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Research paper

Do GDP growth and insurance penetration affect Insurtech funding in the Indian scenario?

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Abstract

The global trend in insurtech funding hit a low around 2020 as it took 2 years, i.e., 2022, to return to the same level, while if we focus on the Indian context, the insurtech investment doubled during this period. This indicates a positive investment environment in this industry, which opens a compelling research area and knowledge gap regarding the factors that contribute to strengthening insurtech funding in India, whereas the global trend shows fluctuating growth. This paper looks forward to the key factors like regulatory changes, revenue growth, profit margins, etc., and how much they are responsible for that change. Further analysis in this study evaluates the funding trend in insurtech companies and compares it with global trends, where we can find a point of inflection with justification. It also focuses on the impact of macroeconomic variables like GDP growth and insurance penetration on the funding of the insurance industry. This study could potentially identify the specific elements influencing insurtech funding in India while offering a better understanding of the investment environment. It might also shed light on the sector's potential for future growth and identify areas for more innovation and investment.

Keywords: *Insurance, Insurtech funding, Insurance Penetration, GDP Growth, Insurtech.*

1. Introduction

In an era of paradigm-defining technological advances and increased customer expectations, all business fields have followed the flow of technological adaptation in their operations, and the financial sector, where forecasting and prediction play such an important role in shaping an organization's operational efficiency, is no exception. The insurance industry followed suit, coining the name "Insurtech," which is a combination of the terms "insurance" and "technology." According to Crunchbase, Tracxn, and BCG FinTech Control Tower studies, global equity financing in insurtech totaled $14 billion, with Indian insurtech accounting for $800 million and general insurers receiving 92% of the capital.

According to IRDAI data, BCG analysis, LI, and GI council figures, total life insurance premiums in India increased from 56000 Cr. in FY03 to 287000Cr. in FY13 to 781000Cr. in FY23, or 14 times. Non-life insurance GWP increased from 14000Cr. to 63000Cr. to 267000Cr. throughout the period, representing a 19-fold increase. This demonstrates a favorable increase in insurance in the country, as well as a greater acceptance of risk and risk management strategies. Increased insurance premiums are frequently associated with stronger economic circumstances, as higher premiums usually imply increased demand for insurance goods, which represents rising economic activity (Dawd, I., & Benlagha, N., 2023). Insurance revenues also aid in economic recovery after bad events by giving financial assistance to individuals and companies, reducing the impact of economic shocks on GDP (Fadun, O. S. 2023). According to research undertaken in numerous markets, as economies grow, so does the insurance business, owing to increasing demand for risk management products (Hossain, M., Jahan, A., & Rahman, A. K. M., 2024). Furthermore, good economic indicators boost investment in the insurance business, which accelerates its expansion (Obiamaka, O., N. A. Mom, and K. Mayin. 2022).

This study will look at the relationship between GDP growth and the rise of financing in insurtech, if there is a link between the two in the Indian setting, and whether GDP growth has an influence on insurance industry funding. Some studies have found that while insurance development is advantageous to economic growth, excessive rises in insurance premiums may eventually lead to diminishing returns, negatively impacting economic performance (Dawd, I., & Benlagha, N., 2023). However, the sector's adaptation to new-era technology and capacity to satisfy client expectations calls into doubt the statement's ultimate validity. As markets change and new issues arise, insurers frequently offer novel solutions adapted to increasing risks, resulting in sustained growth and relevance.

The use of technical breakthroughs in the traditional insurance business is known as Insurtech, a new term coined from the combination of insurance and technology. Initially, this phrase denoted a basic data analysis technique; however, disruptive technologies have transformed its meaning and expanded its uses (Cao, L. 2020). Currently, the Insurtech phenomenon is defined as the use of technology by traditional and alternative market players to provide data-driven and customer-oriented approaches, improve insurance product marketing and distribution, optimize underwriting and risk management, and innovate traditional insurance enterprise models (Xu, X., & Zweifel, P., 2020).

Information technology lowers cost, increases efficiency, and gives clients personalized, value-added, convenient, and user-friendly services (Palmié, M., Wincent, J., Parida, V., & Caglar, U., 2020).

