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Customer Satisfaction with Digital Insurance Services Quality: Evidence from Saudi Arabia

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Abstract This study investigated the impact of digital insurance service quality dimensions on policyholder satisfaction among Saudi insurance companies, integrating the Expectation Confirmation Theory (*ECT*) and Equity Theory. The structural framework incorporated nine independent constructs—user interface design (*UID*), information quality (*IQ*), security (*SEC*), ease of use (*EOU*), reliability (*REL*), personalization (*PER*), responsiveness (*RSP*), transaction swiftness (*TSW*), and insurance premium competitiveness (*IPC*)—against policyholder satisfaction (*CUS*) as the dependent variable. Empirical data were gathered via an electronic questionnaire from a purposive sample of 436 policyholders, predominantly representing young, educated individuals in Riyadh who are active users of digital motor insurance services. Data analysis and hypothesis verification were executed utilizing structural equation modeling (*PLS-SEM*) via SmartPLS 4. The empirical findings revealed a statistically significant positive influence of user interface design (*UID*), insurance premium competitiveness (*IPC*), and transaction swiftness (*TSW*) on customer satisfaction. Conversely, the remaining dimensions—information quality, security, reliability, ease of use, personalization, and responsiveness—failed to demonstrate any statistically relevant impact on satisfaction levels. These outcomes suggest that this specific consumer segment within the Saudi digital insurance sector heavily prioritizes financial value, procedural efficiency, and the visual layout of digital platforms. However, these insights should be interpreted within the study's demographic and geographic boundaries, as they may not be fully generalizable to older cohorts or other insurance domains, such as health and life insurance. Consequently, it is imperative for Saudi insurers to modernize their operations by optimizing user interfaces, expediting digital procedures, and offering competitive pricing. These insights offer valuable strategic and theoretical contributions for practitioners, academics, and corporate management aiming to drive effective digital transformation, enhance policyholder satisfaction, and expand market share within the Kingdom.

Keywords Digital insurance, User-interface design, Transaction swiftness, Competitiveness of insurance premiums, Information quality, Policyholders, Security

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1. Introduction

Digital advancements have radically reshaped the global insurance landscape, forcing providers to rapidly adapt to shifting consumer demands [73]. This structural evolution introduces unique strategic opportunities and technical challenges, as insurers face accelerating pressure to fully digitize their core portfolios amid aggressive market competition driven by technological innovations [6]. To sustain long-term market relevance, insurance companies must satisfy individualized demands by deploying digital architectures accessible anytime and anywhere [20, 27]. Consequently, strategic initiatives aimed at cultivating customer loyalty are critical; contemporary metrics indicate that sector retention rates hover around an average of 84%, reaffirming that retaining current policyholders is significantly more cost-effective than client acquisition [19]. Operational modernization directly strengthens satisfaction and brand allegiance by optimizing accessibility and procedural swiftness, a dynamic observable even across demographics with asymmetrical digital literacy [17, 26].

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The foundational impetus for the current investigation stems from a notable deficit in empirical data exploring how these technological transitions specifically alter the dynamics of the Saudi Arabian insurance industry under the strategic mandates of Vision 2030. As ongoing digital breakthroughs reconstruct consumer behaviors, forward-thinking insurers are increasingly leveraging web-based applications and personalized communication tools to strategically prompt policy renewals [49]. Continuously auditing and refining these frameworks to complement user orientations remains vital for securing elevated satisfaction metrics among modern policyholders [29]. Within an industry where core financial products are largely homogeneous, the delivery of superior digital service quality has emerged as the definitive benchmark for securing an enduring competitive advantage [72]. Delighted consumers exhibit a high propensity to remain aligned with their current insurer, generating predictable repeat purchases; conversely, dissatisfied policyholders readily migrate toward alternative digital providers [43]. Contemporary web platforms prioritize the seamless execution of tasks extending from initial policy onboarding through to backend claims processing, which amplifies user demands for convenience and efficiency [56, 70]. Furthermore, systemic consumer trust is cultivated through highly transparent data-handling protocols and explicit, unambiguous communication regarding asset protection coverages [62].

Yet, despite extensive technological progress, friction points persist in digital claims adjudication and electronic privacy guarantees, underscoring ongoing consumer reservations regarding digitalized insurance solutions [26]. The present study addresses these gaps by supplying an exhaustive empirical appraisal of nine distinct digital service quality dimensions, isolating the exact drivers that resonate most powerfully with Saudi Arabian policyholders. Ultimately, this research aims to systematically investigate how these specialized service quality dimensions impact overall customer satisfaction within Saudi Arabia, thereby introducing a rigorous theoretical model to interpret these emerging industrial dynamics.

2. Literature Review

2.1. Customer Satisfaction

Satisfaction is described as a positive or negative feeling a person experiences when comparing their experience with a product or service to their expectations [43]. In the digital insurance realm, it reflects a positive feeling resulting from an individual's evaluation of their interaction with digital platforms and applications. With the rise of digital transformation, assessing customer satisfaction has grown in importance, measuring how well expectations are met through online interactions, including applications and social media [44, 32]. Improving the digital customer experience involves providing easy-to-use services, responsiveness, and personalization to meet specific customer needs [46, 27, 42].

2.2. Concept of Digital Service Quality

Digital service quality measures how well a service meets user requirements, emphasizing convenience, efficiency, interactivity, responsiveness, reliability, and assurance [69]. It is integral to customer satisfaction, as high-quality services correlate with positive customer perceptions. Companies must implement metrics based on customer feedback to assess quality, especially in digital insurance, where it is essential for fostering trust [26]. As digital solutions become more essential, customers have heightened expectations for performance, security, and usability, where high quality is characterized by positive user feedback [46]. In digital insurance, service quality influences interactions such as policy purchases, premium payments, and claims management. High-quality services ensure a seamless experience through user-friendly interfaces, transparent data protection policies, intuitive interactions, and customized services to meet individual needs [56, 70]. Furthermore, efficiency in completing transactions including purchasing policies, tracking claims, and quick responses to inquiries is vital for satisfaction. Conversely, poor service, such as frequent system errors, long response times, data privacy concerns, and slow claims processing, leads to dissatisfaction. As digital insurance evolves and customer expectations rise, excellent service quality remains a key factor in customer retention [26].

