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The Interrelationship Between Risk Perception, Customer Expectations and Satisfaction in Digital Banking

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Abstract:
Digital banking has transformed financial services, but customer satisfaction remains influenced by numerous factors such as perceived risks and expectations. While prior research emphasizes trust, usability, and perceived value, limited empirical studies have explored how risk perception and customer expectations jointly shape satisfaction. The present research aims to study the relationship between risk perception, customers' expectation, and satisfaction in digital banking, and to assess whether customer expectations mediate the effect of risk perception on satisfaction. A descriptive research design was employed, targeting active digital banking users in the Vijayawada–Guntur region. Stratified random sampling selected 285 respondents. Data were collected via a structured online questionnaire using a five-point Likert scale.

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Descriptive and inferential analysis, like ANOVA and regression were performed using Microsoft Excel and SPSS. Risk perception significantly impacts satisfaction, primarily through trust- and security-related concerns. Customer expectations favourably impact satisfaction and moderate the relationship between risk perception and satisfaction. Features focusing on convenience like time savings, ease of usability, and flexibility are more satisfaction drivers compared with cost but weak drivers of satisfaction are technical faults and regulatory issues. The study demonstrates that trust, security, and expectation management are key to enhancing customer satisfaction in digital banking. Banks should emphasis on minimising risks, aligning services with customer expectations, and investing in innovation, security, and customer education to foster sustainable adoption and loyalty.

Keywords: customer expectations; digital banking; satisfaction and risk perception.

JEL Classification: G41; J10; M30; M41.

Introduction

The information technology-driven transformation of the banking system has redefined customer interactions fundamentally, de-emphasizing conventional face-to-face services in favour of smooth-running technology-enabled interface (Venkatesh et al., 2003; Shaikh & Karjaluoto, 2015). Online and mobile banking are now the backbone of banking processes with the benefit of providing increased convenience, personalization, and access round the clock (Zhou, 2012). While the development has created new risk exposures in the system, risk perception has become the cornerstone in developing expectations of the customers and hence overall satisfaction (Martins et al., 2014).

In this dynamic environment, customers demand not only utility but also easy-to-use, secure, and personalized digital services that are underpinned by clarity and trustworthiness (Laukkanen, 2016). These expectations are frequently weighed against cybersecurity breach concerns, data protection issues, fraud, and system robustness (Koksal, 2016). Perceived risks of that kind, actual or prospective, appear to cut deeply into satisfaction because customers consider not only the functional quality of digital media but also their safety and robustness (Featherman & Pavlou, 2003).

The interplay between digital banking, customer expectations, and risk perception can be explained through several theoretical frameworks. The Expectation Confirmation Theory (ECT) states that customer satisfaction arises when actual service performance meets or exceeds prior expectations (Oliver, 1980). Similarly, the Technology Acceptance Model (TAM) highlights perceived usefulness and ease of use as central elements of customer adoption and satisfaction with digital platforms (Davis, 1989). Extending this view, the SERVQUAL model underscores that digital service quality depends not only on functionality but also on emotional and cognitive dimensions such as trust, confidence, and compliance (Parasuraman, et al. 1988). Collectively, these perspectives reveal that customer expectations and satisfaction are not formed in isolation; rather, they are deeply influenced by perceived risks associated with security, privacy, and system reliability (Yousafzai et al., 2009). For banks, this three-way dynamic is both strategic and rational. Institutions that respond proactively to customer concerns through transparency, robust cybersecurity, and user-friendly digital interfaces can transform risk into reassurance (Alalwan et al., 2016). By blending digital innovation with evolving customer expectations, banks can enhance satisfaction, build trust, and secure long-term loyalty in an increasingly competitive financial marketplace (Ladhari et al., 2011).

In emerging economies like India, even traditional theories of satisfaction, such as the Expectation Confirmation Theory and the Technology Acceptance Model, provide limited insights into the formation of satisfaction for digital banking. These are conceptual models based on assumptions of stable expectations and low-risk service conditions. However, this research has established that users of Indian digital banking operate under high uncertainty driven by concerns related to fraud, data security, limited digital literacy, and system reliability. Contrary to ECT, which assumes that expectations come before experiences, this study finds that perceived risk significantly influences expectations ($\beta = 0.42$), indicating that risk perception precedes expectation.

This risk-expectation linkage is structurally different from the linkage according to traditional theory predictions and therefore shows the inadequacy of those models in situations with a trust deficit and evolving digital infrastructure. Hence, a more holistic and integrated theoretical model is required that correctly explains customer satisfaction in high-risk digital banking environments. Therefore, the present study investigates the connection between digital banking, customers' expectations, risk perception, and satisfaction through empirical validation, theoretical foundations, and industry illustrations. The paper seeks to draw practical inferences for banks ahead in terms of striking a balance between the customer-first ideology and innovation in achieving resilience, relevance, and faith in the digitally evolving world.

Theoretical Framework

The connection between risk perception and satisfaction and between customer expectations and satisfaction in online banks could be well accounted for with existing theories of consumer behaviour and IT adoption. Risk perception that is linked with security and system reliability concerns is central in the formation of the way the customer judges the services of online banks (Featherman & Pavlou, 2003; Martins et al., 2014). Perceived risks that are higher lead to the reluctance of the customers to uptake the services and to the expression of low satisfaction (Yousafzai et al., 2009).