Today, Insurtech seeks to use artificial intelligence (AI), big data, blockchain, and the Internet of Things (IoT) to improve the insurance ecosystem and address industry risks (Xu, X., & Zweifel, P. 2020), (Palmié, M., Wincent, J., Parida, V., & Caglar, U., 2020). This is achieved by changing the way insurance products are created while enhancing efficiency and savings (Cao, L., 2020; Cortis, K., & Davis, B., 2021). Insurtech also uses data analytics, sensors, wearables, and mobile phone data to deliver specialized, tailored, and personalized responses to life-threatening situations (Yan, Y., Mao, Y., & Li, B., 2018). Wearable devices (such as the Apple Watch) allow health insurers and life insurance companies to collect a wide range of biometric data on physical activity, cardiovascular parameters, and sleep quality, allowing them to better understand the insured's true risks. In the case of automotive insurance, telematics allows for the real-time transfer of massive amounts of data, allowing the insurer to anticipate the likelihood of claims more precisely while avoiding approximations that cause low-risk individuals to leave the insured pool. This occurs via technical equipment that transmits real-time data on driving style, distance, speed, and so on (Barbara, L. et.al. 2018). Furthermore, contemporary technology enables insurers to provide pay-as-you-drive or pay-how-you-drive vehicle insurance, as well as dynamic underwriting, which replaces yearly or one-time premium payments with continuous adaptive pricing systems (Cortis, K., & Davis, B., 2021; Battisti, E et.al., 2022).

Technology plays an important part in insurance penetration across the country since it makes it simpler to share knowledge and awareness, and the circle shrinks with the effective use of technology. IoT or telematic devices collect data on numerous personal characteristics, making it easier for insurers to create personalized plans. This can make coverage more appealing and inexpensive to customers, especially those who may pay more under standard risk assessments (Ahmad, S., & Saxena, C., 2022).

The economic growth of a country (measured by Gross Domestic Product, or GDP) and the development of the insurance sector are positively associated (Han L et. al.2010). Insurance penetration is used to develop sector-specific metrics. Insurance penetration varies throughout time. As a result, it is predicted that the form of volatility would vary in response to various factors (Das, S., & Shome, M. K., 2016). Insurance penetration may be described as the ratio of a country's overall insurance consumption to its Gross Domestic Product, which is determined by insurance demand. (Das, S., & Shome, M. K., 2016). Various studies suggested that the demand for insurance is influenced by various variables. Brown and Kim (1993) did a study on per capita life insurance consumption in 45 countries between 1980 and 1987 and discovered that income and social security expenditures have a beneficial influence on insurance consumption. This study focuses on reviewing the insurance sector in India and how GDP growth and Insurance penetration impact the technology equity funding in the insurance industry.

2. Literature Survey

The Indian insurance market has grown dramatically during the last two decades, thanks to growing private sector participation and improved distribution networks (Das, S., & Shome, M. K., 2016). Private enterprises were authorized to enter industry in 2000, with an initial FDI ceiling of 26%, which eventually rose to 49% (Das, S., & Shome, M. K. 2016). The sector is predicted to be the world's sixth largest in the future decade (Ali, N. P. 2024).

There has been much research into the relationship amongst financial sector development and economic growth (Ductor, L., & Grechyna, D. (2015), Gokmenoglu, K. K et. al. (2016), Hsueh, S. J. et. al (2013), Komal, R., & Abbas, F. (2015), Menyah, K, et al (2014), Pradhan, R. P. et al, (2014), Samargandi, N et al. (2015), Seven, Ü., & Yetkiner, H. (2016), Simion, D (2015), Uddin, G. et al. (2013), Zhang, J., et. al (2012), Zhuang, J. et al.2009). In this regard, the insurance industry has not received special attention. However, several recent studies (Akinlo, T., & Apanisile, O. T. (2014), Ndalu, C. (2016), Olayungbo, D. O., & Akinlo, A. E. (2016), Richterková, Z., & Korába, P. (2013), Yinusa, O., & Akinlo, T. (2013), Cristea, M., et. al. 2014) attempt to analyse the relationship between insurance and economic growth. Since 1964, the relevance of insurance for economic performance has been acknowledged at UNCTAD conferences (Brainard, L. 2008). The study of the European Committee in the field of insurance and previous scientific studies pointed out that the insurance industry promotes economic growth through the following channels: (i) offering protection to firms and relieving pressure to cover large losses; (ii) facilitating commercial transactions and the provision of credit by mitigating losses; (iii) promoting entrepreneurial attitude, encouraging innovations, investment, the vitality of the market and

Despite these advances, insurance coverage in India is still very low. In FY23, insurance penetration was 4% of GDP, with life insurance accounting for 3% and non-life insurance for 1% (Jaba Phutkaradze, 2014; Richterková, Z., & Korába, P., 2013). This represents a significant unmet development opportunity, notably in health insurance and protection goods (Ali, N. P. 2024).

