td>
<td>(2.8371)</td>
</tr>
<tr>
<td>Ce</td>
<td>-0.049</td>
<td>-0.049</td>
</tr>
<tr>
<td></td>
<td>(0.2051)</td>
<td>(2.8371)</td>
</tr>
<tr>
<td>Mf</td>
<td>0.205</td>
<td>-0.036</td>
</tr>
</tbody>
</table>

Note: The brackets indicate the robust heteroscedasticity t-values adjusted for the enterprise cluster; ***, **, * represented at significance levels of 1%, 5%, and 10%, respectively.
InsurTech can improve the efficiency of resource allocation, and ultimately achieve the optimization and upgrading of industrial structures by the maximization of utility through accelerating the flow of economic resources between various departments, and then realize the purpose of encouraging technological innovation of insurance enterprises. Therefore, if the development of InsurTech helps enterprises to innovate, it is because of its role in optimizing industrial structure.

The characteristics of a long cycle and large investment of innovation activities of insurance enterprises require enterprises to prepare sufficient R&D funds, and financial constraints will have a direct impact on the innovation ability of enterprises [57]. The digital transformation of enterprises can alleviate financing constraints to a certain extent [29]. In order to test the easing effect of enterprise digital transformation on financing constraints, this paper refers to Yu et al., Ju et al., and Pierce to measure financing constraints by the financing constraint (SA) index [75,78,79]. The greater the absolute value of the SA index, the stronger the financing constraints faced by enterprises. Columns (2) and (3) of Table 5 report the regression results of enterprise digital transformation and financing constraints on innovation ability. It can be seen that InsurTech can significantly alleviate financing constraints, while with the improvement of financing constraints, enterprise innovation ability has been significantly improved, and the regression coefficient is significant. At the same time, the Z statistical value of financing constraints in the Sobel test is −2.716, which rejects the assumption that there is no intermediary effect. This shows that InsurTech can indeed improve the innovation ability of insurance enterprises by alleviating financing constraints. This hypothesis is verified by H2.

5. Heterogeneity Analysis

The development of enterprise InsurTech also has obvious characteristics of different attributes, and digital transformation behavior decisions made by enterprises under different characteristics may be inconsistent. Therefore, ignoring the differences in enterprise attribute characteristics can easily lead to the generalization of conclusions, which is not conducive to the formation of targeted policy recommendations. Considering the differences in enterprise size and property rights, this article further examines the heterogeneity of the impact of InsurTech on the technological innovation of different types of insurance enterprises.

5.1. Analysis of Heterogeneity in the Nature of Enterprise Property Rights

Due to the heterogeneity of property rights between state-owned and non-state-owned enterprises in the management decisions of InsurTech promoting innovation capabilities, this article constructs a dummy variable to distinguish between state-owned and non-state-owned enterprises. Regression was conducted on samples of state-owned and non-state-owned enterprises, and the results are shown in columns (1) and (2) of Table 6. As state-owned enterprises have sufficient cash flow and policy advantages, they can provide strong funds and policy guarantees during the digital transformation of enterprises, increase the investment in technological innovation of enterprises, and improve their innovation ability. Therefore, this article argues that the relationship between InsurTech and enterprise technological innovation is more significant in state-owned enterprises.
Table 6. Analysis of heterogeneity in the nature and scale of enterprise property rights.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Enterprise Nature</th>
<th>Enterprise Size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non-State-Owned</td>
<td>State-Owned</td>
</tr>
<tr>
<td>Insur</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.6628)</td>
<td>(1.6586)</td>
</tr>
<tr>
<td>As</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.2676)</td>
<td>(1.3235)</td>
</tr>
<tr>
<td>Inc</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.036</td>
<td>0.041</td>
</tr>
<tr>
<td>Inv</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(−0.053)</td>
<td>0.005 **</td>
</tr>
<tr>
<td>Ce</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(−0.076)</td>
<td>0.039</td>
</tr>
<tr>
<td>Mf</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.014 **</td>
<td>0.192</td>
</tr>
<tr>
<td>constant</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>−1.413 ***</td>
<td>−4.400 ***</td>
</tr>
<tr>
<td>Year FE</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Company FE</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>N</td>
<td>460</td>
<td>310</td>
</tr>
<tr>
<td>Adj-R²</td>
<td>0.380</td>
<td>0.624</td>
</tr>
</tbody>
</table>

Note: The brackets indicate the robust heteroscedasticity t-values adjusted for the enterprise cluster; ***, **, * represented at significance levels of 1%, 5%, and 10%, respectively.

