





Validation of the Value-Creation-Based Smart Banking User Needs Model (Case Study: Bank Melli Iran)

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ABSTRACT

Validation of models grounded in modern marketing strategies can provide a foundation for enhancing competitive performance and creating a distinctive customer experience in the banking industry. The objective of the present study was to validate a value-creation-based smart banking user needs model (case study: Bank Melli Iran). In terms of purpose, the study was applied, and methodologically it employed a quantitative design using a structural modeling approach. The statistical population consisted of users of the BAM digital banking system of Bank Melli Iran in South Khorasan Province (N = 129,000). A sample of 384 participants was selected using the Morgan sampling table through convenience sampling. Data were collected using a researcher-developed questionnaire. The validity and reliability of the instrument were confirmed through convergent and discriminant validity as well as Cronbach's alpha coefficient ($\alpha = 0.976$). Data analysis was conducted using SmartPLS 3 software and structural equation modeling (SEM). The findings indicated that the overall model fit index (GOF) was 0.487, demonstrating strong validity of the research model.

Keywords: Need, Banking User, Smart Banking, Value Creation, Bank Melli Iran.

Introduction

The contemporary banking industry is undergoing a profound transformation driven by rapid technological innovation, digitalization, and evolving customer expectations. Traditional banking models, historically grounded in physical interactions and standardized service delivery, are increasingly being replaced by digitally enabled ecosystems emphasizing personalization, responsiveness, and value co-creation. The emergence of smart banking represents not merely a technological upgrade but a fundamental paradigm shift in how banks conceptualize service provision, customer relationships, and competitive advantage. Within this context, understanding banking user needs has become a strategic imperative for financial institutions seeking sustainable performance and long-term customer engagement (1, 2).

Smart banking integrates advanced digital technologies—including artificial intelligence, mobile platforms, big data analytics, and omnichannel service infrastructures—to deliver seamless financial services aligned with customers' lifestyles. These technological developments have significantly reshaped customer expectations, transforming bank users from passive recipients of services into active participants in value creation processes.



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Service-dominant logic emphasizes that value is not embedded solely in products or services but emerges through interactions between providers and users, highlighting the centrality of co-creation in modern service ecosystems (3, 4). Consequently, banks must redesign their operational and strategic frameworks around user experiences rather than institutional efficiency alone.

Digital transformation has intensified competition within the financial sector by lowering entry barriers and enabling fintech firms and digital platforms to challenge traditional banks. Customers now evaluate banks not only on financial reliability but also on usability, accessibility, personalization, and technological sophistication. Studies demonstrate that digital service quality strongly influences customer satisfaction, loyalty, and brand attachment under conditions of environmental uncertainty (2, 5). Therefore, identifying user needs in smart banking environments becomes essential for sustaining competitiveness and enhancing customer retention.

Artificial intelligence plays a pivotal role in shaping the future of banking services by enabling predictive analytics, automated decision-making, and personalized financial advisory systems. AI-driven platforms allow banks to analyze behavioral data, anticipate customer expectations, and deliver customized financial solutions in real time. Research shows that artificial intelligence enhances customer experience through improved interaction quality, responsiveness, and personalization across digital channels (6, 7). Moreover, AI facilitates value co-creation by empowering customers to participate actively in service design and consumption processes (1, 8).

The shift toward customer-centric banking is closely linked to the concept of customer engagement. Engagement reflects customers' cognitive, emotional, and behavioral participation in service interactions and has been recognized as a key driver of value creation and organizational performance (9). In digital banking environments, engagement is strengthened through interactive interfaces, personalized services, and continuous communication, which collectively enhance customer trust and perceived value (10). Consequently, smart banking models increasingly prioritize experiential value rather than transactional efficiency.

Electronic banking adoption research further highlights the importance of perceived usefulness, ease of use, trust, and technological readiness in shaping user behavior. Customers adopt digital banking services when technological systems align with their needs, risk perceptions, and lifestyle preferences (11, 12). Conversely, failure to address user expectations may lead to service rejection despite technological availability. These findings reinforce the necessity of systematically identifying banking user needs as a foundation for successful digital transformation strategies.

Value creation in banking has evolved from a firm-centered perspective toward collaborative processes involving customers, employees, and digital platforms. Empirical studies emphasize that value emerges through interactions, service experiences, and relationship quality rather than through isolated service outputs (13, 14). Banks that successfully integrate customers into the value creation process can strengthen loyalty, improve reputation, and generate sustainable competitive advantage. In particular, mobile banking initiatives have demonstrated significant potential for enabling value co-creation through participatory service ecosystems (15).