Health insurance dominates the non-life insurance industry, with car, fire, and marine insurance following after (Dawd, I, & Benlagha, N., 2023). The expansion of related industries such as cars and healthcare is fueling demand for non-life insurance products (Das, S., & Shome, M. K., 2016).

Insurtech is becoming increasingly important in altering the insurance market in India (Ali, N. P., 2024). The use of technology such as data analytics, AI, and machine learning is resulting in simpler and faster claims processing, increased fraud detection, personalized goods, and cost savings (Ali, N. P., 2024).

The Indian insurance industry encounters a number of issues, including low penetration rates, a perception of insurance payments as losses rather than assets, and a need for more knowledge and education regarding insurance products (Ali, N. P., 2024).

The available sources give little information on the direct association between GDP growth and Insurtech financing in India (Ali, N. P., 2024). However, some insights may be gained from larger trends. According to reports, worldwide Insurtech financing slowed in 2022 compared to 2021 (India Insurtech Association, 2023). Despite this, India's portion remained rather consistent, with funding in 2022 being twice that of 2020 (India Insurtech Association, 2023). This implies that India's insurtech sector remains appealing to investors even during times of global funding downturn. One contributing element might be India's strong GDP growth, which creates a favorable macroeconomic climate for investment in growing industries such as Insurtech. More study is needed beyond these sources to determine the influence of GDP growth on insurtech financing in India.

Several studies look at how insurance market activity affects economic growth, as measured by insurance penetration (total gross written premiums relative to GDP). While some studies reveal a positive and substantial connection between insurance penetration and economic development, particularly in industrialized countries (Jaba Phutkaradze, 2014), others provide negative or negligible results, particularly in post-transition economies (Jaba Phutkaradze, 2014).

The impact of various forms of insurance (life vs. non-life) on economic development differs between studies (Richterková, Z., & Korába, P., 2013). Some research implies that life insurance has a favorable influence on growth in rich nations but not in developing countries (Arena, M., 2008), whilst others find minimal or even negative effects on growth (Arena, M., 2008). Non-life insurance generally has a

favorable impact on growth in both developed and developing countries (Arena, M., 2008). According to some studies, the banking and insurance industries work well together to promote economic growth (Jaba Phutkaradze, 2014). Researchers include a variety of control variables in their analysis, including GDP per capita, private credit, government expenditure, exports, and investment (Dada, D. An et. al, 2023).

Long-standing traditional policies have defined India's insurance and technology regulatory structure, which frequently lags the rate of technological innovation exhibited by InsurTech. By establishing regulatory sandboxes, promoting digital experimentation, and indicating adaptability to Insurtech-specific business models, the Insurance Regulatory and Development Authority of India (IRDAI) has taken significant steps to adapt to the shifting landscape (Lin & Chen, 2019).

According to recent studies, insurtech in India is quickly changing the insurance market with technologies like blockchain for safe transactions, AI-driven risk analysis, automated claims processing, and digital onboarding. Especially in the health and auto insurance sectors, these technologies have increased client involvement, increased operational efficiency, and extended insurance coverage to disadvantaged communities (Sumathy & M, 2024), (Garg & Sharma, 2025), (P. K., 2025). According to studies, the use of IoT, telematics, and smart contracts is allowing insurers to provide more affordable and customized policies, which is stimulating industry expansion and drawing in investors (P. K., 2025; Uryavanshi, 2022).

According to research conducted in India, variables such as perceived utility, convenience of use, customer awareness, trust, quality of digi-tal service, and promotional incentives—all of which are boosted by growing internet infrastructure and digital literacy—are what drive the adoption of insurtech (Shah, Laghate, & Chelawat, 2024), f). Therefore, consumer adoption of digital insurance solutions is heavily influ-enced by behavioral, technological, and individual factors; to spur sector growth, businesses and governments must spend on raising awareness and fostering trust (Shah, Laghate, & Chelawat, 2024), (Amnas, Raja, & Velmurugan, 2025).