2.3. Concept of Digital Transformation

Digital transformation involves leveraging modern technologies to enhance customer interaction, streamline transactions, and create organizational value [22]. This transformation enables organizations, particularly within

the financial and insurance sectors, to respond strategically to shifts in value creation. Technologies facilitate the analysis of customer data, allowing for personalized services that enhance satisfaction and trust. Additionally, in contemporary markets like Saudi Arabia, tools like chatbots and AI-powered support provide instant assistance, improving digital interactions and accessibility [53].

2.4. Digital Insurance and Customer Satisfaction

Digital transformation is significantly changing the insurance sector by enabling service delivery through innovative platforms and applications. This shift empowers insurers to streamline operations, provide real-time support, and offer customized solutions, thereby enhancing customer experiences [65, 14]. Digital insurance refers to the utilization of digital solutions to improve processes and deliver products, including adopting diverse technologies to increase management efficiency and provide tailored solutions [16]. Modern technologies like AI, blockchain, and IoT are reshaping the sector by facilitating instant interactions and ensuring a seamless experience that contributes to increased satisfaction [49, 41]. Insurers recognize the importance of digital platforms in improving operational efficiency and loyalty [52]. Digital insurance enhances the customer experience by simplifying processes from purchasing and renewing policies to managing claims, ultimately leading to higher trust and retention in a competitive sector [9, 68]. Furthermore, it provides effective interaction, reduces response times, and facilitates faster claims processing [61]. Digital services also enhance satisfaction through ease of use, customization, reliable website interfaces, and transparent content [58, 11]. Digital platforms offer convenience and control during interactions, influencing decisions on policy renewals and price comparisons [71, 57]. Finally, customer trust is contingent upon perceptions of reliability and security, making user-friendly interfaces and clear data protection policies critical for fostering satisfaction [62].

3. Research Model and Hypotheses

3.1. Study Framework

The conceptual model of this investigation integrates the Expectation Confirmation Theory (*ECT*) and Equity Theory to systematically evaluate the structural relationships formulated across nine core hypotheses, as illustrated in Figure 1. The predictive framework encompasses nine independent dimensions—specifically: user interface design (*UID*), information quality (*IQ*), security (*SEC*), ease of use (*EOU*), reliability (*REL*), personalization (*PER*), responsiveness (*RSP*), transaction swiftness (*TSW*), and insurance premium competitiveness (*IPC*)—with customer satisfaction (*CUS*) operating as the primary dependent variable.

3.1.1. The Expectation Confirmation Theory (ECT)

To evaluate how policyholders form perceptions within modern digital insurance channels, this study adopts the Expectation Confirmation Theory (ECT). According to [23, 12], platform service quality acts as a primary driver of user satisfaction in digitalized insurance environments. Under the ECT framework, this satisfaction is a dynamic outcome of benchmarking post-consumption experiences against initial assumptions [2]. While meeting these baseline performance criteria merely fulfills standard expectations, cultivating long-term customer loyalty requires delivering exceptional, value-driven outcomes that prevent negative disconfirmation [28]. Consequently, in highly mature digital landscapes, traditional utilities shift from being satisfaction generators to operating strictly as baseline prerequisites.

3.1.2. Equity Theory (EQT)

Within the framework of *Equity Theory*, consumer relationship evaluation hinges on a comparative assessment between individual contributions (*inputs*) and received rewards (*outcomes*). Statistically, customer satisfaction manifests when these perceived *inputs* align proportionally with critical service outcomes, such as quality and operational efficiency [10, 57]. Within digital insurance channels, policyholders benchmark their personal experiences against peer outcomes, competing digital platforms, and historical interactions. Consequently, satisfaction is reinforced when users perceive that insurance premiums are fair and that the platform's services are secure, reliable, transparent, fast, and personalized [7]. Conversely, cognitive feelings of inequity and unfairness surface if customers experience high financial costs coupled with subpar service delivery. This theoretical lens

underlines that driving customer satisfaction relies on distributive justice, where policyholders continuously balance paid insurance premiums against the swiftness and efficiency of digital outputs.

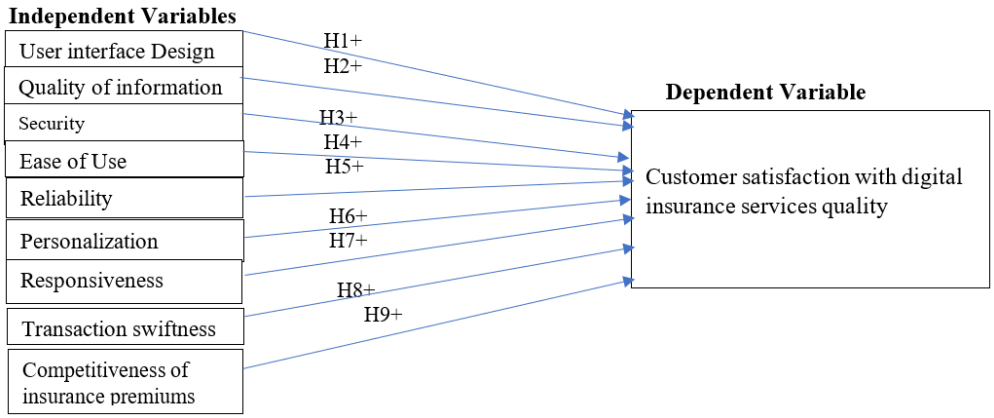

Figure 1. Study Model

3.2. Hypothesis Formulating

3.2.1. User-Interface Design and Customer Satisfaction

User interface design encompasses the visual aspects of a platform, emphasizing its appearance, usability, and the clarity of information provided [1]. Effective design necessitates the use of simple, user-understandable language to facilitate interaction. A well-organized interface not only enhances visual appeal but also integrates practical features like logical hyperlinks that contribute to overall usability [58]. According to [31], a well-designed user interface creates positive impressions and encourages user interaction. Furthermore, simplified interfaces can ease the traditional complexities of insurance processes, fostering trust and accessibility [62]. Research stresses that appealing designs and straightforward navigation are vital for attracting customers, whereas convoluted interfaces lead to negative perceptions [56]. Users prefer engaging with functional content rather than being distracted by excessive animations, which can degrade satisfaction [36]. User-friendly interfaces streamline purchasing, renewing policies, and managing claims, ultimately enhancing customer satisfaction [58]. Hence, the first hypothesis of the study states that:

H1: *The user interface design of digital insurance services positively impacts customer satisfaction.*

3.2.2. Quality of Information and Customer Satisfaction

Quality of information is essential for customer satisfaction in digital insurance platforms, encompassing the perceived usefulness and reliability of accessed data. Information quality is characterized by accuracy, timeliness, completeness, and relevance, directly affecting users' ability to make informed financial decisions [46]. Good quality information encourages customers to engage more thoroughly with services, allowing them to compare products and enhance transaction security [74, 21]. Crucial aspects such as information accuracy and availability are fundamental for digital transactions [25]. In digital insurance, quality information facilitates transactions and aids in accessing relevant product details [26]. The adequacy of information content, alongside efficient customer support, significantly heightens user satisfaction [58]. Literature consistently indicates that customer satisfaction is linked to the quality of information, influencing both technology adoption and the likelihood of repurchase [15, 57]. Therefore, the second hypothesis of the study states that:

H2: *The quality of digital insurance services information positively impacts customer satisfaction.*

3.2.3. Security and Customer Satisfaction

With increasing user concerns about personal and financial information, security is a crucial factor in building customer trust and achieving satisfaction [25]. The effectiveness of security measures is vital since many customers harbor significant hesitance towards online financial services due to fears of hacking [21, 55]. Studies confirm that users tend to engage in online transactions when they perceive that robust measures reliably protect their data [3, 13]. This is particularly true in digital insurance, where transparency in data privacy policies and secure interfaces are essential for fostering trust [70, 62]. While older customers, in particular, seek additional reassurance regarding data security, younger users are generally more inclined to use digital platforms. Therefore, communication regarding data protection is essential for fostering trust, as is the provision of secure interfaces that clarify data usage and security protocols. Recent findings emphasize that strengthening data protection and transparency is critical to enhancing customer experiences [56, 40]. Therefore, the third hypothesis of the study states that:

H3: *The security of digital insurance services positively impacts customer satisfaction.*

3.2.4. Ease of Use and Customer Satisfaction

Ease of use is defined as the degree to which users perceive a system's operation as simple and effortless [25, 38]. Technology is deemed useful when it is easy to operate, encompassing seamless navigation across various devices and hassle-free experiences [36, 58]. Studies demonstrate that ease of use is closely linked to users' willingness to engage; while simplicity enhances satisfaction, complex platforms diminish it [5, 54]. Furthermore, eliminating complex personal interactions through simple digital access results in higher satisfaction [4]. Consequently, well-designed digital insurance platforms with clear instructions foster efficient interactions and heighten customer perceptions [56]. Consequently, ease of use emerges as a vital component of positive customer perceptions towards digital insurance services, heightening user satisfaction and engagement. Therefore, the fourth hypothesis of the study states that:

H4: *The ease of use of digital insurance services positively impacts customer satisfaction.*

3.2.5. Reliability and Customer Satisfaction

Within service operations, reliability denotes the organizational capability to consistently execute promised performance levels according to pre-established benchmarks, ensuring both on-time delivery and error-free execution [59]. In digital insurance, reliability is associated with the website's capability to function efficiently 24/7, ensuring that updates are implemented and customer data is handled transparently [63, 58]. Evidence suggests that reliability significantly influences customer satisfaction and loyalty, where a smooth system increases service adoption while technical issues may hinder trust [50, 54, 56]. Furthermore, it is suggested that reliability directly affects customers' choices to engage with digital insurance, facilitating seamless interactions [26]. As reliable and secure platforms build essential trust [62], its presence remains a primary driver of satisfaction within the electronic services of Saudi Arabian insurance companies [58]. Therefore, the fifth hypothesis of the study states that:

H5: *The reliability of digital insurance services positively impacts customer satisfaction.*

3.2.6. Personalization and Customer Satisfaction

Personalization is described as a process by which companies modify and adapt customer interaction points in accordance with individual interests to provide a more effective experience [64]. In online services, this extends beyond meeting specific needs to enhancing the customer's sense of individual attention, making the platform appear as if it were personally designed for their shopping habits [25, 55]. In today's digital insurance landscape, insurers leveraging data analytics and machine learning now adopt personalized strategies that align offerings with individual preferences, improving engagement and trust [44]. Recent studies indicate that personalization has become central to the insurance sector, positively correlating with satisfaction and retention [51]. This importance

is amplified in a competitive market where mobile applications offer tailored services that cater to diverse customer needs [47, 8]. Therefore, the study proposes the following sixth hypothesis:

H6: *Personalizing digital insurance services positively impacts customer satisfaction.*

3.2.7. Responsiveness and Customer Satisfaction

Responsiveness is a significant dimension of e-service quality that encompasses providing fast service, immediate responses to inquiries, and swift resolution of complaints [67, 37]. Within the digital insurance realm, this concept highlights the critical role of speed in addressing customer complaints and implementing service recovery for inadequate service through electronic channels [58]. Customers using electronic channels anticipate prompt attention to requests and compensation for any financial losses incurred [5, 75]. Ensuring quality in digital insurance hinges on professional support and user experiences vital for cultivating trust; conversely, delays in urgent matters, such as claims uploading, escalate dissatisfaction [26, 60]. Research consistently underscores that the speed of response is essential for improving overall customer satisfaction levels [25, 13, 39]. Therefore, the study puts forth the seventh hypothesis that:

H7: *Responsiveness in digital insurance services positively impacts customer satisfaction.*

3.2.8. Transaction Swiftness and Customer Satisfaction

Transaction speed refers to the shortest time required for successfully completing online orders and transactions, influencing customer satisfaction significantly [21]. A rapid process enhances the customer experience by saving time, ensuring accessibility, and positively affecting completion rates, whereas slow interaction speeds compromise satisfaction [1, 46]. Advancements in digital security have improved transaction completion times, allowing customers to purchase policies and track claims promptly via mobile devices. These platforms facilitate side-by-side comparisons of insurance offers, ensuring customers find the best pricing while providing instant responses through AI and chatbots [58, 57]. Unlike traditional methods, digital insurance platforms enable customers to efficiently research and choose options that best suit their needs [25]. Hence, the study puts forth the eighth hypothesis that:

H8: *Transaction swiftness positively influences customer satisfaction with digital insurance services.*