Within emerging economies, digital banking transformation also aligns with national development agendas emphasizing technological modernization and digital governance. The Seventh Five-Year Development Plan of the Islamic Republic of Iran underscores the expansion of digital infrastructures, financial innovation, and intelligent service delivery as key drivers of economic growth and efficiency (16). Complementarily, the national cyberspace strategic document highlights the necessity of secure digital platforms and customer-centered electronic services

to strengthen trust in digital environments (17). These policy directions emphasize the relevance of studying smart banking user needs within the Iranian context.

Bank Melli Iran, as one of the oldest and largest financial institutions in the country, has played a central role in the modernization of the Iranian banking system. Since its establishment, the bank has evolved from traditional service delivery toward digital platforms such as the *BAM* smart banking system, reflecting broader technological transitions within the financial sector (18). Understanding user expectations within such platforms is crucial for improving service quality, enhancing customer experience, and aligning organizational strategies with national digital transformation initiatives.

Previous studies in Iran and comparable contexts have examined value creation models in banking, emphasizing factors such as service innovation, customer participation, and relationship management. Research has demonstrated that hybrid service channels, human resource capabilities, and customer interaction quality significantly contribute to value creation outcomes (19, 20). Similarly, investigations into brand value co-creation processes reveal that collaborative interactions between banks and customers enhance perceived service value and strengthen long-term relationships (21).

Despite these advances, existing literature often addresses individual components of digital banking—such as service quality, technology adoption, or customer satisfaction—rather than providing a comprehensive model integrating diverse dimensions of banking user needs within a value-creation framework. Studies focusing on electronic banking quality confirm that service reliability, responsiveness, and technological functionality influence satisfaction and loyalty outcomes (22, 23). However, the transition toward smart banking necessitates a broader perspective incorporating digital identity, data security, omnichannel services, lifestyle compatibility, and innovative customer experiences.

Value creation for corporate and retail banking customers increasingly depends on banks' ability to integrate technological capabilities with customer expectations. Research identifying value creation factors emphasizes personalization, technological integration, and advisory services as critical elements of competitive differentiation (24). Moreover, digital ecosystems require banks to move beyond service provision toward adaptive, future-oriented banking models capable of anticipating evolving customer needs.

Recent theoretical developments highlight that smart banking environments function as service ecosystems where customers, technologies, institutions, and organizational actors co-create value dynamically. Such ecosystems require continuous innovation, data-driven decision-making, and collaborative service design processes (1, 3). In this regard, modeling banking user needs provides an analytical foundation for aligning technological investments with customer value expectations and organizational performance objectives.

Furthermore, digital banking transformation introduces new challenges related to trust, security, and customer empowerment. Users increasingly demand transparency in data usage, secure authentication mechanisms, and reliable digital interactions. Trust has emerged as a critical determinant of digital banking success, influencing adoption intentions, engagement behaviors, and long-term loyalty (10). Therefore, identifying user needs must encompass both functional service requirements and psychological factors shaping customer perceptions.

The evolution toward smart banking also reflects broader shifts in marketing thought, particularly the movement from goods-dominant to service-dominant logic. This paradigm emphasizes relationships, interactions, and experiential value as central components of market exchange (4). Banks that embrace this perspective can design

services that integrate technological innovation with human-centered value creation processes, thereby improving customer satisfaction and organizational sustainability.

Given the rapid expansion of digital banking technologies, financial institutions face increasing pressure to understand how customers perceive, evaluate, and interact with smart banking services. While technological capabilities continue to advance, sustainable competitive advantage depends on aligning these capabilities with actual user needs. The development and validation of comprehensive user-need models enable banks to design customer-oriented strategies, optimize digital platforms, and enhance service innovation outcomes.

In summary, the convergence of digital transformation, artificial intelligence, service-dominant logic, and value co-creation has fundamentally reshaped the banking landscape. Smart banking success increasingly depends on accurately identifying and validating the multidimensional needs of banking users within value-creation frameworks that integrate technology, experience, and trust. Accordingly, the aim of this study is to validate the model of banking user needs in value-creation-based smart banking in Bank Melli Iran.

Methods and Materials

This study was applied in terms of purpose and quantitative in terms of execution method, employing a structural modeling approach. The statistical population consisted of users of the *BAM* digital banking system of Bank Melli Iran in South Khorasan Province (N = 129,000). A total of 384 participants were selected using the Morgan sampling table through convenience sampling.