Due to the industry's innovation trajectory and sizable unexplored market, venture capitalists, private equity, and institutional investors have become more interested in Indian InsurTech businesses in recent years (K. P. & Pathak, 2020; Suryavanshi, 2022). New investment mechanisms, such as revenue-based financing, microfinance, corporate venture arms, and iSAFE notes, have emerged to complement traditional equity and debt capital in India's more developed startup funding landscape (Jain, 2020). Government-backed programs like the Fund of Funds for Startups (FFS) scheme and the Startup India Seed Fund Scheme also provide targeted support, which together foster an environment that is conducive to the growth of insurance companies that are driven by innovation (Jain, 2020). Business viability, technological superiority, founders' experience, and flexibility in response to market and regulatory changes are important factors in determining Insur-Tech investment (Amnas, Raja, & Velmurugan, 2025). Crucially, equity funding and angel investors continue to be essential at the seed and early phases (Ghosh, 2020).

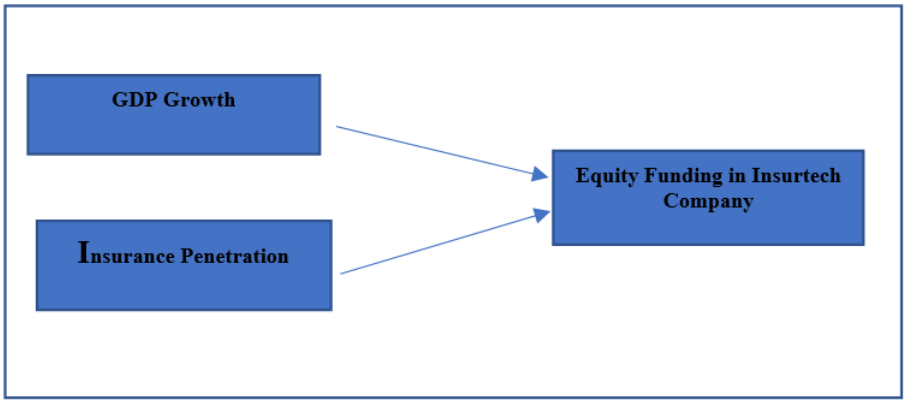

Fig. 1: Shows the framework of the model

3. Research Methodology

This study tries to understand the relationship between three variables, namely, GDP growth, Insurance Penetration, and Equity Funding in Insurtech companies, where Equity funding is the dependent variable (VAR0003), while GDP and Insurance penetration are Independent Variables (VAR0001 and VAR0002). After understanding the normality of the data, the multi-collinearity has been checked before putting it into regression analysis, The statistical diagnostics are given below

The collinearity statistics in Table 5 indicate that there is no evidence of multicollinearity between the two independent variables. This suggests that the assumption of no multicollinearity is satisfied, allowing the research to proceed with the regression diagnostics.

Null Hypothesis (H0):

i H0: $\beta 1 = 0$; Insurance Penetration has no significant impact on Equity Funding in Insurtech companies.

ii. H0: $\beta 2 = 0$; GDP growth rate has no significant impact on the Equity Funding in Insurtech companies.

This study uses SPSS software to do all the statistical calculations.

A descriptive statistical analysis was performed to get a fundamental understanding of the data, then a correlation analysis was performed with the Pearson correlation function to examine the linear relationships among the variables and understand how the change in one variable affects the other variable. It is one of the significant aspects to further analyze the data with regression analysis.

In order to calculate the statistical significance a one-tailed test is carried out to understand the p-value related to the correlation coefficient and whether or not the observed correlation is statistically significant.

Regression analysis is performed to understand the relationship between the 2 independent variables and the dependent variable. The following is the linear equation formed,

$$x = a + by_1 + by_2 \quad (1)$$

Where,

x is Equity Funding in insurtech (Dependent Variable)

y_1 is the GDP growth (Independent Variable)

y_2 is the Insurance Penetration (Independent Variable)

R (Correlation Coefficient) indicates the correlation strength between the predicted values and observations. While the R sq. measures the proportion of variance in the dependent variable and independent variable to understand the explanatory power of the model. While adjusted R-squared will provide a more accurate assessment of how the model will fit in with a no. of predictors. While the standard error will quantify the accuracy and the reliability of the model.

