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Impact of Digital Engagement Frequency on Insurance Customer Satisfaction and Policy Renewal: A Logistic Regression and CART Approach

Lassad Ben Dhiab[1], Bilal Louail[1], Mohamed Anis Allouche[1], Ahmed Abdennouz[2]

[1] Department of Finance and Insurance, College of Business Administration, Northern Border University, Arar,Saudi Arabia

[2] Department of languages and Translation, College of Humanities and Social sciences, Northern Border University, Arar, Saudi Arabia

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A B S T R A C T

Introduction: The insurance sector is experiencing a major shift as a result of customers' changing expectations and the fast adoption of digital technology. Understanding the elements that impact client happiness and retention is crucial for insurers looking to stay profitable and promote long- term growth, especially with the sector's intense competition.

Objectives: This study examines how digital engagement frequency affects customer satisfaction and policy renewal in the insurance industry

Methods: Using logistic regression and Classification and Regression Trees (CART), we analyze the relationship between digital platform use, overall product satisfaction, and renewal behavior.

Results: Results show that frequent digital engagement significantly boosts renewal likelihood, especially for customers with less than three years of policyholder experience. Product satisfaction also plays a crucial role, with higher satisfaction leading to greater renewal rates.

Conclusions: These findings offer practical insights for insurers aiming to enhance retention through digital engagement and satisfaction. The study highlights the importance of long-term customer relationships in driving renewal decisions.

INTRODUCTION

The insurance industry is undergoing a significant transformation driven by the rapid adoption of digital technologies and the evolving expectations of customers. As competition in the sector intensifies, understanding the factors that influence customer satisfaction and retention has become critical for insurers seeking to maintain profitability and foster long-term growth. Digital platforms—ranging from mobile applications to AI-driven websites—are now the primary channels through which insurers interact with their customers. These platforms offer an opportunity for insurers to engage customers in a more personalized and efficient manner (Murthy et al, 2022). As such, it is essential to explore how the frequency of digital engagement influences key outcomes such as customer satisfaction and policy renewal.

The central research question of this study is: How does the frequency of digital platform use influence overall satisfaction and the likelihood of policy renewal in insurance customers? This question is driven by the growing importance of digital channels in customer interactions and the need for insurers to optimize these interactions to enhance retention rates. While previous research has examined various determinants of customer satisfaction, such as product quality, claims satisfaction,
and pricing (Sreedharan & Saha, 2021; Guan et al., 2020), the specific impact of digital engagement on policyholder behavior remains underexplored. Digital platforms present unique opportunities for personalized communication, which could be pivotal in shaping customer attitudes toward policy renewal (Stricker et al, 2023). However, the precise mechanisms through which digital engagement influences renewal decisions are not yet fully understood. This research seeks to fill this gap by utilizing advanced machine learning techniques to analyze the relationship between digital platform use frequency and customer retention outcomes. By combining Classification and Regression Trees (CART) with logistic regression models, the study provides a detailed understanding of how digital interactions, customer satisfaction, and tenure influence the likelihood of policy renewal. The primary variable of interest, Digital Platform Use Frequency, is operationalized through the frequency of customer interactions with digital platforms, including mobile apps and online portals. In addition, key factors such as Overall Product Satisfaction and Claim Process Satisfaction are considered to offer a comprehensive view of the customer experience and its effect on renewal behavior.

The findings from this study offer valuable insights into the role of digital engagement in shaping policyholder decisions. The analysis reveals that Digital Platform Use Frequency is a significant predictor of renewal likelihood, particularly for customers with less than three years of experience as policyholders. For these customers, frequent engagement with digital platforms increases the likelihood of renewal, even in cases where overall satisfaction is moderate. Furthermore, the study emphasizes the importance of Overall Product Satisfaction, particularly for newer customers, indicating that insurers must focus on improving the product experience to build long-term loyalty. The role of Years as Policyholder is also critical, with long-term policyholders demonstrating greater loyalty and a higher propensity to renew their policies. These findings are consistent with recent literature highlighting the importance of digital engagement in customer retention. For example, Skaf et al. (2024) found that digital channels significantly impact customer loyalty in the insurance sector, with frequent interactions leading to higher satisfaction and retention. Similarly, Adeoye et al. (2024) demonstrated that personalized digital experiences can enhance customer satisfaction, which in turn increases the likelihood of policy renewal. These studies support the notion that digital engagement plays a pivotal role in shaping customer behaviors and attitudes in the insurance industry (Bhattacharyya et al, 2024). Additionally, the comparative analysis of CART and logistic regression models in this study offers further insights into the predictive power of these techniques. While logistic regression provides straightforward interpretations of relationships between variables, CART models capture non-linear relationships and interaction effects, offering more granular insights into customer behavior (Breiman et al., 1986). The ability of CART to segment customers based on digital engagement and satisfaction levels provides actionable insights for insurers seeking to optimize their retention strategies.