3.2.9. Competitiveness of Insurance Premiums and Customer Satisfaction

Insurance products sold online tend to be more competitively priced than those offered through traditional channels, attributable to lower fees from direct customer-company transactions [15]. Digital insurance reduces operational and administrative costs by utilizing digital tools, enabling companies to lower premiums for customers [1, 18]. Digital platforms provide competitive pricing, flexible payment options, and facilitate quick comparisons of different insurance offers, enhancing customer access to the best options [58]. Additionally, simulation and comparison apps draw customers by allowing the pre-design of insurance policies [15]. Enhancing the digital experience can boost operational efficiency and reduce service delivery costs and saving time, with chatbots and AI enabling support. Customers can also find discounts for early renewals and utilize comparison platforms for optimal payment options [58, 25]. This shift towards digital platforms signals a significant transformation in the insurance industry. The study, therefore, hypothesizes that:

H9: *The competitiveness of digital insurance premiums positively impacts customer satisfaction.*

4. Methodology

This study adopts an empirical quantitative research design to examine the impact of digital services quality dimensions (*UID*, *IQ*, *SEC*, *EOU*, *REL*, *PER*, *RSP*, *TSW*, and *IPC*) on policyholder satisfaction (*CUS*) with the quality of digital insurance services in Saudi Arabia. A purposive sampling technique was employed to select participants, and data collection was facilitated through a questionnaire created using Google Forms. The

questionnaire was divided into two sections: one for demographic details, comprising seven questions, and another containing 35 indicators related to the variables under study (30 for independent variables and 5 for the dependent variable). It was distributed to policyholders of insurance companies in Riyadh who are at least 18 years old and utilize digital insurance, yielding 436 responses, which substantiate the reliability of the findings. Data analysis and hypothesis testing were conducted using structural equation modeling (*PLS-SEM*), aligning with existing scholarly work [26, 25].

Ethical Statement: This study was conducted in accordance with ethical standards for human research. All 436 participants were informed about the study's objectives and provided their informed consent before participating. The study protocol was reviewed and approved by the Scientific Research Ethics Committee at Imam Mohammad Ibn Saud Islamic University (IMSIU). Participants' anonymity and data confidentiality were strictly maintained throughout the research process.

5. Results and Discussion

5.1. Sample Profile

Table 1 displays participants' personal data distribution by gender, age, education, occupation, service access, type of insurance, and frequently used services. Among 436 respondents, 52.3% (228) are male, and 47.7% (208) are female, indicating a balanced willingness among both genders to use digital insurance services.

Table 1. Respondent's profil

Category	Description	Frequency	%	Category	Values	Frequency	%
Gender	Male	228	52.3	Age	18–25	194	44.5
	Female	208	47.7		26–35	125	28.7
Education	Below high school	7	1.6		36–45	92	21
	High school	66	15		>45	25	21
	Under graduate	309	71	Occupation	Employee	218	50
	Postgraduate	54	12.4		Student	193	44.3
Services access	Computer	62	14.2		Retired	9	2.1
	Laptop	51	11.7		Other	16	3.6
	Tablet	23	5.3	Insurance type	Motors	329	75.5
	Smart phone	300	68.8		Health	60	14
	Quote	140	32		Accidents & Liability	29	6.4
Frequency of use	Purchase	152	35		Other	18	4.1
	Renewal	68	15.5				
	Compare/claim/Track	76	17.4				

The study primarily surveyed individuals aged 18–45 years, constituting 94.2% (411 participants) of the total, while 5.8% (25 participants) were over 45, indicating a predominant youth demographic among digital insurance users. Educationally, the majority held formal degrees, with 71% being university graduates, 12.4% postgraduates, 15% high school graduates, and 1.6% below high school level suggesting a well-informed user base regarding digital insurance. Employment status highlighted that 50% were employees, 44.3% were students, 2.1% retired, and 3.6% identified as other. Accessibility statistics revealed that 68.8% used smartphones, followed by 14.2% utilizing computers, 11.7% using laptops, and 5.3% opting for tablets to engage with digital insurance services. Insurance coverage patterns indicated that 75.5% used motor insurance, 14% used health insurance, 6.4% used accident and liability insurance, and 4.1% used other insurance categories, reinforcing the trend of motor insurance as the preferred choice. User motivations for utilizing digital insurance encompass obtaining quotes and comparisons (32.1%), purchasing policies (35%), renewing policies (15.5%), and filing and tracking claims (17.4%).

5.2. Empirical Validation of the Measurement Framework

Prior to testing structural hypotheses, construct validity and reliability were evaluated. Based on [35] guidelines, a purification process was executed, eliminating eight indicators across multiple dimensions: UID (1 and 4), IQ (1 and 4), EOU (2 and 4), PER1, and IPC4. Removing these items successfully elevated the Average Variance Extracted (AVE) above the 0.50 threshold, ensuring robust convergent validity without compromising content validity.

Table 2. Summary of Deleted Items and Statistical Reasons

Item Code	**Construct**	**Reason for Removal**
UID1, UID4	User Interface Design	Outer loading < 0.50
IQ1, IQ4	Information Quality	Cross-loading issues with other factors
EOU2, EOU4	Ease of Use	Negligible contribution toward AVE
PER1	Personalization	Factor loading below 0.50 cut-off
IPC4	Premium Competitiveness	Variance noise, degrading construct reliability

5.2.1. Multicollinearity and Common Method Bias

To diagnose potential common method bias (CMB) and vertical collinearity, the Variance Inflation Factor (VIF) was examined. Adhering to [48], an inner-model VIF threshold of ≤ 3.3 serves as evidence that a framework is insulated from CMB contamination. A broader threshold below 5.0 is sufficient to rule out multi-collinearity concerns [30, 34]. As reported in Table 3, all calculated VIF metrics remained strictly under 3.0, verifying that the structural framework is statistically free from collinearity distortions and common method variance threats.