The research instrument was a researcher-developed questionnaire. The questionnaire items and statements were designed based on the research literature and findings derived from the value-creation-based smart banking user needs model.

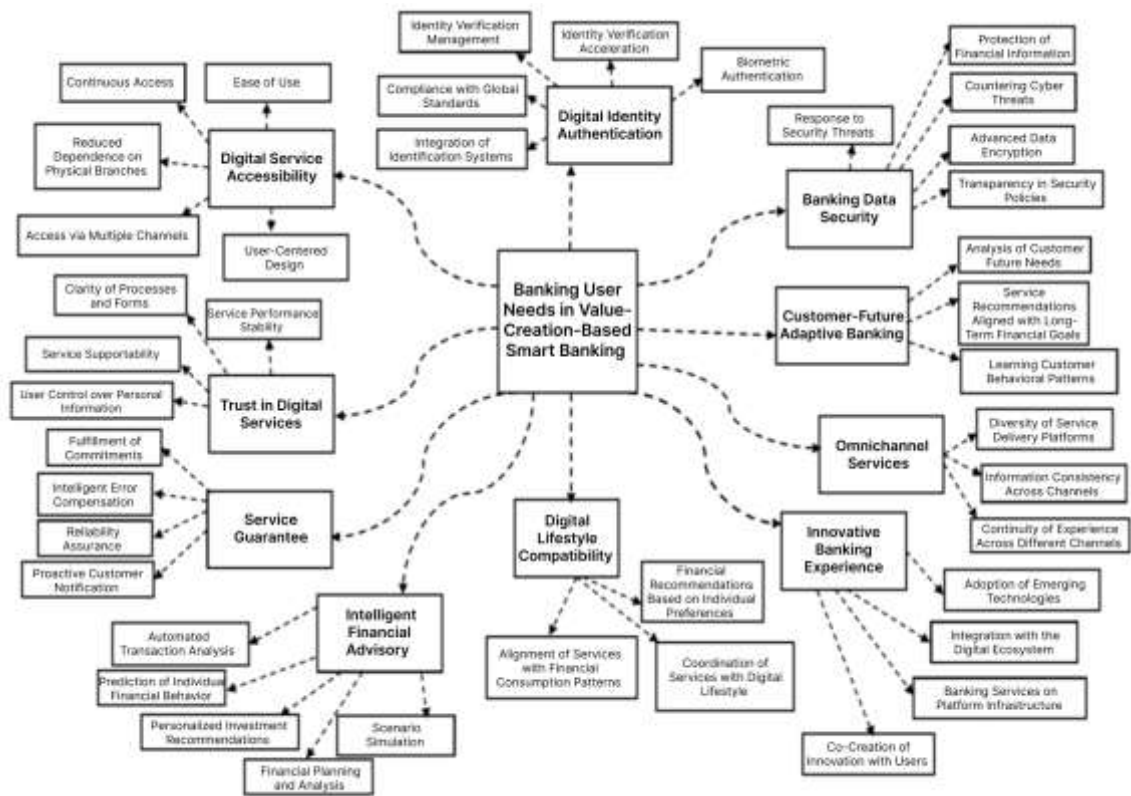


Figure 1. Value-Creation-Based Smart Banking User Needs Model (25).

Accordingly, the questionnaire consisted of 129 items organized into 41 subcomponents and 10 main components, including: digital service accessibility; digital authentication; banking data security; trust in digital services; intelligent financial advisory; service guarantee; compatibility with digital lifestyle; omnichannel services; customer-future adaptive banking; and innovative banking experience.

All questionnaire items were measured using a five-point Likert scale ranging from *strongly disagree* (score = 1) to *strongly agree* (score = 5). The overall Cronbach's alpha coefficient of the questionnaire was 0.976, confirming its reliability, and its validity was also verified.

To examine the conceptual relevance of the items to the construct under investigation, as well as the clarity and comprehensibility of each item, the questionnaire was reviewed by five faculty members. Based on this expert evaluation, content validity was reconfirmed.

Finally, to assess the validity of the proposed model, goodness-of-fit indices were evaluated using confirmatory factor analysis (CFA). Confirmatory factor analysis determines whether the selected factors and related items are appropriately specified. In other words, CFA examines whether the items assigned to each factor have been correctly selected. For this purpose, data were analyzed using structural equation modeling (SEM) in SMARTPLS software.