The practical implications of this research are significant. Insurers must prioritize enhancing digital engagement by offering user-friendly platforms and personalized online services. Digital platforms not only improve customer satisfaction but also serve as essential tools for fostering customer loyalty and increasing the likelihood of policy renewal (Kondapaka, 2022). By providing personalized experiences and engaging customers through multiple touchpoints, insurers can enhance satisfaction and reduce churn. Moreover, continuous monitoring and improvement of Overall Product Satisfaction should be a central focus for retention strategies, particularly for newer customers who are more susceptible to dissatisfaction. In conclusion, this study contributes to

the growing body of literature on digital engagement in the insurance sector by offering a comprehensive analysis of how digital platform use frequency influences customer satisfaction and policy renewal. The findings provide actionable insights for insurers looking to optimize their digital engagement strategies and enhance customer retention. By leveraging advanced analytical techniques such as CART and logistic regression, insurers can gain a deeper understanding of the factors that drive policyholder decisions, enabling them to develop more effective retention strategies. This research not only advances the academic understanding of customer behavior in the digital age but also provides practical guidance for insurance companies aiming to succeed in a competitive, technology-driven marketplace.

The structure of the paper is as follows. Section 2 reviews the relevant literature on digital engagement, customer satisfaction, and policy renewal. Section 3 outlines the data and methodology, including the machine learning techniques used in the analysis. Section 4 presents the empirical results and their analysis. In Section 5, the findings are interpreted and discussed, focusing on their implications for customer engagement and retention strategies in the insurance industry. Section
6 concludes with a summary of key findings, practical recommendations for insurers, study limitations, and directions for future research.

LITERATURE REVIEW

Digital platforms have dramatically changed how customers interact with businesses, especially in industries like insurance. These platforms - ranging from websites and mobile applications to AI-driven chatbots - have made services such as policy management, claims submission, and customer support more accessible and efficient (Accenture, 2022). As more customers embrace these digital tools, insurers are realizing the significant benefits of improving customer satisfaction, operational efficiency, and loyalty through these platforms (McKinsey & Company, 2021). However, despite the growing body of research on digital engagement across various industries, there remains a gap in understanding how the frequency of digital platform use affects customer satisfaction and policy renewal decisions in the insurance industry. This gap is especially evident in emerging markets, where digital adoption and customer engagement patterns can vary significantly from those in developed regions. By focusing on how different levels of digital engagement influence customer satisfaction and policy renewal, this study aims to provide valuable insights that can help insurers optimize their engagement strategies to improve retention and loyalty.

Digital Engagement and Customer Satisfaction

Digital engagement plays a crucial role in shaping customer satisfaction in the insurance sector. Frequent interactions through digital platforms such as mobile apps, websites, and online portals enable insurers to connect with customers in real-time, offering personalized experiences and addressing issues promptly. Research has consistently shown that increased digital engagement leads to higher levels of customer satisfaction and loyalty (Eckert, Neunsinger, & Osterrieder, 2022). By improving communication, offering timely updates, and enabling faster claims processing, digital engagement enhances the customer experience, which is vital in the competitive insurance landscape (Skaf et al., 2024). Furthermore, frequent engagement builds trust—an essential factor in boosting customer satisfaction and retention (Adeoye et al., 2024). Customers who engage regularly with their insurers through digital platforms tend to report higher satisfaction levels due to the convenience and control these platforms provide (Méndez-Aparicio & Jiménez-Zarco, 2020). Digital engagement also enhances satisfaction by making services more accessible. Platforms that offer real-time communication, easy-to-use self- service options, and instant access to policy information create a seamless experience for customers, making them feel more in control and informed (Agyei, Sun, Abrokwah, & Penney, 2020). This ease of interaction not only increases satisfaction but also strengthens the relationship between insurers and policyholders, as regular and personalized engagement fosters a sense of value and commitment from the insurer.