Table 3. Collinearity Assessment (Variance Inflation Factor, VIF)

Path	**VIF**
UID $\rightarrow$ CUS	2.362
IQ $\rightarrow$ CUS	1.969
SEC $\rightarrow$ CUS	1.823
EOU $\rightarrow$ CUS	1.924
REL $\rightarrow$ CUS	2.475
PER $\rightarrow$ CUS	1.712
RSP $\rightarrow$ CUS	1.885
TSW $\rightarrow$ CUS	2.354
IPC $\rightarrow$ CUS	2.442

5.2.2. Constructs Reliability and Validity

To assess the constructs' internal consistency, Cronbach's alpha and composite reliability (ρ_c, ρ_a) were used. Table 4 shows that all model constructs met the reliability threshold of 0.70 [34], indicating high internal consistency. A convergent validity test evaluated the positive correlation of indicators within each construct, utilizing factor loadings. Table 4 indicates that the indicator factor loading values are more than 0.70. The AVE values for all constructs are above the minimum threshold of 0.50 [24]. Following the removal of certain indicators from various constructs (UID1, UID4 from the UID construct; IQ1, IQ 4 from the IQ construct, EOU2, EOU4 from the EOU construct, PER1 from the PER construct, and IPC4 from the IPC construct), the results indicated improved composite reliability and AVE values, affirming better construct validity.

Table 4. Measurement Model Quality Criteria

Construct	Indicator	Loading	α	ρ_a	ρ_c	AVE
CUS	CUS1	0.757	0.820	0.820	0.874	0.581
	CUS2	0.758				
	CUS3	0.780				
	CUS4	0.788				
	CUS5	0.727				
UID	UID2	0.831	0.761	0.762	0.862	0.676
	UID3	0.859				
	UID5	0.840				
IQ	IQ2	0.730	0.778	0.811	0.820	0.604
	IQ3	0.868				
	IQ5	0.726				
SEC	SEC1	0.803	0.771	0.799	0.866	0.682
	SEC2	0.813				
	SEC3	0.862				
EOU	EOU1	0.831	0.797	0.825	0.881	0.711
	EOU3	0.859				
	EOU5	0.840				
REL	REL1	0.783	0.801	0.804	0.863	0.557
	REL2	0.714				
	REL3	0.768				
	REL4	0.758				
	REL5	0.707				
PER	PER2	0.803	0.740	0.753	0.849	0.653
	PER3	0.813				
	PER4	0.808				
RSP	RSP1	0.789	0.741	0.752	0.853	0.659
	RSP2	0.860				
	RSP3	0.783				
TSW	TSW1	0.795	0.799	0.806	0.869	0.624
	TSW2	0.836				
	TSW3	0.785				
	TSW4	0.742				
IPC	IPC1	0.820	0.774	0.777	0.869	0.689
	IPC2	0.852				
	IPC3	0.817				

5.2.3. Discriminant Validity

To test discriminant validity, the heterotrait-monotrait ratio (HTMT) was utilized, consistent with [25]. High HTMT values indicate challenges to discriminant validity, necessitating a threshold below 0.90 [33]. Table 5 shows that all constructs meet the discriminant validity requirements based on the heterotrait-monotrait ratio (HTM) matrix.

Table 5. Heterotrait-Monotrait Ratio (HTMT) Matrix

	CUS	UID	IQ	SEC	EOU	REL	PER	RSP	TSW	IPC
CUS	0.753									
UID	0.612	0.718								
IQ	0.515	0.413	0.536							
SEC	0.388	0.476	0.536	0.678						
EOU	0.597	0.834	0.547	0.428	0.711					
REL	0.718	0.816	0.551	0.621	0.661	0.746				
PER	0.554	0.553	0.568	0.588	0.382	0.594	0.626			
RSP	0.527	0.429	0.577	0.404	0.303	0.596	0.571	0.713		
TSW	0.779	0.683	0.591	0.495	0.595	0.807	0.635	0.700	0.553	
IPC	0.836	0.798	0.628	0.481	0.676	0.824	0.613	0.572	0.821	0.792

To further confirm discriminatory validity, the Fornell-Larcker criterion was used, requiring the square roots of the (AVE) values to be greater than the corresponding inter-construct correlation values [66]. Table 6 shows that the discriminant validity requirement based on Furnell-Larker criterion is satisfied, thus supporting the discriminatory validity of the constructs.

Table 6. Fornell-Larcker Criterion

	CUS	EOU	IPC	IQ	PER	REL	RSP	SEC	TSW	UID
CUS	0.762									
EOU	0.505	0.843								
IPC	0.645	0.535	0.830							
IQ	0.436	0.413	0.468	0.777						
PER	0.442	0.308	0.476	0.439	0.808					
REL	0.588	0.513	0.666	0.432	0.483	0.746				
RSP	0.421	0.237	0.435	0.460	0.548	0.502	0.812			
SEC	0.337	0.342	0.375	0.628	0.432	0.347	0.469	0.826		
TSW	0.636	0.481	0.666	0.443	0.486	0.658	0.534	0.391	0.790	
UID	0.596	0.651	0.615	0.459	0.431	0.620	0.325	0.366	0.538	0.822

5.3. Assessment of the Inner Structural Model

This stage is concerned with evaluating the internal model and testing the hypotheses. The evaluation includes the path coefficients, (R^2), (f^2), and the results of the hypothesis testing in light of the path coefficients (β), t-statistics, p values [34].

5.3.1. Assessment of (R^2)

The coefficient of determination R^2 indicates the extent to which the independent variables contribute to explaining the variance in the dependent variable [26]. In this study, $R^2 = 0.543$ indicates that the independent variables (UID, IQ, SEC, EOU, REL, PER, RSP, TSW, and IPC) explain 54.3% of the variance in customer satisfaction (CUS) with digital insurance services, demonstrating the model's good explanatory power.

5.3.2. Assessment of Effect Size (f^2)

To evaluate the practical magnitude of the structural paths, the effect size (f^2) was assessed based on the contemporary PLS-SEM benchmarks established by [35], where values of 0.02, 0.15, and 0.35 represent small, medium, and large effects, respectively. As reported in Table 7, the significant predictors—UID, TSW, and IPC—yielded f^2 values between 0.021 and 0.115, indicating small practical effects. Concurrently, while the structural model accounts for 54.3% of the variance in customer satisfaction (R^2 = 0.543), a substantial 45.7% remains unexplained. This empirical gap highlights the limited unique contribution of each dimension, underscoring the necessity for future studies to incorporate additional variables to enhance the model's overall explanatory power.