Findings and Results

In confirmatory factor analysis, the researcher seeks empirical confirmation of a hypothesized factor structure. Specifically, it determines whether the collected data are consistent with the predefined factor structure proposed in the research hypothesis. Confirmatory factor analysis is also applied to evaluate the validity of construct indicators within a questionnaire and to verify the alignment and consistency among indicators (items). In other words, CFA serves as a tool for assessing questionnaire validity, ensuring that the instrument measures precisely what it was designed to measure.

Unlike exploratory factor analysis, confirmatory factor analysis assumes—based on prior theoretical foundations—that each factor is associated with a specific subset of variables. One important application of CFA is evaluating the fit of a model containing the measurement items of a construct and determining the degree of compatibility between the research model and the collected data.

The following diagram presents the model in its standardized form, displaying factor loadings and path coefficients.

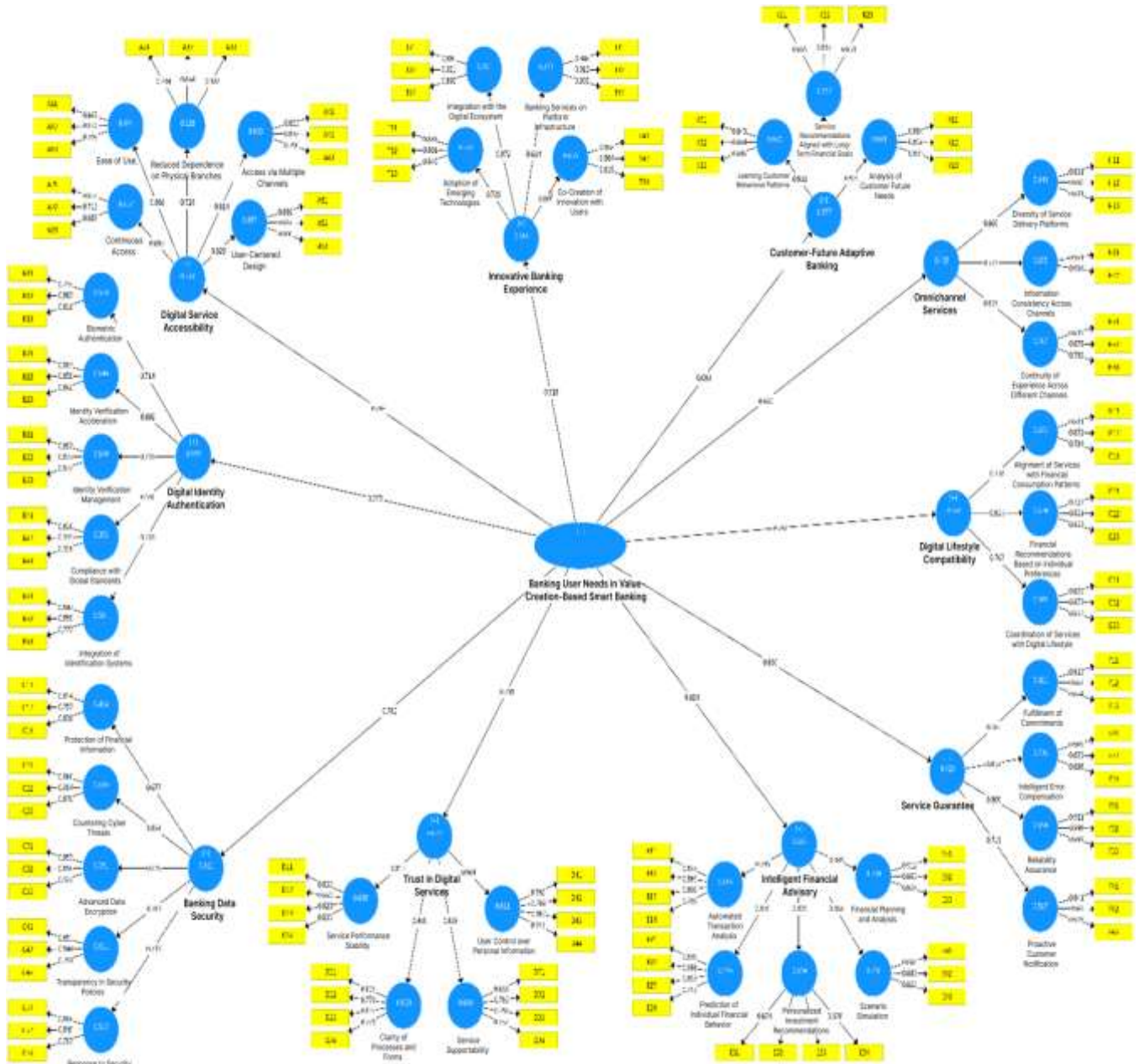


Figure 2. Model with Standardized Factor Loadings and Path Coefficients (Measurement Model Evaluation)

The following diagram presents the research model based on t-values significance coefficients.