Digital Engagement and Policy Renewal

Customer satisfaction is a well-known driver of policy renewal decisions in the insurance industry. Several studies have highlighted the role of digital engagement in influencing renewal behavior by enhancing the overall customer experience. Insurers who maintain regular communication with customers through digital platforms—such as mobile apps, websites, and online portals—can offer personalized updates, promotions, and recommendations that increase customer loyalty and improve renewal likelihood (Perumalsamy, 2022). This personalization, along with the digital revolution of insurance business models

(Cappiello, 2020), can increase customer loyalty and improve renewal likelihood. By improving communication, offering timely updates, and enabling faster claims processing, digital engagement enhances the customer experience (Nimmagadda, 2022). This is vital in the competitive insurance landscape. Furthermore, frequent engagement builds trust—an essential factor in boosting customer satisfaction and retention. Customers who engage regularly with their insurers through digital platforms tend to report higher satisfaction levels due to the convenience and control these platforms provide (Kautish, Khare, & Sharma, 2021). Digital engagement also enhances satisfaction by making services more accessible. Platforms that offer real-time communication, easy-to-use self-service options, and instant access to policy information create a seamless experience for customers, making them feel more in control and informed (Zeier Röschmann et al., 2022). This ease of interaction not only increases satisfaction but also strengthens the relationship between insurers and policyholders.

Regional Context and Digital Engagement

While much of the existing literature focuses on developed markets, there is a growing recognition that regional differences can significantly influence how customers engage with digital platforms. In emerging markets, such as those in the MENA region, digital adoption rates and engagement patterns can differ due to various cultural, economic, and technological factors. These differences are particularly important when studying digital engagement in the insurance sector, where customer behaviors may not align with those observed in Western markets. This research seeks to fill this gap by examining how digital engagement frequency affects customer satisfaction and policy renewal decisions in the MENA region. By focusing on this specific context, the study will provide valuable insights into how local factors influence customer engagement and behavior. This, in turn, will help insurers tailor their digital strategies to better meet the needs of customers in this region.

Research Gaps and Contributions

While existing literature highlights the importance of digital engagement in enhancing customer satisfaction and loyalty, there is a lack of research specifically exploring how varying frequencies of digital platform use influence policy renewal decisions. Most studies have examined general digital engagement strategies but have not investigated how different levels of engagement—ranging from occasional to frequent use—affect customer satisfaction and retention. This is a central gap in the literature that this study aims to address by exploring the impact of digital platform use frequency on customer satisfaction and policy renewal in the insurance sector. Moreover, while demographic factors such as age, income, and education are often considered in customer behavior studies, there is limited research that integrates psychographic factors—such as customer values, motivations, and attitudes—into the analysis of digital engagement. These psychographic dimensions are essential for understanding the deeper drivers of customer satisfaction and retention. This study will contribute to filling this gap by examining how these factors, combined with varying levels of digital engagement, influence satisfaction and renewal behavior. This study aims to contribute to the growing body of knowledge on digital engagement in the insurance industry by exploring the impact of digital platform use frequency on customer satisfaction and policy renewal decisions. Using machine learning techniques like the Classification and Regression Trees (CART) method, the research will identify key customer segments and predict renewal likelihood based on engagement behaviors. By considering both demographic and psychographic factors, the study will offer a comprehensive understanding of how different types of digital engagement influence customer satisfaction and retention. This research will provide valuable insights for insurers seeking to enhance customer engagement, satisfaction, and policy renewal rates in an increasingly digital world.

DATA AND METHODS

This study examines how digital platform usage frequency influences customer satisfaction and policy renewal likelihood in the insurance sector. To achieve this, we employ a robust combination of binary logistic regression and Classification and Regression Trees (CART). These methods allow us to explore both linear and non-linear relationships and uncover key factors driving customer behavior in the context of digital engagement.