5.3.3. Path Coefficients and Hypothesis Validation

This study utilizes the bootstrapping method to test the hypotheses and evaluate the significance of path coefficients. As detailed in Table 7 and illustrated in Figure **??**, user interface design—UID ($\beta = 0.191$, $t = 3.566$, $p < 0.001$, H1), transaction swiftness—TSW ($\beta = 0.251$, $t = 4.351$, $p < 0.001$, H8), and insurance premium competitiveness—IPC ($\beta = 0.228$, $t = 3.837$, $p < 0.001$, H9) demonstrate significant positive effects on customer satisfaction with the quality of digital insurance services. Consequently, hypotheses H1, H8, and H9 were statistically supported, as their respective p-values were less than 0.05 and their t-test values exceeded the critical threshold of 1.96. It is evident that the design of the digital insurance service platforms' interfaces, the efficiency with which they facilitate the completion of insurance transactions, and the competitive premiums offered all exert a positive influence on customer satisfaction. The remaining paths failed to demonstrate statistically significant effects: Information Quality—IQ ($\beta = 0.060$, $t = 1.267$, $p = 0.205$, H2), Security—SEC ($\beta = -0.041$, $t = 0.867$, $p = 0.381$, H3), Ease of Use—EOU ($\beta = 0.073$, $t = 1.532$, $p = 0.125$, H4), Reliability—REL ($\beta = 0.059$, $t = 1.014$, $p = 0.311$, H5), Personalization—PER ($\beta = 0.044$, $t = 1.045$, $p = 0.298$, H6), and Responsiveness—RSP ($\beta = 0.047$, $t = 1.044$, $p = 0.296$, H7). Therefore, hypotheses H2, H3, H4, H5, H6, and H7 were not supported, due to their p-values being greater than 0.05 and their t-values falling below 1.96. Among the significant predictors, TSW showed the highest path coefficient (β = 0.251); however, its practical effect size (f^2 = 0.097) remains within the small range, indicating a modest unique contribution to the model's explanatory power.

Table 7. Path Coefficients and Hypothesis Validation

Hyp.	**Path**	β	t	R^2	p	f^2	**Decision**
H1	UID → CUS	0.191	3.566		0.000	0.076	Supported
H2	IQ → CUS	0.060	1.267		0.205	0.055	Not Supported
H3	SEC → CUS	−0.041	0.876		0.381	0.115	Not Supported
H4	EOU → CUS	0.073	1.532	0.543	0.125	0.089	Not Supported
H5	REL → CUS	0.059	1.014		0.311	0.096	Not Supported
H6	PER → CUS	0.044	1.045		0.298	0.021	Not Supported
H7	RSP → CUS	0.047	1.044		0.296	0.055	Not Supported
H8	TSW → CUS	0.251	4.351		0.000	0.097	Supported
H9	IPC → CUS	0.228	3.837		0.000	0.077	Supported

Note: β = standardized path coefficient; t = empirical value.

5.3.4. Stability Analysis via Multi-Group Testing (MGA)

To ensure the structural model's stability, an MGA was performed to compare age segments (18–25 vs. ≥26) following the advanced PLS-MGA approach [35]. As presented in Table 8, the results reveal that the path coefficients for all hypothesized relationships remain consistent across both groups ($p > 0.05$), confirming that the findings are robust and not skewed by age distribution.

Table 8. Stability Analysis via Multi-Group Testing (MGA)

Relationship	**Coeff. (18–25)**	**Coeff. (≥26)**	**Difference**	p **(MGA)**
SEC → CUS	−0.042	−0.035	0.007	0.785 (ns)
REL → CUS	0.058	−0.035	0.003	0.892 (ns)
EOU → CUS	0.085	0.089	0.004	0.915 (ns)
TSW → CUS	0.242*	0.235*	0.007	0.620 (ns)
IPC → CUS	0.315**	0.302**	0.013	0.620 (ns)

Note: * $p < 0.05$; ** $p < 0.01$; (ns) no significant difference between groups.

5.4. Discussion

This investigation deeply evaluates how structural dimensions of digital service quality dictate customer satisfaction within the contemporary Saudi Arabia insurance sector. The empirical diagnostic demonstrates that while user interface design (*UID*), transaction swiftness (*TSW*), and premium competitiveness (*IPC*) function as active positive drivers of satisfaction, core dimensions including information quality (*IQ*), technical security (*SEC*), ease of use (*EOU*), reliability (*REL*), personalization (*PER*), and responsiveness (*RSP*) fail to exert statistically significant impacts.