Customer expectations are a main mediatorial variable in the equation. Through The Expectation Confirmation Theory (ECT), satisfaction results from actual performance of the service matching or going beyond expectations already created (Oliver, 1980). Customers in online banks typically anticipate efficiency, reliability, simplicity of use, and protection of transactions (Laukkanen, 2016). Effectively managed risk supports the likelihood of expectations being met and consequently improving satisfaction but failure to meet expectations might lead to dissatisfaction in spite of the technical stage of the delivery of the service running smoothly (Bhattacherjee, 2001).

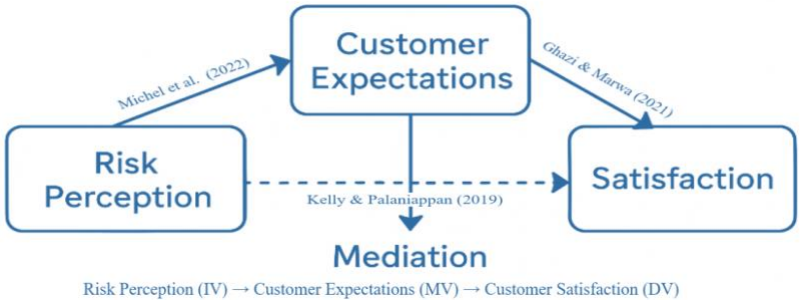
The core theoretical contribution of this study lies in bringing together risk perception, customer expectations, and customer satisfaction into an empirically validated framework. Unlike prior research that examines these constructs in isolation, this model therefore shows a clear mediating mechanism through which risk influences satisfaction. The results indicate that perceived risk shapes expectations significantly ($\beta = 0.42$), and that expectations strongly drive satisfaction ($\beta = 0.49$). This confirms the pathway: Risk → Expectation → Satisfaction. This is a novel insight because it illustrates the fact that expectations serve as the psychological conduit whereby concerns related to data security, fraud, and knowledge gaps affect satisfaction. Hence, the study extends the traditional expectation-confirmation logic by reframing expectations not only as predictors of satisfaction but also as mediators conditioned by perceived risk, an aspect little explored in digital banking literature to date. In this framework, risk perception is presented as the antecedent of the expectations of the customers that result in satisfaction outcomes. Hence, expectations psychologically intervene between risk and forming satisfaction through the impact on perceived quality of the service (Zhou, 2012). The conceptual model is a complete explanation of the risk- expectations- satisfaction path and thus a valuable account of the experience of the client in the digitized bank.

Conceptual Framework

The conceptual model identifies customer expectations as the pivotal mediating mechanism in the Risk → Expectation → Satisfaction pathway. Statistical results confirm partial mediation, showing that risk exerts a direct effect on satisfaction ($\beta = 0.22$), while a stronger indirect effect is conveyed through expectations ($\beta = 0.42 \rightarrow 0.49$) (Table 7). Risk perception was assessed as a formative construct comprising six dimensions, namely, trustworthiness, data safety, digital knowledge gaps, unorganized applications, fraud risk, and regulatory restrictions, which represents the cumulative nature of perceived digital banking vulnerabilities. The construct showed strong convergence (CR = 0.90; AVE = 0.61) (Table 6), confirming its appropriateness. Major risk dimensions, such as data safety, trust, fraud risk, and knowledge gaps, significantly influence expectations (Table 4), while the latter determines satisfaction through system reliability, accuracy, and innovativeness (Table 5). This mediated mechanism constitutes the theoretical backbone of the model and the main contribution of this study, as

it points out that customer expectations are the psychological route through which perceived vulnerabilities are channelled to satisfaction.

Figure 1: Interrelationship between risk perception, customer expectations and satisfaction in digital banking



The conceptual framework outlines the relationship between risk perception, customers' expectation, and satisfaction in internet banking. Risk perception embodies the concerns of customers about security, privacy, and system reliability that affect their confidence and willingness to use internet banking services. Customers' expectation is the mediator that captures the standards and beliefs customers possess about the performance of the service in convenience, efficiency, and security terms. High risk perception may result in careful or negative expectations that decrease the prospect of satisfaction. When banks minimize risks through strong security control and open communication, the expectations are favourably influenced and hence favourable prospects for satisfaction result. Satisfaction, the outcome variable, is the overall assessment of the internet banking experience by the customers and is defined by the level at which expectations are fulfilled. Accordingly, risk perception is proposed to directly and indirectly impact satisfaction where the relationship is mediated by the expectations of the customers.

1. Research Background

In the fast-changing environment of online banking, the combination of customer psychology, service quality, and technological development has turned into a vital domain of academic scrutiny. With digitization redefining the face of financial services, banks no longer compete with each other on the basis of efficiency and innovation but on risk perception management, adherence to the expectations of customers, and satisfaction in a highly competitive marketplace. Mobile banking, internet banking, and fintech-driven payment systems have changed the very face of interactions between the customer and the bank and put the focus on sustainability of the bank at the level of trust, security, and reliability of servicing.