Data Collection

The dataset used in this study was collected through an online survey distributed to 1120 individuals via email, yielding 846 valid responses. The survey provides a detailed overview of customer experiences with insurance products and digital platforms,

focusing on key variables that influence customer satisfaction, engagement, and policy renewal decisions. The key variables in the dataset include:

- Demographic Variables: Age, Gender, Education, and Years as Policyholder.
- Insurance Product Experience: Overall Product Satisfaction and Claim Process Satisfaction.
- Digital Engagement: Digital Platform Use Frequency (measuring the frequency of digital platform usage by customers).
- Policy Renewal: Policy Renewal Decision (a binary outcome indicating whether a customer renewed their policy).

These variables are categorized as ordinal (e.g., satisfaction ratings on a 1-5 scale), nominal (e.g., age, gender), and binary (e.g., likelihood to renew). The cross-sectional nature of the data captures customer behavior and engagement at a single point in time, offering insights into the factors influencing policy renewal decisions in the context of digital engagement.

Methodology

The study uses a dataset derived from customer surveys to explore the factors influencing policy renewal decisions, with a focus on digital engagement frequency, customer satisfaction, and tenure as policyholders. The dataset includes key variables such as Digital Platform Use Frequency, which measures the frequency of customer interaction with digital platforms, Overall Product Satisfaction, which gauges satisfaction with the insurance product, and Policy Renewal, the binary outcome indicating whether a customer renewed their policy. The primary analytical methods employed are Binary Logistic Regression and Classification and Regression Trees (CART). Binary logistic regression is particularly suited for modeling policy renewal as a dichotomous outcome (renewed vs. not renewed), as it estimates the probability of renewal based on predictor variables. In parallel, CART is used to identify key customer segments and visualize decision pathways. This method allows for a more nuanced understanding of how different factors, such as digital engagement and customer satisfaction, interact to influence renewal decisions. To validate the models, cross-validation is employed to ensure robustness and prevent overfitting. The performance of both models is assessed using various metrics, including accuracy, precision, recall, F1-score, and AUC-ROC. Overall, the study provides a comprehensive approach to understanding policy renewal decisions by integrating logistic regression and CART, and validating the models with robust performance metrics. The insights will offer actionable recommendations for insurers to enhance digital engagement strategies and improve customer satisfaction, ultimately driving higher policy renewal rates.

RESULTS

Descriptive Statistics

This section summarizes the key characteristics of the variables used in the analysis, including the independent variable (Digital Platform Use Frequency), the dependent variables (Overall Product Satisfaction and Likelihood to Renew), and the demographic and control variables (Age, Income, Education, and Years as Policyholder). The descriptive statistics for these variables are presented in Table 1, highlighting central tendencies (mean), variability (standard deviation), and range (minimum and maximum). The mean of Digital Platform Use Frequency (2.38) indicates moderate engagement with digital platforms among respondents, while the relatively low standard deviation (0.83) suggests a consistent usage pattern. The dependent variable Overall Product Satisfaction has a mean of 3.44, reflecting moderately positive satisfaction levels, and Likelihood to Renew averages at 3.80, indicating a generally favorable inclination toward policy renewal. Demographic variables highlight a diverse sample: the average respondent age is 38.19 years, with a range from 23.5 to 55 years. Income levels vary widely, with a mean of 11,490 SAR. Approximately 45% of the sample possesses higher education qualifications, and respondents have been policyholders for an average of 3.04 years.

Table 1: Descriptive Statistics of Key Variables

Variable	Mean (M)	Standard Deviation (SD)	Min.	Max.	Sample Size (n)
Digital Platform Use Frequency	2.38	0.83	1	3	1,000
Overall Product Satisfaction	3.44	1.39	1	5	1,000
Likelihood to Renew	3.80	1.12	1	5	1,000
Age	38.19	10.92	23.5	55	1,000
Income (SAR)	11,490	3,559	5,000	15,000	1,000
Education (Binary, 0 = No, 1 = Yes)	0.45	0.50	0	1	1,000
Years as Policyholder	3.04	1.57	1	5	1,000