4. Research findings

Table 1, shows the GDP at current prices from the year 2019-2024 and insurtech funding a million dollars in a percentage analysis is done with the help of MS. Excel to get all the 3 variables, i.e., GDP growth (%), Insurance Penetration, and Equity funding(growth in%) in a similar set which will help us to do the further analysis.

The information provided was gathered from reliable sources, including the RBI Handbook, the IRDAI Handbook, and the India Brand Equity Foundation's (IBEF) blog post on digitalizing insurance in India. Data on GDP at current prices (in crore rupees), insurance funding (in million USD), insurance penetration as a proportion of GDP, GDP growth rate, and insurtech funding growth rate are all included for the 2019–2023 period. The RBI and IRDAI publications, which monitor macroeconomic indicators, are the source of GDP data and growth rates. The degree of adoption about the size of the economy is shown by insurance penetration, which is calculated as the ratio of total insurance premiums to GDP. Sourced from IBEF and industry databases, insurtech financing data and growth rates show the amount and pattern of investments in technology-driven insurance firms. While the GDP growth rate is the annual change in national output, the financing growth rate indicates the percentage change in funding from year to year. When combined, these metrics aid in evaluating how India's economic expansion and the development of insurtech interact.

Table 1: Table showing the variables.

Years	Gross Domestic Product (At current price) (in Crore)	Insurtech Funding (In million $)	Insurance Penetration (%) (At Current Price)	GDP Growth Rate (%)	Funding Growth Rate (%)
2019-20	17090042	340	3.70%	10.57%	-14.71%
2020-21	18899668	290	3.80%	6.37%	31.03%
2021-22	20103593	380	4.20%	-1.24%	123.68%
2022-23	19854096	850	4.20%	19.00%	-35.29%
2023-24	23597399	550	4%	14.20%	-85.45%

Source: IRDAI handbook, RBI handbook, & https://www.ibef.org/blogs/digitalizing-insurance-in-india

Table 2 presents various descriptive statistics, with Equity Funding in Insurtech having a mean of 3.85 and a standard deviation of 78.976. The relatively high standard deviation suggests a wide range of values in the Equity Funding data. This could indicate significant disparities in funding across different geographies or periods. Further, the presence of outliers or data points that deviate considerably from the rest of the dataset may be contributing to the increased standard deviation.

Table 2: Table showing Descriptive Statistics.

Descriptive Statistics			
	Mean	Std. Deviation	N
Equity Funding	3.85	78.976	5
Insurance Penetration	3.98	0.228	5
GDP Growth	9.78	7.717	5

For Insurance Penetration, the average growth rate is 3.98%, with a standard deviation of 0.228. This low standard deviation indicates that the insurance penetration rate has remained relatively stable over the past five years.

In contrast, the GDP growth rate is averaging 9.78% annually, but with a higher standard deviation of 7.717. This suggests that the GDP growth rate has shown significant variability, indicating inconsistency across different periods or regions.

Table 3: Showing Correlations

Correlations				
		EQF	IP	GGr
Pearson Correlation	EQF	1.000	0.226	-0.896
	IP	0.226	1.000	0.012
	GGr	-0.896	0.012	1.000
Sig. (1-tailed)	EQF		0.357	0.020
	IP	0.357		0.492
	GGr	0.020	0.492	
N	EQF	5	5	5
	IP	5	5	5
	GGr	5	5	5

As is seen in Table 3, the correlation coefficient between equity funding and the GDP growth rate is -0.896, which suggests a strong inverse relationship between the two variables. As the GDP growth rate increases, equity funding will start to decline, and vice versa. This might arise due to industry trends or government policy implementation. While the 1-tailed test shows a statistically significant negative correlation (p-value 0.02)

Figure 2 shows the pictorial representation of the correlation among the three variables. There is a positive correlation between Insurance Penetration and Equity funding, although it is weak (0.226), which shows a with the increase in Insurance penetration, equity funding will increase slightly. The one-tailed test shows a statistically insignificant relationship with a p-value of 0.357, which is higher than the standard p-value (0.05).