5.2. Analysis of Heterogeneity in Enterprise Scale

The impact of the development of InsurTech on the technological innovation ability of insurance companies varies in terms of enterprise size. According to the “Financial Industry Enterprising Standard Regulations”, insurance companies are divided into small and micro enterprises (with total assets less than 40 billion) and large and medium-sized enterprises (with total assets more than 40 billion) based on their total asset size. Then, with the technological innovation ability of insurance companies as the dependent variable, the sample data of insurance companies are grouped and regressed. As shown in columns (3) and (4) of Table 6, the regression coefficient of InsurTech development on enterprise technological innovation is 0.322, and it is significantly positive at the 1% level. It is said that InsurTech has a more significant impact on the technological innovation of small and micro insurance enterprises.

6. Discussion

6.1. Discussion of Results

This paper uses the panel data of Chinese insurance companies to empirically test the relationship and mechanism between InsurTech and insurance companies’ technological innovation level by using the fixed effect model and the mesomeric effect model. The research results indicate that InsurTech empowers the insurance industry in areas such as product development, marketing, risk control, underwriting and claims verification, and fund utilization [20, 21]. InsurTech has improved the technological innovation level of insurance companies. From the perspective of mechanism, information asymmetry [59], high risk of technological innovation projects, and moral hazard are the main obstacles preventing insurance companies from obtaining R&D funds from financial institutions.
As mentioned earlier, InsurTech can help alleviate the problem of information asymmetry between fund borrowers and lenders [29]. At the same time, it cannot only provide diversified financing channels for innovative insurance companies, alleviate financing constraints, and increase R&D investment intensity, but also promote technological innovation in insurance companies. Therefore, if InsurTech promotes technological innovation in insurance companies due to its credit catalytic effect, the “incentive effect” of InsurTech will be more significant in insurance companies with severe financing constraints. Through heterogeneity analysis, we also found that there are significant differences in the promotion effect of insurance enterprise development on the technological innovation of enterprises of different sizes and properties. At the same level of development, InsurTech has a greater and more significant “incentive effect” on the technological innovation level of non-state-owned enterprises and small and micro insurance enterprises.

6.2. Limitations and Future Research Directions

From the limitations of this article, the development of InsurTech is still in its early stages. With the development of highly emerging technologies such as 5G and artificial intelligence, increasing amounts of technologies have been rapidly applied and developed in practical exploration, but related academic research requires a longer time to test. On the one hand, during the research process, it was found that there are objective situations in the field of InsurTech where practice precedes theory, so this article has certain limitations in the systematic nature of theory. On the other hand, the technology sector of insurance companies and the business models of InsurTech startups are complex and distributed around the world. The lack of public data and the difficulty of obtaining it have led to a relative shortage of data resources, which has had a certain impact on the comprehensiveness of this study.

From the perspective of future research directions in this article, there is still great room for expansion in the research on the relationship between InsurTech and the level of technological innovation of insurance companies. Firstly, it is possible to collect the latest data from various advanced InsurTech enterprises. By selecting operational management indicators that are in line with the actual situation of InsurTech, this study investigates the specific factors that directly affect innovation in InsurTech enterprises, and provides relevant recommendations that are more practical. Secondly, by comparing the impact of China’s InsurTech on technological innovation in insurance companies with foreign insurance companies, the most effective investment direction and business management model can be inferred, providing a reference for the sustainability of technological innovation development in Chinese insurance enterprises. Thirdly, by expanding research on product innovation in insurance companies and with the deep integration of InsurTech and insurance companies, InsurTech can promote product innovation in insurance companies. Insurance products that are customer-oriented can help insurance companies achieve sustainable innovation.