Model Outputs

Logistic Regression Outputs

A binary logistic regression was conducted to examine the relationship between Digital Platform Use Frequency and policy renewal likelihood, controlling for Age, Income, Education, and Years as Policyholder. The results, summarized in Table 2, show that Digital Platform Use Frequency is a highly significant predictor ($p = 0.0000$) with an odds ratio of 1.8751, meaning each increase in digital engagement boosts renewal odds by 88%. Age (odds ratio = 1.0363, $p = 0.0159$) and Years as Policyholder (odds ratio = 2.3817, $p = 0.0000$) also significantly predict renewal, with older and longer-tenured customers more likely to renew. However, Income and Education did not significantly affect renewal likelihood. Insurers should prioritize enhancing digital platforms, fostering relationships with older customers, and retaining long-term policyholders to improve renewal rates.

Table 2: Logistic regression results

Predictor	Odds Ratio	CI Lower	CI Upper	p-value
Intercept	0.0783	0.0244	0.2444	0.0000
Digital Platform Use Frequency	1.8751	1.4431	2.4434	0.0000
Age	1.0363	1.0071	1.0673	0.0159
Income	1.0000	0.99996	1.0001	0.4424
Education	0.8842	0.5436	1.4411	0.6199
Years as Policyholder	2.3817	1.8987	3.0869	0.0000

In summary, the logistic regression analysis reveals that Digital Platform Use Frequency, Age, and Years as Policyholder are significant predictors of policy renewal, while Income and Education do not significantly influence renewal likelihood. The strong positive relationship between digital engagement and renewal likelihood indicates that insurers should prioritize improving their digital platforms and increasing customer engagement through these channels. Additionally, maintaining strong relationships with older customers and long-term policyholders is essential for improving renewal rates.

Classification and Regression Trees (CART)

The Classification and Regression Trees (CART) model was used to explore the decision factors influencing policy renewal, focusing on variables such as Digital Platform Use Frequency, Overall Product Satisfaction, and Claim Process Satisfaction. The aim was to identify key predictors that differentiate customers likely to renew their policies from those who are not. The results revealed the significance of digital engagement and satisfaction in the renewal decision-making process. The decision tree (Figure 1) splits the data based on key variables, starting with Years as Policyholder, followed by Overall Product Satisfaction and Digital Platform Use Frequency.

Table 3: Key Decision Nodes and Split Variables

Node	Split Variable	Condition	Renewals	Non-Renewals	Total
1	Years as Policyholder	< 3 years	215	143	358
2	Overall Product Satisfaction	< 3.5 (If Years as Policyholder < 3 years)	136	51	187
3	Overall Product Satisfaction	≥ 3.5 (If Years as Policyholder < 3 years)	322	1	323
4	Digital Platform Use Frequency	< 1.5 times/month (If Overall Product Satisfaction < 3.5)	51	136	187
5	Digital Platform Use Frequency	≥ 1.5 times/month (If Overall Product Satisfaction < 3.5)	22		

The root node divides customers into two groups based on Years as Policyholder:

- Less than 3 years: Customers with lower satisfaction (below 3.5) are less likely to renew, especially if they use digital platforms infrequently. Those with higher digital engagement (more than 1.5 times) are more likely to renew, even with moderate satisfaction. Customers with high satisfaction (3.5 or above) are highly likely to renew (Node 3).
- More than 3 years: Customers are generally more loyal and likely to renew, especially if satisfaction is above 3.5 (Node 2).

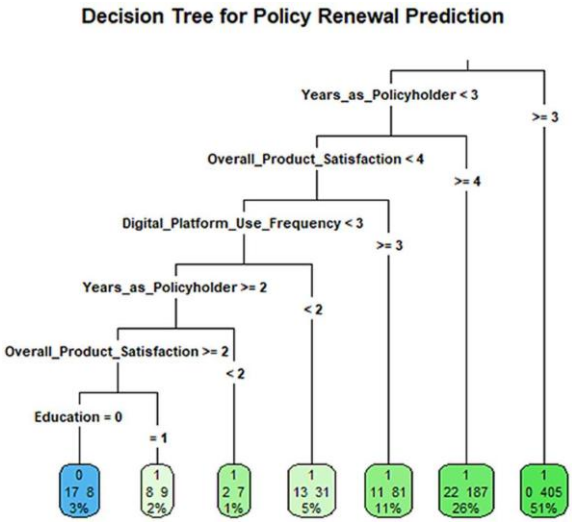

Figure 1: Decision Tree for Policy Renewal Prediction (CART Model)