Prior studies highlight the crucial role of risk perception, trust, and security in shaping customer behaviour in digital banking. Mwesigwa & Nkundabanyanga (2011) found that higher perceived risk negatively affects adoption, while trust reduces risk concerns and strengthens satisfaction and loyalty, with security being the most critical determinant. Esmaeili et al. (2021) showed that relative advantage, satisfaction, and trust strongly enhance loyalty, whereas perceived risk undermines it, suggesting that convenience and benefits must outweigh risk concerns. Triwardhani et al. (2023) emphasized trust as the strongest predictor of adoption, with risk perception having unexpected positive effects when benefits and reliability are perceived as high. Almaiah et al. (2023) demonstrated that perceived security, trust, and service quality significantly improve attitudes and adoption, while perceived risk erodes trust. Similarly, Audina & Sudrartono (2024) stressed that robust risk management, regulatory collaboration, and customer education enhance security perception and sustain satisfaction.

Overall, the literature consistently shows that trust mitigates the positive influence of risk perception, while security emerges as the strongest predictor of satisfaction, loyalty, and adoption. However, most studies focus on adoption and loyalty rather than ongoing satisfaction, and few explicitly examine the mediating role of customer expectations. This gap underscores the need to investigate whether expectations act as the mechanism through which risk perception translates into satisfaction in digital banking.

Few studies stranded in the Technology Acceptance Model (TAM) demonstrate that perceived usefulness (PU) and ease of use (PEOU) outline customers' attitude and intention, while security and privacy concerns function as risk-related beliefs influencing expectations and satisfaction. Evidence shows that perceived security and trust counterbalance risk perceptions, indirectly fostering satisfaction through positive attitudes. Herzallah et al. (2018) further emphasizes that trust, driven by security, privacy, and usefulness, is the strongest interpreter of online banking adoption, whereas ease of use exerts minimal influence. These results imply that banks ought to stress cybersecurity, clear data protection, and trust-establishing steps more than simplicity of interface in new markets. In general terms, the literature suggests that customer trust, influenced mainly by security, privacy, and usefulness, is central to lowering risk perceptions, expectations alignment, and acceptance of digital banks. Such a gap initiates the present study whose raise research questions is: *"What is the Role of Customer Expectations in shaping Satisfaction with Digital Banking Services"?*

TAM-based studies routinely report that perceived usefulness (PU) and ease of use (PEOU) determine attitudes and intentions whereas security and privacy function as risk-related beliefs that determine customer expectations and satisfaction. By way of illustration, Herzallah et al. (2018) report that trust, with security, privacy, and usefulness as antecedents, was the strongest predictor of the adoption of online banks whereas ease of use has a limited effect. This highlights the necessity of banks emphasizing secure private systems and trust-building methods at the expense of simplicity of interface in the case of emerging markets.

Customer expectations are also found to be commensurate with satisfaction in the study of service quality. Lee & Moghavvemi (2015) found that the antecedents of service quality like reliability, security, and empathy buttress perceived value that in turn fuels satisfaction, trust, and loyalty. Similarly, Sarkar & Gope (2020) emphasized responsiveness, assurance, and reliability as key signals of competence and safety, reinforcing expectations of secure digital services. Kaur et al. (2021) found that Indian customers largely value digital transformation, with assurance, transparency, and government-backed consumer protection reducing risk concerns and fostering loyalty. Other studies highlight the centrality of customer experience and expectations. Arora & Banerji (2024) argued that digital service quality (RATER framework) elevates satisfaction, which then mediates loyalty, though they did not address risk perception. Yu & Nuangjamnong (2022) reported that performance-related attributes such as speed, accessibility, and relative advantage dominate satisfaction judgments in China, where baseline security is assumed, and risk plays little role. By contrast, Harb et al. (2022) stressed that cost-effectiveness, convenience, and safety enhance satisfaction in times of uncertainty, highlighting digital resilience as a competitive advantage.

From an Islamic banking perspective, Zouari & Abdelhedi (2021) confirmed that service quality positively influences satisfaction, with assurance functioning as a risk-attenuating cue. Likewise, Ramezani et al. (2024) found that while e-satisfaction boosts e-loyalty, perceived risk weakens this relationship, especially for less digitally skilled customers, suggesting that expectations of security and usability are critical for sustaining loyalty. Bayyapu et al. (2021) highlight that digital transformation, through mobile apps and AI chatbots, enhances satisfaction and loyalty by providing personalized, seamless, and secure services, though data privacy, cybersecurity, and the digital divide remain key challenges. Barjaktarovic Rakocevic et al. (2025) found that time-saving, simplicity, and flexibility significantly improve satisfaction, while concerns about data safety, fraud, and lack of knowledge reduce it. Interestingly, expectations for better security or simpler apps did not show a strong effect on satisfaction.