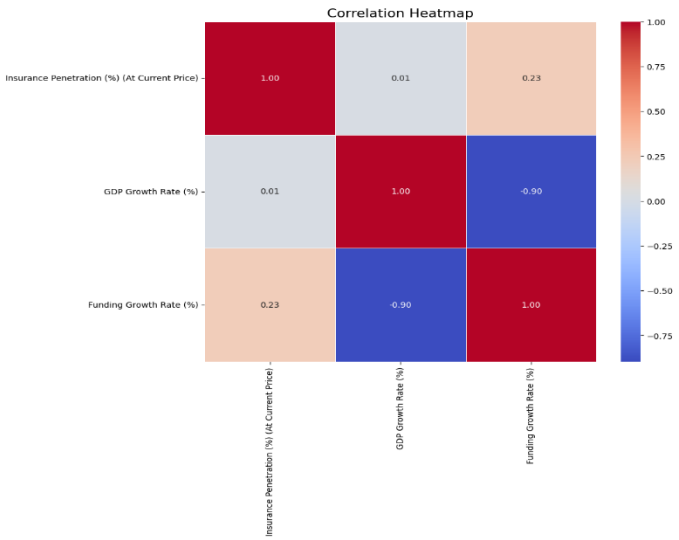

Fig. 2: represents the correlation heat map among the variables

The independent variables, Insurance penetration and GDP growth rate, have negligible correlation among themselves i.e., (0.012) with a p-value of 0.492. This indicates that the relationship between the two variables is statistically insignificant, suggesting that there is little or no meaningful correlation between them.
The results of this analysis support proceeding with the regression analysis between the dependent and independent variables.

Table 4: Showing the model summary

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.926[a]	0.858	0.716	42.070

a. Predictors: (Constant), GGr, IP

From Table 4, we can infer that the model shows a strong and positive correlation coefficient of 0.926, indicating strong linear relationships among the dependent and independent variables. In addition to demonstrating how well a statistical model explains the data, adjusted R-squared also accounts for the number of variables used. It provides a more accurate perspective on the model's true quality since, unlike standard R-squared, it penalizes the model for including unnecessary variables.
R sq. =0.858, suggesting that 85.8% of the variation in the Equity Funding is explained by the GDP Growth rate and Insurance Penetration Adjusted Rsq. = 0.716, suggests that after adjusting the predictors, the model still explains 71.6% of the dependent variable by its independent variables. Although it is less than the R-squared, it also suggests that not all the predictors are significantly affecting the model's explanatory power.
Standard error of the estimate, i.e., 42.070, suggests that the predicted model is likely to deviate from the accuracy 42.070% of the time, which shows a high level of inaccuracy in this model.
This is a typical scenario in the regression analysis where a high R^2 and modified R^2 suggest that the model effectively explains the connection between variables. However, the standard error offers a realistic assessment of how well the model predicts individual events. This amount of inaccuracy may indicate that there are more underlying variables influencing the dependent variable that are not captured by the model (omitted variable bias) or that the relationship is not exactly linear for all data points.

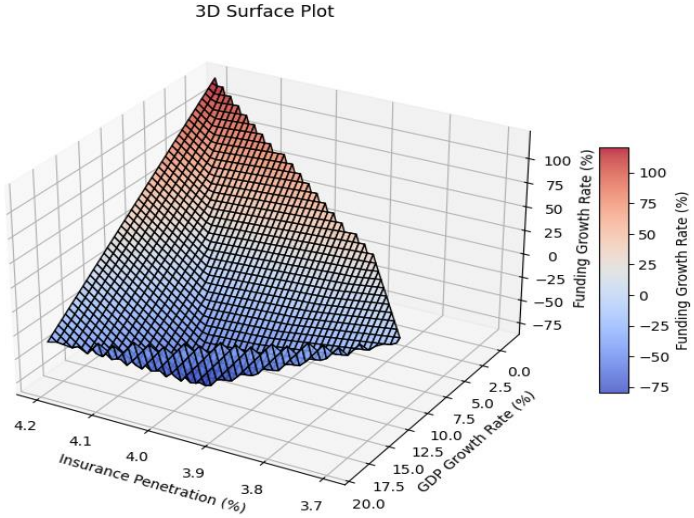

Fig. 3: 3D surface plot shows the inter-relationship among the variables

Figure 3 shows the 3D surface plot, which is generated using Python Matplotlib Lib, which demonstrates the interrelationship among the 3 variables. The X-axis (horizontal) shows insurance penetration (%), which ranges from 3.7% to 4.2 %. The Y-axis (horizontal, to the right) represents a GDP growth rate (%), which ranges from 0.0% to 20.0%. The z-axis (vertical) represents the funding growth rate (%),