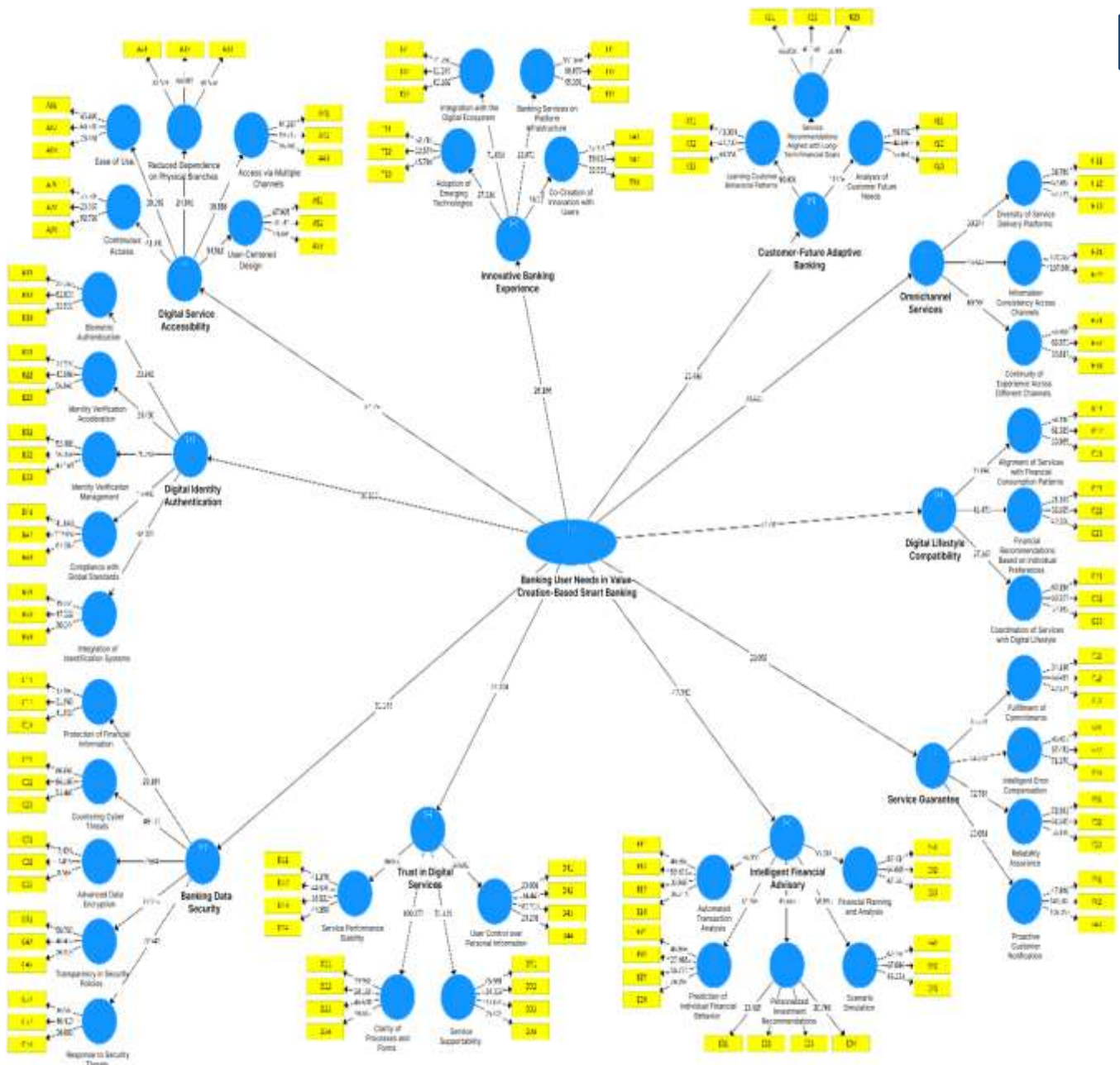


Figure 3. Model with t-Values Coefficients (Measurement Model Evaluation)

To evaluate model fit (questionnaire adequacy) in the Partial Least Squares (PLS) approach, the following criteria were examined:

- Cronbach’s alpha
- Composite reliability (CR)
- Factor loading coefficients and their significance
- Average Variance Extracted (AVE) validity
- Fornell–Larcker matrix

From the standardized measurement model, it can be determined whether a significant correlation exists between latent variables and their corresponding indicators. Factor loading represents the numerical value

indicating the strength of the relationship between a latent variable and its observed variable during the path analysis process.