Furthermore, reviewing the literature shows a significant interrelationship between customer risk perception, expectations, and satisfaction regarding digital and AI-enabled banking. For instance, Bindiya & John (2025) find evidence of an adoption-satisfaction paradox, where a high usage of advanced digital banking services among women, young adults, and students does not lead to satisfaction due to unmet expectations. Fathimath & Santhi (2024) therefore underline generational differences: Gen X considers security a priority; for Gen Y, convenience matters the most; for Gen Z, the ability to be innovative and personalized. Thasleena & Santhi (2025) also identified that efficiency, trust, and user experience are drivers for positive attitudes toward AI banking, but its adoption is impeded by privacy and security concerns. Overall, the studies suggest that managing risk perceptions through

strong cybersecurity and expectation alignment is required for improving satisfaction and increasing the rate of adoption. Overall, customer satisfaction in digital banking is shaped by both convenience and risk concerns, with expectations playing a mixed role, suggesting they may mediate how perceived risks influence satisfaction. This gap motivates the present research question is: "Do Customer Expectations Mediate the Relationship between Risk Perception and Satisfaction"?

Previous work is also limited by methodological and geographical factors in that it frequently examines adoption intentions in a narrow sense but not ongoing satisfaction. Few utilize longitudinal or cross-country designs and hence the ability to generalize is restricted. Further, the relationship between Risk Perception and Satisfaction and between Expectations and Satisfaction has hardly been studied in a holistic manner, whereas new technologies such as AI, blockchain, and superior cybersecurity are transforming the basis of customer trust in online banks. To address the gaps in the prior work, this study explores the interactions between risk perception and customer expectations to determine the impact on satisfaction. By crafting a holistic framework in a theoretic and practice sense, the study provides banks with actionable advice to reinforce online strategies and build trust and improve experience in a competitive technology-intensive environment.

This study contributes both theoretical and practical contributions to the understanding of digital banking adoption. Theoretically, it extends existing literature by integrating risk perception, customer expectations, and satisfaction into a unified framework, addressing the gap where these constructs have largely been examined separately. By exploring their interrelationships, the study enhances expectation–confirmation theory and risk perception models, providing deeper insights into how customer psychology influences satisfaction in digital banking contexts. Practically, the study provides banks and other financial institutions with actionable advice. Knowing the way risk perceptions form expectations among the customers, the banks can frame strategies to build up confidence and trust. Additionally, insights into the mediating role of expectations can inform improvements in service quality, transparency, and customer experience. Overall, the study supports the design of customer-centric digital banking strategies that promote sustainable adoption, loyalty, and long-term competitiveness in an increasingly technology-driven financial environment.

2. Research Methodology

The methodology aims to observe how risk perception and customer expectations influence satisfaction with digital banking services, and whether expectations mediate the relationship between risk perception and satisfaction. It seeks to provide a concise understanding of the key factors shaping customer satisfaction in digital banking.

Table 1: Variable Measurement scale

Variables	Constructs	Scales
Digital Banking Service Characteristics	Lower Costs	Rate Scale from 1 (least important) to 5 (very important))
	Saving Time	
	Use Simplicity	
	Time / Place Flexibility	
Customer expectations	Transparency & Low-Cost Transactions	Rate Scale from 1 (low expectations) to 5 (very high expectations)
	Reliability & Accountability of Transactions	
	Availability of Multiple Features	
	Better Security & Privacy of Digital Banking	
	More User-friendly Applications & Channel	
	Innovation Functionalities (AI Chatbots, Personalized Offers, Advanced Apps)	
Customer Perceived Risk	Trusty worthiness	Score Scale from 1 (lowest risk) to 5 (highest risk)
	Data Safety & Security Concerns	
	Lack of Digital Banking Knowledge	

Variables	Constructs	Scales
	Unorganized Applications	
	Risk of Fraudulence	
	Regulatory Risk Restrictions (RRR)	

Source: Collected data from various referred journals.

This study follows a descriptive qualitative research design to explore the interlink between risk perception, customer expectations, and satisfaction in digital banking. The population comprises all customers in the Vijayawada–Guntur region, with respondents limited to those knowledgeable about and actively using digital banking. Using stratified random sampling, 285 respondents were selected to ensure representation across customer segments. Data were gathered through a structured questionnaire (through online survey) on a five-point Likert scale, capturing customer risk perceptions and experiences. Primary data was collected from bank customers, while secondary data were sourced from research articles, journals and related publications. Both descriptive and inferential statistical methods were applied. Microsoft Excel and SPSS were used for ANOVA and Regression Analysis, enabling the identification of significant relationships and validation of the conceptual framework.

3. Results & Discussions

The demographic profile of the sample reveals that males (56.14%) slightly outnumber females (43.86%), indicating a balanced gender representation with a male dominance. In terms of age, the majority of respondents fall between 31–35 years (35.09%), followed by 26–30 years (29.82%), while only 7.02% belong to the youngest age group of 18–25 years, showing that the sample is largely composed of mid-aged individuals. Regarding educational qualifications, diploma holders form the largest group (38.60%), followed by postgraduates (33.33%), while graduates and others constitute 16.84% and 11.23%, respectively, suggesting a reasonably well-qualified sample. Professionally, most respondents are engaged in private jobs (38.60%), with government employees (24.56%) and businesspersons (21.05%) forming substantial proportions, while students comprise the smallest group (15.79%). Income distribution indicates that the largest share of respondents earns between ₹25,001–₹35,000 (38.60%), followed by ₹15,001–₹25,000 (28.07%), while 21.05% earn above ₹35,000, and a minority of 12.28% earn below ₹15,000. In conclusion, the sample represents a predominantly middle-aged, diploma-educated, and privately employed group with moderate to higher income levels, providing a balanced demographic base for the study.