6.3. Research Significance

With the orderly and continuous promotion of insurance industry reform, InsurTech, as an emerging model, has emerged and rapidly developed under a policy background as a “Financial support innovation system, serving the real economy, and sustainable insurance”. It is urgent to explore the impact of InsurTech on the insurance industry, especially on the technological innovation of insurance companies. The conclusions of this study not only help the relevant decision-making departments of the government to better improve the scientific and technological innovation system and mechanism, improve the efficiency of insurance services, and formulate more efficient regulatory programs at the initial stage of the “14th Five Year Plan”, but also help make good use of InsurTech as a tool for insurance companies to achieve digital transformation, integrate various resources to promote the sustainability of the growth and development of insurance companies, and unblock the “double cycle” at home and abroad. Further achieving the long-term goal of socialist modernization by 2035 has practical guiding significance and policy reference value.
In terms of theoretical research, this article differs from the previous literature that examines the impact of traditional insurance models on technological innovation. This article explores the role of technological development in the innovation of insurance companies, starting from the new financial model of InsurTech. Empirical research not only verifies the possible pathways through which InsurTech affects innovation in insurance companies, but also tests for the first time the role of InsurTech development in technological innovation in insurance companies. This provides an important supplement to the literature on innovation in insurance companies.

7. Conclusions and Suggestions

This paper uses the panel data of 77 insurance companies from 2011 to 2020, selects the insurance business sub-items in the digital inclusive financial index compiled by the Financial Research Center of Peking University as the proxy variables of InsurTech, and uses the fixed effect model and the mesomeric effect model to study the impact and mechanism of InsurTech on the level of enterprise technological innovation. The research results indicate that the development of InsurTech has a significant impact on improving the technological innovation level of insurance companies, mainly manifested as InsurTech’s ability to improve the technological innovation level of insurance companies by alleviating financing constraints and promoting industrial structure optimization and upgrading. Further research has found that under the same level of development of InsurTech, InsurTech has a greater and more significant “incentive effect” on the technological innovation level of non-state-owned enterprises and small and micro insurance enterprises.

Based on the above empirical research conclusions, the following policy recommendations are proposed: (1) It is necessary to accelerate the layout of InsurTech as a new financial service model in China and accelerate the digital reform of traditional insurance enterprises through the application of InsurTech to improve the application capabilities of existing InsurTech new technology scenarios and achieve a sustainable insurance strategy. At the same time, we need to improve the construction of InsurTech infrastructure, optimize the financing environment for insurance enterprises, and provide financial support to promote technological innovation in insurance enterprises. (2) Insurance companies should deepen the implementation of the “Insurance + Technology” strategy and increase investment in IT infrastructure construction research and development from product design, webpage design, backend services, and other aspects. Focusing on the development and improvement of core technologies in the industry, the company has more intelligent and digital patents, while registering its own trademarks in important links of the insurance industry chain, thereby continuously enhancing brand influence. This can be achieved by optimizing the intelligent underwriting, claims settlement, customer service, and risk control system management software specifically designed for insurance companies, and continuously improving the company’s operational and management efficiency. (3) Small and micro insurance companies should actively use InsurTech to solve financing constraints while improving the success rate of product innovation through the development of InsurTech. For example, strengthening communication with banks, regularly submitting financial statements and innovative achievements information to banks, improving corporate credit ratings, eliminating the asymmetry of financing information between banks and enterprises, and actively expanding endogenous and exogenous capital. In addition, the government should also strengthen the promotion and guidance of InsurTech policies, such as improving the construction of InsurTech infrastructure, optimizing the financing environment of insurance enterprises, and providing financial support to promote product innovation of insurance enterprises. In short, insurance companies should make good use of InsurTech as a tool to achieve technological takeoff, transformation, and breakthrough, and integrate various resources to promote the sustainability of insurance company growth and development.
Author Contributions: Data curation and draft, J.L. and S.Y.; methodology, review, and editing, Y.Z. and L.Z. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

Conflicts of Interest: The authors declare no conflict of interest.

References

Disclaimer/Publisher’s Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.