As illustrated in Figures 2 and 3, the calculated t-statistic values between items and their respective latent variables exceeded 1.96 in all cases. Therefore, the relationships between items and their corresponding constructs were statistically significant.

Furthermore, standardized factor loadings for all questionnaire items were greater than 0.40, indicating that no item removal from the model was necessary.

Cronbach's alpha and composite reliability values for all research variables exceeded 0.70, confirming acceptable reliability levels.

Additionally, the AVE values for all variables were greater than 0.50, supporting convergent validity.

Results obtained using the Fornell–Larcker criterion for discriminant validity showed that the square root of AVE for each construct was located on the main diagonal of the matrix, while inter-construct correlations appeared below the diagonal. Since diagonal values exceeded off-diagonal correlations, discriminant validity was confirmed using the Fornell–Larcker method.

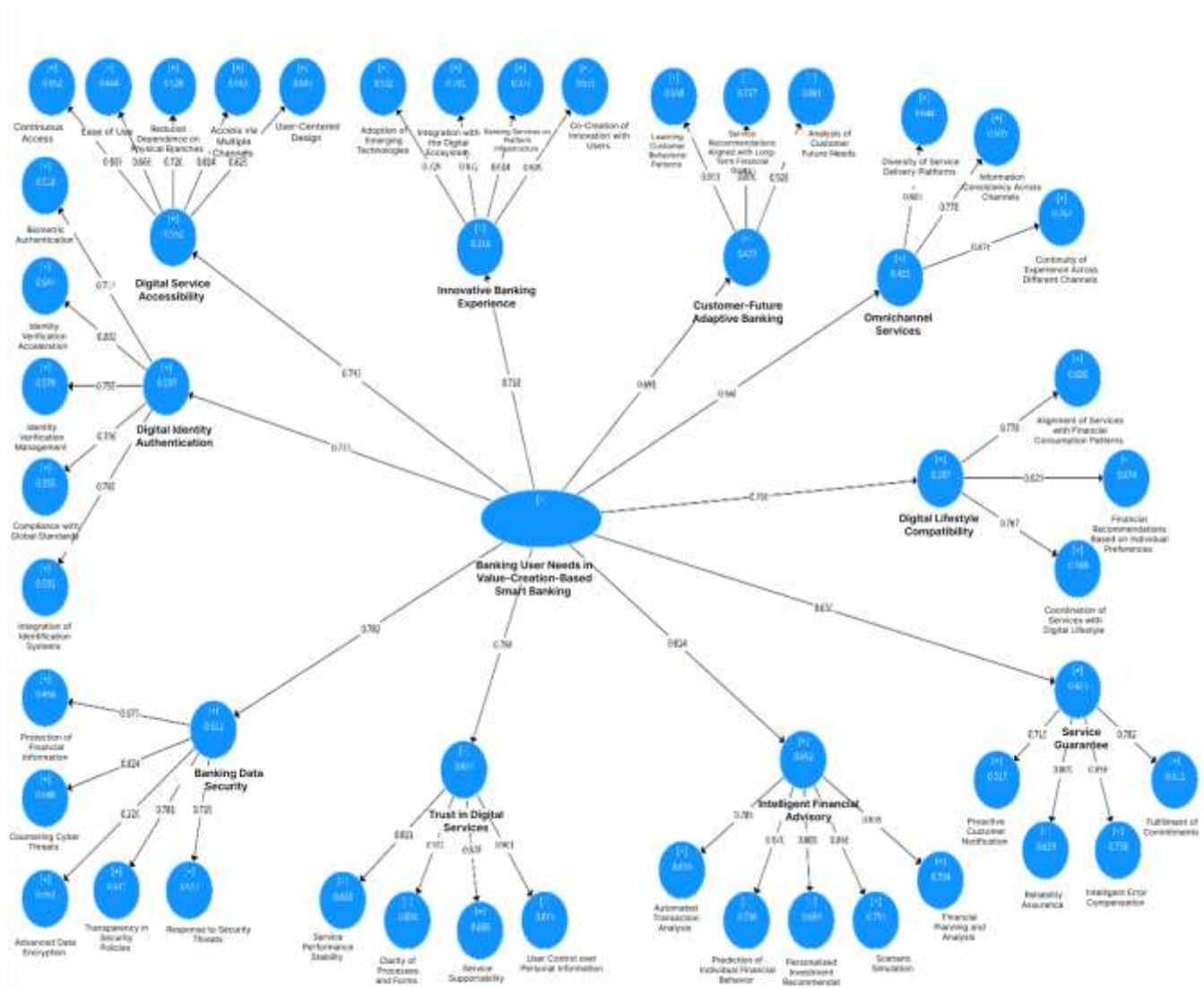


Figure 4. Standardized Path Coefficients in the Third-Order Confirmatory Factor Analysis Model

After conducting confirmatory factor analysis and validating the measurement instrument (questionnaire), the next step was to determine whether the ten factors—digital service accessibility, digital authentication, banking data security, trust in digital services, intelligent financial advisory, service guarantee, digital lifestyle compatibility, omnichannel services, customer-future adaptive banking, and innovative banking experience—could collectively represent banking user needs within a value-creation-based smart banking model.

Given the nature of the questionnaire items, this construct was tested using third-order confirmatory factor analysis. The following diagram illustrates the conceptual model with standardized path coefficients.

The following diagram presents the conceptual model based on t-value significance coefficients.