Table 2: Demographic profile of the respondents

Variable	Classification	Frequencies	Percentages
Gender	Male	160	56.14
	Female	125	43.86
Age (Years)	Between 18 - 25 Years	20	7.02
	26 – 30 Years	85	29.82
	31 – 35 Years	100	35.09
	36 – 40 Years	50	17.54
	Above 40 Years	30	10.53
Qualification	Graduate	48	16.84
	Diploma	110	38.60
	Postgraduate	95	33.33
	Others	32	11.23
Profession	Students	45	15.79

Variable	Classification	Frequencies	Percentages
	Govt Job	70	24.56
	Pvt Job	110	38.60
	Business	60	21.05
Income (Per Month)	Below 15,000	35	12.28
	15,001 – 25,000	80	28.07
	25,001 – 35,000	110	38.60
	Above 35,000	60	21.05

Source: Author's Calculations.

Table 3 presents a comparison of three groups of respondents based on their level of satisfaction with digital banking services (Group 01 - Dissatisfied; Group 02 - Satisfied; Group 03 - very Satisfied) in relation to the importance of various service features. The analysed characteristics (Lower Costs, Time Savings, Use Simplicity, and Flexibility of Time/Place) were tested to determine their influence on customer satisfaction. The results indicate that while some features significantly impact satisfaction levels, others do not, thereby partially confirming the hypothesis that differences in satisfaction are influenced by these service attributes. The variable Lower Costs ($F = 1.596$, $p = 0.204$) shows no statistically significant difference in satisfaction levels across groups, indicating that cost-related benefits may not be a strong differentiator of satisfaction. However, Time-Saving ($F = 3.261$, $p = 0.039$) demonstrates a significant effect, suggesting that the ability of digital banking to save time contributes meaningfully to higher satisfaction. Similarly, Use Simplicity ($F = 4.562$, $p = 0.011$) also indicates a significant difference among groups, emphasizing that ease of use is a critical determinant of satisfaction. The strongest effect is observed in Flexibility of Time/Place ($F = 6.040$, $p = 0.003$), which shows a highly significant relationship, underscoring that the anytime-anywhere convenience of digital banking is the most influential factor in shaping customer satisfaction levels. In conclusion, while lower costs do not significantly impact satisfaction, factors such as time-saving, simplicity, and flexibility play a decisive role in enhancing customer satisfaction with digital banking services.

Table 3: Characteristics of customer satisfaction levels towards digital banking services

Variable	Source of Variation	Sum of Squares	Df	Mean Square	f	p
Lower Costs	Groups (Between)	06.01	02	03.01	01.60	0.20
	Groups (Within)	992.22	283	01.88		
	Sum	998.23	285			
Saving Time	Groups (Between)	03.75	02	01.87	03.26	0.04
	Groups (Within)	303.01	283	00.58		
	Sum	306.75	285			
Use Simplicity	Groups (Between)	07.26	02	03.63	04.56	0.01
	Groups (Within)	419.22	283	00.79		
	Sum	426.48	285			
Time / Place Flexibility	Groups (Between)	08.00	02	03.98	06.04	0.01
	Groups (Within)	347.43	283	00.66		
	Sum	355.40	285			

Notes: df - degrees of freedom; f - statistic; p - statistical significance. Source: Author's Calculations

Table 4 presents an evaluation of three (03) groups of respondents on the impact of digitalization of products and services on banks' satisfaction (Group 01 - Does not affect; Group 02 - Affect; Group 03 - Affects a lot). The analysis focuses on perceived risks, including Trustworthiness, Safety of Personal & Financial Data, Insufficient Knowledge of Digital Banking, Non-Functional Applications, Risk of Fraud, and Regulatory Restrictions Risk. To test the hypothesis i.e., H_{01}: Risk perception has a significant positive effect on customer satisfaction in digital banking. The findings reveal that four variables - Trustworthiness, Safety of Data, Knowledge Gap, and Fraud Risk - significantly influence customer satisfaction, whereas Non-Functional Applications and Regulatory Restrictions show no significant effect. Overall, risk perception employs a significant positive impact on customer satisfaction, with the effect being primarily driven by trust and security-related risks rather than technical or regulatory concerns. The ANOVA results examine the impact of perceived risks in digital banking on customer satisfaction levels. The analysis shows that Trustworthiness (F = 2.483, p = 0.016), Safety of Personal & Financial Data (F = 3.188, p = 0.042), Insufficient Knowledge of Digital Banking (F = 4.088, p = 0.017), and Risk of Fraud (F = 3.623, p = 0.027) have statistically significant effects on customer satisfaction.