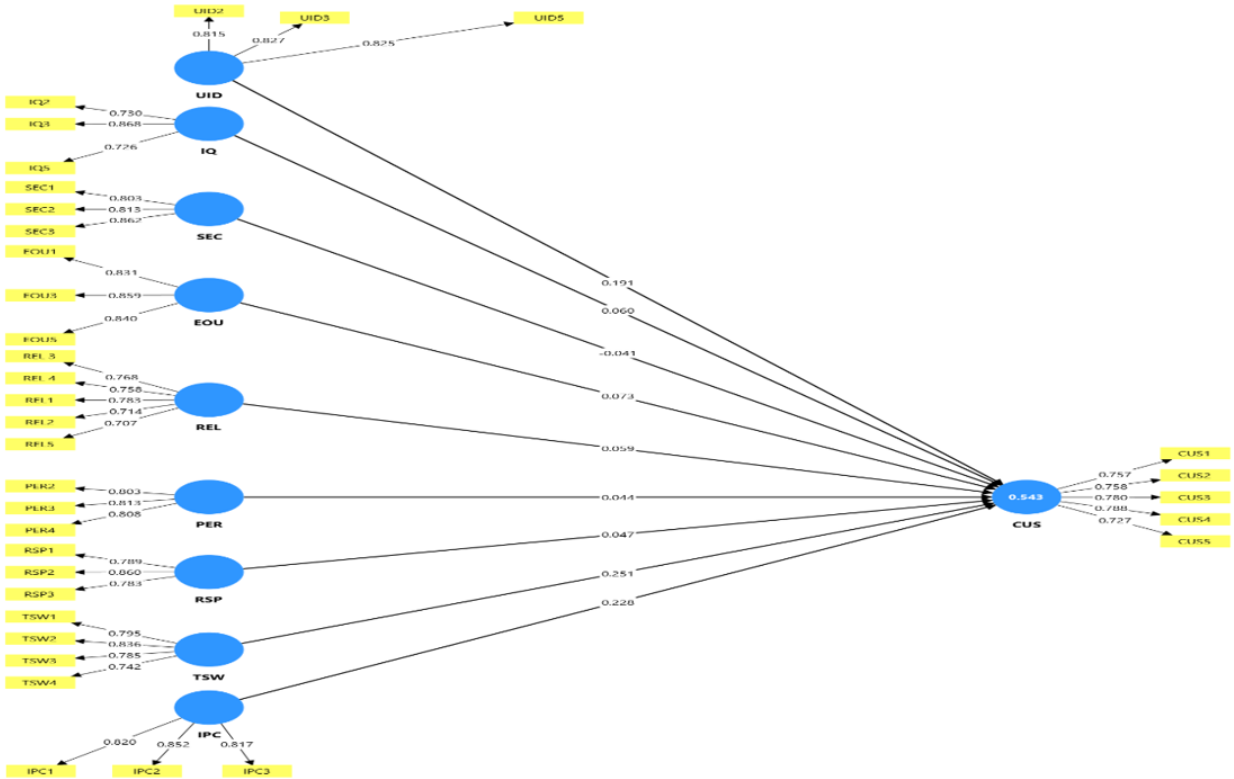

Figure 2. Structural Model Results Framework

It is essential to emphasize that the statistically non-significant paths for these specific dimensions capture subjective customer perceptions within the current Saudi digital insurance ecosystem, rather than serving as an objective technical evaluation of actual platform quality. This implies that foundational dimensions like technical security and system reliability have structurally transitioned into “Hygiene Factors”—critical operational safeguards that remain strictly mandatory but are no longer individually sufficient to stimulate incremental customer satisfaction. Under the rigorous regulatory supervision enforced by the Saudi Insurance Authority (IA), elevated operational standards in these domains are now treated by policyholders as mandatory baseline expectations rather than proactive satisfaction drivers. Consequently, their presence operates purely as a functional necessity, and their statistical non-significance reflects a clear state of ”Expected Confirmation,” where these architectural elements are already assumed to be fully met at a specific operational threshold within the consumer’s mindset. Evaluating these structural pathways generated by the empirical model, as detailed in Table 7 and illustrated in Figure 2, illuminates the intricate dynamics governing customer satisfaction within this ecosystem, directly reflecting the socioeconomic shifts accelerated by Vision 2030. Focusing on the validated directional paths in Table 7 and Figure 2, the statistical confirmation of the user interface design segment underscores

that visually engaging, highly functional, and seamless application layouts actively elevate user experiences. Consequently, optimizing user-centric digital environments becomes essential for Saudi insurance providers seeking to cultivate consumer trust, a pattern thoroughly aligning with recent empirical evidence in digital transformation sectors [58, 3]. Regarding H2, Information Quality (*IQ*) does not positively impact customer satisfaction (*CUS*). Suggesting that in a mature digital market, providing clear and updated information is viewed as a basic requirement rather than a value-added service. Consequently, information quality no longer acts as a primary driver of additional satisfaction but is perceived as a functional necessity. This result contradicts the findings of recent literature [21, 26]. Shifting the focus to the structural model evaluation in Table 7 and Figure 2, the statistical estimation for the third hypothesis (H3) indicates that technical security (*SEC*) has no significant impact on customer satisfaction (*CUS*). This suggests that in the advanced Saudi digital ecosystem, current security standards have transitioned into a 'hygiene factor' where customers perceive high security as a mandatory baseline expectation. This confirms that the "Trust Level" in Saudi Arabia's cybersecurity framework, supported by the NCA, has transformed security from a motivator into a standard utility. While the negative path coefficient may reflect the perception that lengthy security procedures can be confusing, the lack of statistical significance indicates that security is now viewed as a 'given' requirement. Therefore, adopting sophisticated yet seamless security protocols, such as two-factor authentication (*2FA*), is essential to ensure protection without negatively impacting the user experience. This finding is congruent with recent foundational literatur [58, 38]. Focusing on the statistical parameters in Table 7, the analysis for the fourth hypothesis (H4) demonstrates that ease of use (*EOU*) did not exert a statistically significant impact on customer satisfaction (*CUS*). This outcome indicates that as digital literacy grows in Saudi Arabia, 'ease of use' is no longer a distinctive feature but a standard expectation that does not significantly fluctuate satisfaction levels. Technology has transitioned from being a 'facilitating feature' into a fundamental utility that must exist, but no longer serves as a primary driver for increasing satisfaction. This finding stands in contrast to recent empirical literature [57, 73, 1]. Referring to the structural weights detailed in Table 7, the assessment of the fifth hypothesis (H5) further demonstrates that the reliability of digital services (*REL*) did not exert a statistically significant impact on customer satisfaction (*CUS*). This result is attributed to the fact that in a mature digital market, technical reliability is perceived as an industry norm and a mandatory baseline. The overall expectation of system reliability has become so standardized that its presence no longer triggers additional satisfaction levels, rendering it challenging for reliability to act as a differentiator. This finding contradicts recent contemporary studies [50, 25, 36]. Evaluating the empirical estimates compiled in Table 7, the analysis for the sixth hypothesis (H6) reveals that personalizing digital insurance services—Personalization (*PER*)—does not have a significant impact on customer satisfaction (*CUS*). This suggests that in the rapid digital environment of Saudi Arabia, basic personalization has reached a saturation point and is now viewed as a standard feature, rather than a competitive motivator. This finding is consistent with prior literature [5, 38]. Examining the path coefficients generated in Table 7, the validation of the seventh hypothesis (H7) reveals an absence of a statistically significant impact of response time—Responsiveness (*RSP*)—on customer satisfaction (*CUS*). These conclusions suggest that prompt digital interaction has become an industry norm in Saudi Arabia, where its presence is taken for granted as a hygiene factor, effectively neutralizing its impact as a primary satisfaction driver. These conclusions contradict prior contemporary studies [50, 36]. Concluding the structural model estimation based on the parameters in Table 7 and the framework in Figure 2, the statistical assessment strongly supports both the eighth hypothesis (H8) and the ninth hypothesis (H9), confirming that the swiftness of digital insurance service transactions—Transaction Swiftness (*TSW*)—and the competitiveness of digital insurance premiums(*IPC*) positively impact customer satisfaction (*CUS*). This finding aligns with "Equity Theory" and "Distributive Justice," where customers balance insurance premiums against the efficiency of digital outcomes. This provides a critical insight into a "trade-off" where immediate functional rewards (speed and cost) outweigh technical inputs. Theoretically, this indicates that the Saudi market is in a "honeymoon phase" of digital transformation, where the novelty and efficiency of digital tools overshadow traditional caution. This behavior reflects a broader GCC regional trend driven by high "institutional trust" in regulatory bodies like the IA and NCA, shifting the competitive focus from "functional necessity" to "experiential excellence." Strategically, this implies that while security must remain a robust baseline to prevent catastrophic failure, competitive investment should be reallocated toward speed and price, which are the true strategic drivers in this evolving landscape. The divergence of these results from global literature reflects the unique