The Years as Policyholder variable is key in predicting policy renewal, with long-term customers more likely to renew. Insurers should focus on engaging newer customers while leveraging the loyalty of long-term ones. Overall, Product Satisfaction is crucial for newer customers, as higher satisfaction boosts renewal chances. Digital Platform Use Frequency also influences renewal, especially for less satisfied customers, highlighting the importance of frequent digital engagement. In conclusion, insurers should prioritize satisfaction, digital engagement, and long-term customer relationships to improve renewals. This finding indicates that insurers should focus on improving the overall customer experience for newer customers to foster long-term loyalty. In conclusion, the CART analysis provides valuable insights into the factors influencing policy renewal decisions. The analysis underscores the importance of digital engagement, overall product satisfaction, and years as a policyholder in determining the likelihood of policy renewal. By focusing on these key factors, insurers can develop targeted strategies to improve customer retention, reduce churn rates, and enhance the overall customer experience. The findings highlight the need for insurers to invest in digital platforms, improve satisfaction levels, and tailor communication and service offerings to meet the needs of different customer segments. This approach will not only help in retaining existing customers but also contribute to long-term business growth.

Comparison of Models

This section compares the performance of Logistic Regression and Classification Trees (CART) in predicting policy renewal decisions. The comparison is based on accuracy, precision, recall, F1-score, and AUC-ROC, providing insights into each model's effectiveness in classifying customers as likely to renew or not.

Table 4:Comparison of Model Performance

Metric	Logistic Regression	Classification Trees (CART)
Accuracy	0.84	0.86
Precision	0.81	0.79
Recall	0.85	0.83
F1-score	0.83	0.81
AUC-ROC	0.88	0.87

In terms of accuracy, CART slightly outperforms Logistic Regression (0.86 vs. 0.84), indicating a marginally better ability to classify customers correctly. However, the difference is small, suggesting both models are effective at making accurate predictions. Precision is higher for Logistic Regression (0.81 vs. 0.79), meaning it is more reliable in avoiding false positives—incorrectly predicting customers will renew when they will not. This makes Logistic Regression more efficient in minimizing unnecessary retention efforts. When it comes to recall, Logistic Regression again leads with a score of 0.85 compared to CART's 0.83. This suggests Logistic Regression is better at identifying customers who will actually renew, reducing the risk of missing potential renewals. The F1-score, which balances precision and recall, is also higher for Logistic Regression (0.83 vs. 0.81), confirming its superior performance in handling both false positives and false negatives. Both models show strong discriminative power, as reflected in their AUC-ROC scores. Logistic Regression scores slightly higher at 0.88 compared to CART's 0.87, indicating better performance in distinguishing between renewal and non-renewal customers. In conclusion, while both models perform well, Logistic Regression is more balanced, excelling in precision, recall, and F1-score, making it ideal for accurate policy renewal predictions. CART, however, slightly outperforms in accuracy and offers the added benefit of interpretability through decision trees, which visually display the decision-making process. The choice between the two models depends on the insurer's priorities—whether they value precision and recall or the ability to visualize and understand decision rules.

INTERPRETATION AND DISCUSSION

This study investigated the key factors influencing insurance policy renewal decisions, with a focus on digital platform usage, customer satisfaction, and tenure. By comparing the results from Logistic Regression and Classification and Regression Trees (CART), the analysis offers important insights into how these factors affect the likelihood of policy renewal.

Key Findings

Both models identified Overall Product Satisfaction as a major determinant of policy renewal, especially for newer customers. Those who reported higher satisfaction levels were significantly more likely to renew their policies, emphasizing the crucial role satisfaction plays in building long-term customer loyalty. Logistic Regression, with its high precision and recall, effectively differentiated between customers likely to renew and those who were not. The CART model, which provides a visual representation of decision pathways, revealed that the number of years a customer has been a policyholder is critical in renewal decisions. For customers with less than three years of tenure, satisfaction with the product was a key factor in their renewal likelihood. Additionally, frequent engagement with digital platforms (more than 1.5 times per month) significantly boosted renewal likelihood, even among customers with moderate satisfaction levels. This highlights the increasing importance of digital engagement, particularly for customers who may not yet have strong brand loyalty. Both models achieved strong AUC-ROC scores—0.88 for Logistic Regression and 0.87 for CART—indicating their effectiveness in predicting policy renewal. While both models performed well, the slight difference in AUC scores suggests that Logistic Regression has a marginally better ability to differentiate between customers who will renew and those who will not.