which ranges from -75% to 100%. The surface plot is defined using a gradient from dark blue to dark red, where dark blue indicates the lower funding growth rate (-75%) and dark red indicates the higher funding growth rates (100%).
The most striking feature of the plot is the overall upward slope, starting from the bottom left (low insurance penetration, low GDP growth) to the top right (high insurance penetration, high GDP growth). This trend supports the previous observation of a positive association, suggesting that increases in Insurance Penetration, GDP Growth, or both are linked to higher Funding Growth Rates.
However, the range of values for Insurance Penetration and GDP Growth Rate appears somewhat limited. A broader range might reveal more complex interactions between the variables. While the plot indicates a correlation, it does not establish causation, and other external factors could be influencing these relationships.

Table 5: Showing the coefficients

Coefficientsa											
		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
Model		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	-232.506	368.291		-0.631	0.592					
	IP	81.979	92.252	0.237	0.889	0.468	0.226	0.532	0.237	1	1
	GGr	-9.194	2.726	-0.898	-3.373	0.078	-0.896	-0.922	-0.898	1	1
a. Dependent Variable: EQF											

Table 5 calculates the variance inflation factor (VIF) to assess the influence of collinearity among variables in a regression model. It always exceeds or equals one. There is no defined VIF value for detecting the existence of multicollinearity; nonetheless, values more than 10 are frequently interpreted as indicating high multicollinearity, and values more than 5 denote moderate or low multicollinearity. In our study, we got 1, which shows that multicollinearity among variables does not exist.
The B coefficient is mentioned in Table 5. represents the change in the dependent variable (Equity funding) for a unit change in the independent variables (GDP Growth, Insurance Penetration). When both IP and GGr are zero, the predicted value of the EQF is -232.50.
While a unit increase in insurance penetration would lead to an increase of Equity funding by 81.979 units, and 1 unit increase in the GDP growth will lead to an increase in equity fund growth of -9.194, i.e., one unit growth of the GGr will reduce the growth of the equity funding by 9.194 units.
β represents the relative importance of independent variables for predicting the dependent variable, where the standardised value of Insurance Penetration is 0.237, which indicates that IP has a positive but moderate impact on Equity funding compared to other variables, while the GDP growth rate is -0.898 which means it has an evident negative impact on the equity funding relative to other variables.
t-statistic suggests that for insurance penetration and Equity funding, there is a weaker relationship, while the p-value is more than 0.05, which suggests its insignificance, and we fail to reject the null hypothesis (H0: $\beta 1 = 0$; Insurance Penetration has no significant impact on Equity Funding in Insurtech company.)
For the case of GDP growth t-statistic is high but negative (-3.373) which suggests a strong negative relationship between GDP growth and Equity Funding, and the p-value is 0.078 which means we fail to reject the null hypothesis (H0: $\beta 2 = 0$; GDP growth rate has no significant impact on the Equity Funding in Insurtech company)
Zero-order correlation shows the simple correlation between each independent variable and the dependent variable, while the partial correlation shows a correlation between both the independent and dependent variables, and the partial correlation shows a moderate impact.
Institutional quality, regulatory coherence, and financial market infrastructure are all identified as accelerators of the relationship between GDP growth and insurance market development.((Giné, Ribeiro, & Wrede, 2019), (Fernando et al., 2023))Strong institutions enhance the reach and reliability of insurance products, enforce contracts, and boost public confidence—a set of conditions that usually progress in tandem with, rather than preceding, overall economic growth (Fernando et al., 2023), Etudaiye-Muhtar & Agboola, 2021).
Countries that have prioritized legal reforms and created competitive financial ecosystems during periods of economic expansion have consistently seen faster insurance sector modernization and greater penetration, reinforcing the idea that GDP-driven development is foundational to sustained insurance market growth (Giné, Ribeiro, & Wrede, 2019; Ndalu, 2011).