socio-technical context of Saudi Arabia, where high institutional trust reduces the individual's perceived need to evaluate foundational security features that are already standardized across the region. This finding is consistent with recent literature [15, 21]. Furthermore, the non-significance of certain dimensions, such as Personalization and Responsiveness, can be attributed to cultural priorities and market maturity in Saudi Arabia. Saudi insurance customers currently prioritize utilitarian outcomes—specifically price competitiveness and transaction speed—over intangible experiential attributes. This behavior reflects a market in its early digital maturity phase, where functional reliability is perceived as a baseline, and cultural trust is primarily built through institutional oversight (IA and NCA) rather than individual service personalization. Such cultural and market dynamics explain why immediate functional rewards outweigh experiential features in this evolving landscape. Among these significant predictors, TSW exhibited the highest relative path coefficient; however, its practical significance remains limited given its small effect size (f^2), and the model leaves 45.7% of the variance in satisfaction unexplained. In conclusion, these results demonstrate that in the evolving Saudi insurance landscape, traditional quality dimensions like reliability (*REL*), security (*SEC*), and ease of use (*EOU*) have become 'baseline expectations,' while transaction swiftness (*TSW*) and premium competitiveness (*IPC*) have emerged as the true strategic drivers of customer satisfaction (*CUS*).

6. Conclusion and Suggestions

The study revealed that the design of the digital insurance services user interface (*UID*), transaction swiftness (*TSW*), and the competitiveness of digital insurance premiums (*IPC*) are important indicators of the quality of digital services in achieving customer satisfaction among Saudi insurance companies. These indicators exert the most considerable impact on customer satisfaction (CUS), thereby enhancing customers' experiences with digital insurance platforms. In contrast, indicators such as platform information quality (*IQ*), service security (*SEC*), ease of use (*EOU*), reliability (*REL*), personalization (*PER*), and responsiveness (*RSP*) did not demonstrate a positive impact on customer satisfaction. This suggests that in the mature Saudi digital insurance market, these dimensions have evolved into "hygiene factors"—baseline expectations that are necessary but no longer sufficient on their own to drive additional satisfaction. This behavior reflects a broader regional trend in the GCC, driven by high institutional trust in regulatory frameworks and the efficiency-oriented preferences of a digitally native population. Crucially, these empirical insights must be evaluated relative to the demographic boundaries of the investigated dataset, which predominantly captured young, highly educated policyholders residing in Riyadh and focused on digital motor insurance portfolios. Accordingly, applying these deductions to older generations or diverse insurance fields such as life and health sectors demands careful analytic caution.

To address these challenges, the study proposes that insurance companies enhance their services by adopting an integrated strategy. The initiation of this strategy should entail the enhancement of user interfaces through the integration of aesthetically pleasing designs, and the augmentation of these designs with precise and contemporary informational content. While current security and reliability standards are viewed as mandatory foundations under the Saudi Insurance Authority (IA) regulations, companies should strive to transform these from "given" requirements into seamless experiences. Strategically, although security and reliability are not active satisfaction drivers, they remain critical safeguards; any reduction in security investment would be risky, as a breach could lead to catastrophic dissatisfaction. Therefore, Saudi insurers should adopt an "Invisibly Robust Security" strategy—maintaining high regulatory standards as a non-negotiable foundation while focusing competitive investments on transaction swiftness and premium competitiveness. This shift reflects a market transition from "functional necessity" to "experiential excellence," where insurers must capitalize on the current "honeymoon phase" of digital transformation by prioritizing the speed and economic value that policyholders demand. The integration of design quality, operational efficiency, and economic value is the cornerstone for transforming digital platforms into key drivers of customer loyalty. The implications of this research offer insights that can assist insurance companies in Saudi Arabia in their efforts to modernize their operations through digital transformation, ultimately contributing to a stronger digital insurance ecosystem.

7. Research Limitations and Future Directions

Although this investigation yields crucial insights, several inherent limitations must be acknowledged. First, the data relies on subjective, self-reported user perceptions rather than dynamic objective technical metrics of the platform systems. While potential common method bias (CMB) was rigorously scrutinized and ruled out using Harman's single-factor test and full collinearity Variance Inflation Factor (VIF) assessments, future scholarly works could expand on this by tracking actual platform usage logs to bypass social desirability constraints. Additionally, the gathered sample heavily reflects younger, highly educated policyholders within the capital city of Riyadh, limiting generalizability to more senior demographics or specialized insurance domains. Furthermore, this structural model evaluated direct causal linkages, omitting potentially rich insights from moderating variables such as consumer age, educational background, or specific policy types. The statistical non-significance observed in subtle dimensions like personalized interfaces or customer responsiveness could stem from distinctive cultural orientations within the contemporary Saudi marketplace. At this specific stage of digital ecosystem development, regional consumers demonstrate a strict utilitarian focus, prioritizing direct transactional velocity and premium cost-competitiveness over softer experiential attributes. This behavior is strongly linked to high institutional trust, where baseline structural stability is assumed to be fully guaranteed by the rigorous standards of the Saudi Insurance Authority (IA) and the National Cybersecurity Authority (NCA). To build upon these insights, forthcoming research should pivot toward longitudinal methodologies or qualitative frameworks, such as semi-structured depth interviews, to uncover the evolving psychological drivers behind policyholder trends. Finally, implementing a more diverse geographic sampling strategy coupled with Multi-Group Analysis (MGA) will prove essential in mapping out how shifting generational attributes alter the strategic pillars of insurance customer satisfaction over time.

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