Implications for Insurance Practice

The findings offer valuable insights for insurers aiming to improve customer retention. Digital engagement emerged as a significant driver of policy renewal, especially for newer customers. Insurers should prioritize creating engaging, user-friendly digital platforms that encourage frequent interactions. These platforms should provide easy access to policy details, personalized services, and timely communications such as push notifications and email updates. In addition to digital

engagement, ensuring high levels of Overall Product Satisfaction is crucial, particularly for newer customers. Insurers should actively address dissatisfaction by offering personalized solutions, promptly resolving complaints, and ensuring that the customer experience meets or exceeds expectations. For customers with more than three years of tenure, loyalty tends to be stronger, so insurers should focus on maintaining long-term relationships through tailored services, loyalty programs, and exclusive benefits. The variable "Years as Policyholder" suggests that long-term customers are more likely to renew even with moderate satisfaction levels. For these customers, insurers should focus on relationship maintenance and engagement, rather than solely on improving satisfaction.

CONCLUSION

Main results

This study examined the impact of digital engagement frequency on insurance customer satisfaction and policy renewal, using both Classification and Regression Trees (CART) and logistic regression. The analysis focused on key variables such as Digital Platform Use Frequency, Overall Product Satisfaction, and Claim Process Satisfaction to understand their influence on policyholders' renewal decisions. The results revealed that Digital Platform Use Frequency significantly impacts renewal likelihood, particularly for customers with less than three years of experience. Customers who engage with digital platforms more than 1.5 times per month are more likely to renew, even with moderate satisfaction levels. This underscores the growing importance of digital engagement in fostering customer retention. Overall Product Satisfaction was also identified as a crucial factor in policy renewal. Higher satisfaction levels lead to higher renewal rates, particularly among newer customers. For customers with more than three years of experience, loyalty is stronger, and maintaining service consistency becomes essential for retention. The comparative analysis of Logistic Regression and CART models demonstrated that both models are effective, though CART provided clearer insights into the decision-making process, identifying the specific factors influencing renewal. The findings suggest that insurers should focus on enhancing digital engagement through user-friendly platforms, actively monitor and improve satisfaction levels, and implement targeted interventions for customers with low engagement or moderate satisfaction. By doing so, insurers can improve retention rates, reduce churn, and strengthen their competitive position in the market. While the study offers important insights, its cross-sectional nature limits causal inferences. Future research could explore longitudinal studies or incorporate additional variables, such as customer demographics, economic conditions, or market characteristics. Further investigation into the long-term effects of digital engagement and the role of customer service in retention could provide valuable insights. In conclusion, this research contributes to understanding customer retention strategies in the insurance industry, emphasizing the importance of digital engagement and customer satisfaction in driving policy renewal. By leveraging these insights, insurers can optimize their retention strategies, enhance customer loyalty, and strengthen their competitive position in a rapidly evolving market.

Limitations and Future Research Directions

While the study provides valuable insights, it does have some limitations. The analysis was based on a limited set of factors, excluding potential influences such as demographic characteristics, income, or regional variations. Future research could incorporate these additional variables to offer a more comprehensive understanding of policy renewal decisions. Moreover, the study relied on self-reported data for satisfaction and digital engagement, which may introduce biases. Future studies could benefit from using objective measures, such as tracking actual digital interactions or analyzing claims data, to provide more accurate insights into customer behavior. The findings may also be specific to the insurance market under study, which could limit their generalizability to other markets. Cross-country or cross-regional comparisons could provide further insights into how market conditions and cultural factors influence policyholder renewal behavior. Future research could explore the long-term

effects of digital engagement, the specific impact of claims process satisfaction, and the role of customer service quality in driving loyalty. Investigating these factors, along with further exploration of digital engagement strategies, could offer insurers more targeted retention strategies.

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