5. Conclusion

This research concludes that the model used is good enough to explain the dependent variable most of the time, but the predicting capabilities of this model are questionable as this will show a standard error of 42% which says one of the predictors used in adjusting Rsq. is not good enough and the researcher's assumption from the given data analysis is that variable is Insurance Penetration as β is 0.238. Therefore, increasing or reducing insurance penetration is unlikely to significantly affect the dependent variable. If the model is utilised for forecasting or decision-making, this weak predictor may not give relevant information to stakeholders. There is a strong likelihood that larger sample sizes will lead to more efficient activities.
The model's greater association with the GDP Growth Rate implies that economic growth is a better predictor of the dependent variable. This indicates that economic circumstances and their influence on the market or system under consideration are more important for making predictions or informed judgments. For organizations or governments looking to improve outcomes, promoting economic growth may be a more successful strategy than focusing on insurance penetration. Understanding how GDP growth affects the market may help estimate future trends and determine investment plans in industries such as insurance and finance.
There were quite a few limitations of this study, which included a small sample size, as the funding in insurtech is not a very old phenomenon; researchers could only collect data from 2018, and even though there was quartile data available, using that would lead to a lack of data for insurance penetration. There is a good chance that with a bigger sample size, not only would the significance increase, but also the standard error would decrease.
There are a lot of future scopes of this study, including but not limited to using gross premium and underwriting profit/loss data as an independent variable in the similar model, there are various studies as well which have been carried out with these variables in insurance research but very few could be found in insurtech.
The findings imply that governments or corporations that use this approach to drive decision-making may need to adjust their focus. If the model is used to educate policy on topics such as insurance sector expansion, the low predictive power of insurance penetration may signal

the need for wider, more inclusive approaches to solving the concerns. Similarly, a concentration on GDP growth may result in economic policies that prioritize general economic health above industry-specific initiatives.

The relationship between GDP growth and the development of the insurance market is found to be accelerated by institutional quality, regulatory consistency, and financial market infrastructure (Giné, Ribeiro, & Wrede, 2019), (Kurukulasuriya et al., 2023). Strong institutions increase public confidence, enforce contracts, and expand the availability and dependability of insurance products—all of which often follow rather than precede general economic expansion (Kurukulasuriya et al., 2023), (Etudaiye-Muhtar & Agboola, 2021).

The idea that GDP-driven development is the cornerstone of sustained insurance market growth has been reinforced by the consistent faster modernization and greater penetration of the insurance sector in nations that prioritized legal reforms and established competitive financial ecosystems during periods of economic expansion (Giné, Ribeiro, & Wrede, 2019) (Ndalu, 2011).

Future research should incorporate a variety of tangible factors that span technological adoption, regulatory quality, financial and demographic fundamentals, product and market innovation, and firm-level conditions to make research directions more actionable (Ostonokulov Azamat et al., Gengnan Chiang et al., Eglantina Zyka et al.).Findings are guaranteed to be both analytically sound and directly applicable to industry and policy practice through the use of both quantitative (such as indices, rates, and costs) and qualitative (such as awareness/trust surveys) factors. Researchers can increase the effect and usefulness of their work for sectoral and national advancement by using a multifaceted approach to help unlock the synergies between insurance development, digital transformation, regulatory frameworks, and economic growth. (Fahad Zeya et al, Alice Kavubu, et al.).

In conclusion, economic theory, past policy trends, and a variety of empirical studies all support the idea that GDP growth has a greater and more direct impact on insurance penetration than the opposite (Bhatia & Jain, 2018), (Chopra & Saldi, 2016), (Bednarczyk, 2014), (Devarakonda & Chittineni, 2019). This dominance stems from GDP's fundamental function as the engine that produces resources, facilitates institutional advancement, and establishes the ideal environment for the growth of insurance markets (Giné et al., 2019; Ndalu, 2011). Although it is essential for maintaining and stabilizing economic systems, insurance penetration works best when it builds upon the significant advancements made by general economic development, which is fueled by strong GDP growth. (Devarakonda, 2016), (Bhatia & Jain, 2018), (Laskowska, 2022), (Zouhaier, 2014).

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Data availability

The datasets used during the current study are available from the corresponding author on reasonable request.

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