Table 4: Assessing the customers' satisfaction levels in terms of perceived customer's risk towards digital banking services

Variable	Source of Variation	Sum of Squares	df	Mean Square	f	p
Trusty worthiness	Groups (Between)	11.94	02	03.60	02.48	0.02 (Sig)
	Groups (Within)	874.32	283	01.44		
	Sum	886.26	285			
Data Safety & Security Concerns	Groups (Between)	10.88	02	05.44	03.19	0.04 (Sig)
	Groups (Within)	908.07	283	01.71		
	Sum	918.95	285			
Lack of Digital Banking Knowledge	Groups (Between)	12.38	02	06.19	04.09	0.02 (Sig)
	Groups (Within)	805.19	283	01.51		
	Sum	817.57	285			
Unorganized Applications	Groups (Between)	03.33	02	01.66	00.94	0.39 (Not Sig)
	Groups (Within)	936.87	283	01.76		
	Sum	939.20	285			
Risk of Fraudulence	Groups (Between)	11.45	02	05.72	03.62	0.03 (Sig)
	Groups (Within)	840.52	283	01.58		
	Sum	851.97	285			
Regulatory Risk Restrictions (RRR)	Groups (Between)	00.88	02	00.44	00.28	0.75 (Not Sig)
	Groups (Within)	827.97	283	01.56		
	Sum	828.85	285			

Notes: df - degrees of freedom; f - statistic; p - statistical significance.
Source: Author's calculations

These findings highlight that customers are highly sensitive to issues of security, data safety, fraud prevention, and their own knowledge gaps when using digital banking services. On the other hand, Non-Functional Applications (F = 0.944, p = 0.390) and Regulatory Restrictions Risk (F = 0.283, p = 0.753) do not show significant influence, suggesting that technical glitches or regulatory concerns are not perceived as major differentiators of satisfaction. In conclusion, the study confirms that customers' satisfaction in digital banking is strongly influenced by trust, data security, knowledge adequacy, and fraud-related risks, whereas non-functional and regulatory risks have limited impact.

Table 5 presents an evaluation of three (03) groups of respondents regarding the impact of digitalization of products and services on bank satisfaction (Group 01 - Does not Affect; Group 02 - Affect; Group 03 - Affects a lot). The analysis focuses on customers' expectations from digital banking services, including Transparency and Low Transaction Costs, Reliability and Accuracy of Transactions, Seamless Integration and Availability of Multiple Features, Better Security and Privacy, and More User-Friendly Applications, Channels, and Innovative Functionalities. To test the hypothesis i.e., H_{02}: Customers' expectation has a significant positive effect on customers' satisfaction in digital banking.

Table 5: Assessing the customer satisfaction levels with usage of customers' expectations towards digital banking services

Variable	Source of Variation	Sum of Squares	df	Mean Square	f	p
Transparency & Low-Cost Transactions	Groups (Between)	03.33	02	0.68	07.72	0.06
	Groups (Within)	936.87	283	0.31		
	Sum	940.20	285			
Reliability & Accountability of Transactions	Groups (Between)	07.26	02	10.29	12.30	0.00
	Groups (Within)	419.26	283	0.91		
	Sum	426.52	285			
Availability of Multiple Features	Groups (Between)	27.65	02	13.82	17.21	0.00
	Groups (Within)	427.41	283	0.80		
	Sum	455.06	285			
Better Security & Privacy of Digital Banking	Groups (Between)	0.84	02	0.42	0.45	0.63
	Groups (Within)	492.90	283	0.93		
	Sum	493.74	285			
More User-friendly Applications &Channel	Groups (Between)	5.28	02	2.64	2.87	0.06
	Groups (Within)	490.10	283	0.92		
	Sum	495.38	285			
Innovation Functionalities	Groups (Between)	13.48	02	6.74	10.36	<0.001
	Groups (Within)	346.19	283	0.65		
	Sum	359.67	285			

Notes: df - degrees of freedom; f - statistic; p - statistical significance. Source: Author's Calculations

ANOVA results assessing the relationship between customers' expectation from digital banking services and its level of satisfaction. Among the six expectation variables tested, three variables, Reliability & Accuracy of Transactions ($p = 0.004$), Seamless Integration & Availability of Multiple Features ($p = 0.001$), and Innovation Functionalities (AI Chatbots, Personalized Offers, Advanced Apps) ($p < 0.001$), show a statistically significant impact on customer satisfaction ($p < 0.05$). In contrast, the variables Transparency & Low Transaction Costs ($p = 0.057$), Better Security & Privacy of Digital Banking ($p = 0.635$), and More User-Friendly Applications & Channels ($p = 0.058$) do not show statistically significant effects. Overall, the results confirm that customers' expectation have a significant positive effect on satisfaction in digital banking. However, the impact is primarily driven by expectations related to accuracy, integration of features, and innovation, while cost, security, and ease of use were found to be less influential.

Table 6 presents the descriptive statistics and reliability results for the four main constructs: Characteristics, Customer Perceived Risks, Customer Expectation, and Customer Satisfaction. The analysis of reliability confirms that the constructs are statistically weighted, allowing the study to move forward with assurance in testing hypotheses.