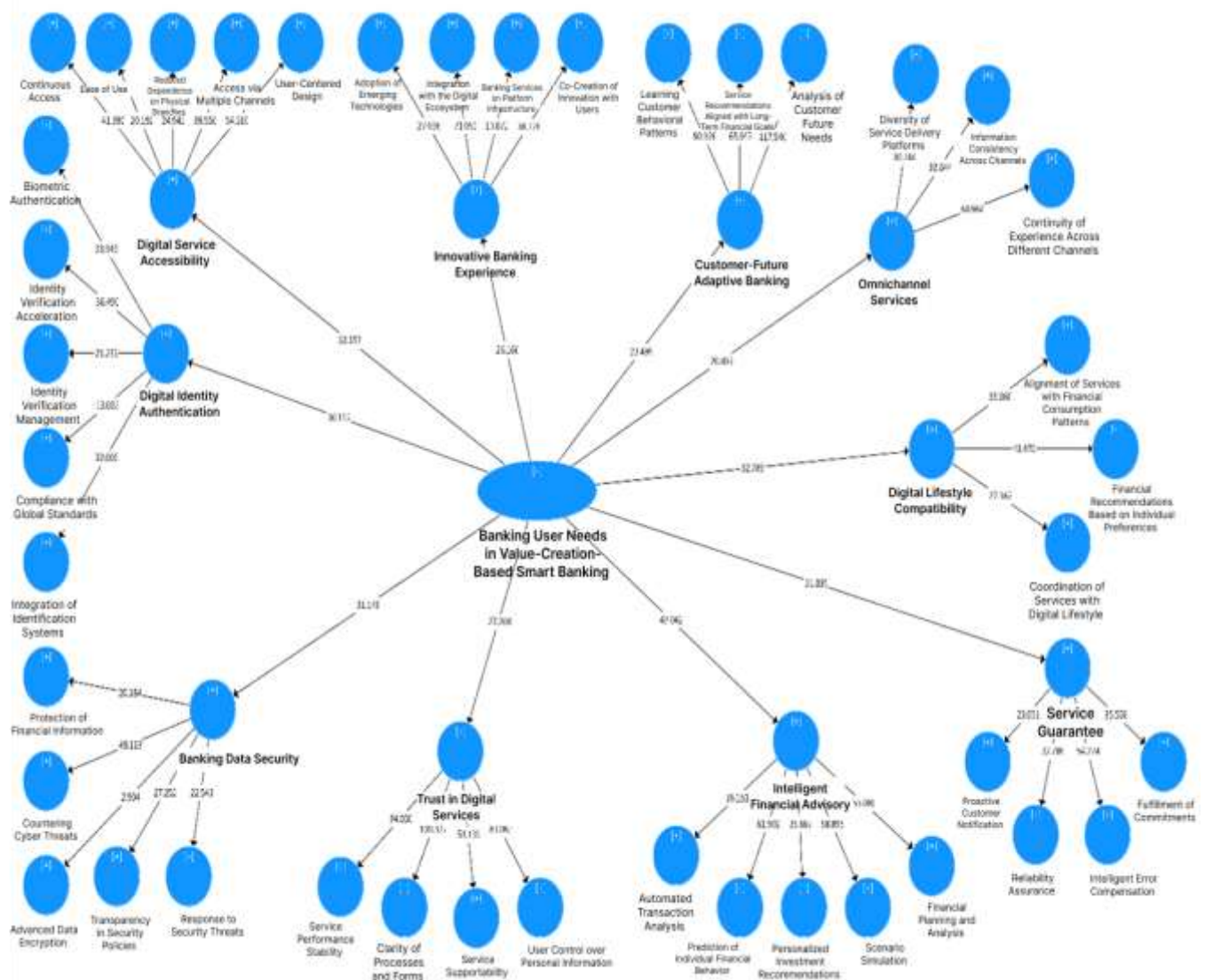


Figure 5. t-Value Significance Coefficients in the Third-Order Confirmatory Factor Analysis Model

Table 1. Model Fit Indices, Path Coefficients, and t-Values for Relationships among Model Variables

Paths	Path Coefficient	t-Statistic	Significance Level	R ² of Dependent Variable	Q ² of Dependent Variable
Banking User Needs → Digital Service Accessibility	0.743	32.55	0.00	0.552	0.333
Banking User Needs → Digital Authentication	0.773	30.11	0.00	0.597	0.309
Banking User Needs → Banking Data Security	0.782	31.14	0.00	0.611	0.280
Banking User Needs → Trust in Digital Services	0.788	27.20	0.00	0.622	0.446
Banking User Needs → Intelligent Financial Advisory	0.814	47.04	0.00	0.662	0.449
Banking User Needs → Service Guarantee	0.950	21.03	0.00	0.423	0.262
Banking User Needs → Digital Lifestyle Compatibility	0.766	32.78	0.00	0.587	0.359
Banking User Needs → Omnichannel Services	0.660	20.46	0.00	0.435	0.286
Banking User Needs → Customer-Future Adaptive Banking	0.691	23.49	0.00	0.477	0.391
Banking User Needs → Innovative Banking Experience	0.718	26.16	0.00	0.516	0.298

$$GOF = \sqrt{((Communalities \times R^2))} = \sqrt{(0.390 \times 0.609)} = 0.487$$

$$SRMR = 0.086$$

As shown in the table above, banking user needs in value-creation-based smart banking were examined from ten dimensions: digital service accessibility, digital authentication, banking data security, trust in digital services, intelligent financial advisory, service guarantee, digital lifestyle compatibility, omnichannel services, customer-future adaptive banking, and innovative banking experience.

Decisions regarding confirmation or rejection of these dimensions were made based on t-statistics and significance levels. According to the results, all relationships between variables were statistically significant. Each of the ten factors included several subcomponents, and all relationships between subcomponents and their main constructs were statistically confirmed ($p < .05$).