From a practical viewpoint, banks must focus on customer expectations and risk mitigation as these directly shape satisfaction levels in digital banking. The measurement model exhibits strong reliability and validity. Construct reliability reveals high internal consistency (CR = 0.86–0.92; α = 0.83–0.90), while convergent validity is ascertained with AVE values exceeding 0.50 for all constructs (Table 05). Discriminant validity is further demonstrated by HTMT ratios ranging from 0.71 to 0.77, all below the conservative threshold of 0.85, confirming that risk perception, expectations, characteristics, and satisfaction is conceptually distinct. These results provide strong validation of the robustness of the model and lend more empirical weight to the Risk → Expectation → Satisfaction mediation framework.

Table 6: Descriptive statistics and reliability

S.no.	Construct	Items	Mean	SD	CR	AVE	HTMT	Cronbach's α
01	Characteristics	04	3.78	0.62	0.86	0.55	0.70	0.83
02	Customer Perceived Risks	06	3.65	0.71	0.90	0.61	0.78	0.87
03	Customer Expectation	06	3.82	0.66	0.92	0.64	0.76	0.90
04	Customer Satisfaction	04	3.74	0.59	0.88	0.60	0.73	0.85

Source: Complied data from SPSS.

From Table 7 depicts that the Regression Analysis for Customer Expectations as a Mediator the relationship between risk perception and customers' satisfaction in digital banking. Perceived risk has a significant positive effect on customer expectations (β = 0.42, p < 0.001), while customer expectations strongly influence satisfaction (β = 0.49, p < 0.001). Even after including expectations as a mediator, perceived risk continues to directly impact satisfaction (β = 0.22, p < 0.002), confirming partial mediation. This indicates that while higher perceived risks directly reduce satisfaction, they also shape customer expectations, which, when met, enhance satisfaction. Thus, customer expectations serve as a critical bridge between risk perception and satisfaction. To test the hypothesis i.e., H_{03}: Customer Expectations Mediate the Relationship between Risk Perception and Customers' Satisfaction in Digital Banking. highlights that customer expectations plays a Strong mediating role between risk perception and satisfaction. While perceived risks can directly reduce satisfaction, much of their influence operates through the way risks shape customer expectations. Hence, banks must not only minimize risks but also proactively meet heightened expectations to ensure sustained digital banking satisfaction.

Table 7: Regression analysis for customer expectations mediate association between risk perception and customer satisfaction

Mediator Variable	β	SE	t-value	p-value
PER RISK → CUST EXPECT	0.42	0.06	6.38	< 0.001
CUST EXPECT → CUST SAT	0.49	0.07	8.13	< 0 .001
PER RISK → CUST SAT (Direct)	0.22	0.08	5.72	< 0.002
Constant	1.20	0.15	8.00	< 0.001

Notes: t - statistic; p - statistical significance.
Source: Compiled data from SPSS

From below the Table 8 model demonstrated an acceptable overall fit to the data, F (01.74) = 3267, p < 0.072. The fit indices were as follows: CFI = 0.849, TLI = 0.785, SRMR = 0.045, and RMSEA = 0.034 (95% CI: 0.232–0.252). While SRMR and RMSEA indicate an excellent model fit, the CFI and TLI values suggest only moderate adequacy. The information criteria values (AIC = 6472; BIC = 7108) provide additional benchmarks for model comparison, with lower values in alternative models indicating improved fit.

Table 8: Model fit indices

Test for Exact Fit							
ANOVA / Chi-Square		df		p			
3267		01.74		<0.072			
Fit Measures							
				RMSEA 90% CI:			
CFI	TLI	SRMR	RMSEA	Lower	Upper	AIC	BIC
0.849	0.785	0.045	0.034	0.232	0.252	6472	7108

Source: Complied data from SPSS.

The demographic profile indicates that the study's findings have strong practical relevance for banks and policymakers targeting middle-income, working-age, and educated customers, who constitute the core user base of digital banking services. The study confirms that customer satisfaction is more strongly influenced by time-saving, ease of use, and flexibility than by cost, suggesting that banks should prioritize convenience-oriented innovations over cost-based competition. Findings further reveal that satisfaction is shaped primarily by trust, security, knowledge, and fraud prevention, rather than technical glitches or regulatory concerns. Customers place greater emphasis on bank trustworthiness, data safety, digital literacy, and fraud risk mitigation when evaluating satisfaction. The study identifies four key variables - Trustworthiness, Data Safety, Knowledge Gap, and Fraud Risk, as significant determinants of satisfaction, while Non-Functional Applications and Regulatory Restrictions have negligible effects. In general, risk perception exerts a significant impact on satisfaction largely through issues of security and trust related concerns. Risk influences satisfaction because customers in emerging markets face uncertainties associated with data safety, cyber fraud, and digital literacy, which raise vulnerability and lower trust, thereby reducing satisfaction (Table 4). Expectations is another driver of satisfaction, as users evaluate digital banking performance based on the level of accuracy, ease of working, and innovativeness of the services provided (Table 5), satisfaction being higher when such expectations are met. Further, perceived risk to be higher is associated with stricter expectations ($\beta = 0.42$) because customers become cautious and demand more reliability, transparency, and security. Thus, risk impacts satisfaction directly and indirectly by influencing expectations.

Furthermore, expectations from the customers greatly determine satisfaction, with reliability, precision, smooth integration, and innovative features being the top drivers. Transparency, safety, and ease of use emerged with no considerable impact. The result lends support to the hypothesis that expectations positively mediate the risk perception-satisfaction relationship. Practically, banks ought to be keen on risk perception management and services that conform with expectations from customers. By tackling issues of trust and security while guaranteeing precision, feature integration, and innovation, banks can raise the level of satisfaction. The results emerge with the vision that expectations from the customers form a very important linkage between perceived risk and satisfaction and support the notion of expectation management in the context of digital banking strategy. India's rapid digital adoption, surge in UPI transactions, and increasing cases of cyber-fraud make risk a central element of the customer experience. The mediation pathway suggests that banks not only have to mitigate actual risks but also have to actively manage customer expectations through transparency and consistent performance. In environments where there are deficits of trust, customers use expectations as a cognitive mechanism to navigate uncertainty, and thereby effective expectation management is a strategic imperative for digital banking.

Conclusion

This paper sheds valuable light on the determinants of customer satisfaction in internet banking with empirical and theoretical contributions to banks and policymakers. The results suggest that convenience-related attributes like usability, efficiency, and accessibility are more influential drivers of satisfaction in the first instance compared to price competitiveness. Further, psychological and security-related risks in the form of trust, data confidentiality, protection against frauds and awareness of the customers feature prominently in the formation of satisfaction with less contribution from technical failure and regulatory impediments.

This research demonstrates that, in emerging markets, digital banking satisfaction is primarily driven by the interaction of perceived risk with customer expectations. While perceived risk has a direct negative effect on satisfaction, its effect is much stronger when it acts through expectations, which is the chief psychological mechanism that connects customer vulnerability with overall service quality evaluation.

The results confirm that risk perception significantly affects satisfaction, with much of its influence operating through customer expectations, which act as a strong mediating mechanism. Expectations related to accuracy, seamless integration of features, and innovation are particularly influential, highlighting the need for banks to proactively align services with customer expectations while mitigating perceived risks. The study further reveals that the strongest drivers of customer satisfaction are related to expectations on accuracy, reliability, feature integration, and innovation. Combining robust security with effective expectation management, therefore, becomes very important for banks if they have to increase satisfaction to support digital adoption. Real-time fraud alerts, transparent communication of data protection, and visible encryption, among others, will be necessary as risk negatively impacts satisfaction. Simultaneously, service promise expression, system reliability, and easy features such as AI-driven assistance, personalized dashboard, and seamless multi-service access need to be introduced. The customer education programs which will help bridge the digital knowledge gaps also play a very important role in satisfaction (Table 4).

The study measurement results indicate that the constructs used, service characteristics, perceived risks, customer expectations, and satisfaction, are statistically reliable and valid, supporting robust hypothesis testing. The model fit indices further confirm that the proposed framework provides an acceptable representation of the interrelationships among risk perception, expectations, and satisfaction, though some indices suggest opportunities for refinement in future research. Overall, the study concluded that banks should focus on trust-building, robust security measures, customer education, and expectation management to enhance satisfaction, loyalty, and sustainable adoption in an increasingly digital and competitive banking environment.

Scope and Limitations of the Study

This study investigates the interrelationship among risk perception, customer expectations, and satisfaction in digital banking, focusing on how trust, security, and convenience-oriented features influence customer satisfaction, and whether expectations mediate the impact of risk perception. The research is geographically confined to the Vijayawada–Guntur region and targets active digital banking users across diverse demographic segments, providing insights for banks and financial institutions to improve service quality, trust, and overall customer experience. However, the study has certain limitations. Because the study was based in only one region the results might not be completely applicable to other regions or countries. The sample size of 285 respondents represents a specific user base, which may not capture the full diversity of digital banking users. The cross-sectional design captures insights at a single point in time, and self-reported responses may introduce bias due to subjective judgment. Additionally, while the study focuses on risk perception, expectations, and satisfaction, other factors such as technological infrastructure, cultural stimuli, and regulatory changes were not extensively explored. Longitudinal approaches in future studies should track how risk perception changes with increasing digital experience. Cross-regional or cross-country comparative research will deal with the cultural and infrastructural variability of the risk–expectation–satisfaction linkage. Further, a range of technological variables should be added, like the adoption of AI, mechanisms for cyber-resilience, and integration of fintech, to understand how satisfaction is shaped in emerging digital banking ecologies.

Credit Authorship Contribution Statement

Guduri, N.., was responsible for the conceptualization of the research framework, designing the methodology, conducting the formal analysis. Irrinki, M. K. contributed to data collection, performed the investigation. Repalle Giddaiah, R. and Kotigari Reddi Swaroop. assisted in validating the results, and participated in reviewing and editing the manuscript. All authors have read and approved the final version of the paper.

Conflict of Interest Statement

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Acknowledgement/Founding

N/A

Data Availability Statement

The data that support the findings of this study are not publicly available due to [reason: privacy, ethical, or legal restrictions], but are available from the corresponding author upon reasonable request.

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