To evaluate model fit in the Partial Least Squares approach, the Goodness-of-Fit (GOF) index proposed by Tenenhaus et al. (2004) was calculated using the formula presented in the table. GOF threshold values of 0.01, 0.25, and 0.36 indicate weak, moderate, and strong model fit, respectively.

The obtained GOF value of 0.487 indicates strong model fit. Additionally, the SRMR index was within an acceptable range. Therefore, the proposed model of banking user needs in value-creation-based smart banking demonstrates strong explanatory power and overall adequacy.

Discussion and Conclusion

The present study aimed to validate a comprehensive model of banking user needs in value-creation-based smart banking within Bank Melli Iran. The findings confirmed that banking user needs in smart banking environments can be conceptualized through an integrated multidimensional framework encompassing digital service accessibility, digital identity authentication, banking data security, trust in digital services, intelligent financial advisory, service guarantees, compatibility with digital lifestyle, omnichannel services, customer-future adaptive banking, and innovative banking experience. The strong goodness-of-fit index and significant structural relationships indicate that these dimensions collectively form a coherent and empirically supported structure

explaining how value is created in smart banking ecosystems. These results reinforce the notion that modern banking success depends not merely on technological deployment but on aligning digital capabilities with customer-centered value creation processes (25).

One of the central findings of the study was the strong effect of digital service accessibility on overall banking user needs. The results demonstrated that continuous access, ease of use, and multi-channel availability significantly shape customers' perceptions of smart banking value. This finding aligns with prior research emphasizing that digital quality and accessibility are primary drivers of satisfaction and loyalty in technologically mediated banking environments (2). Similarly, studies on internet and mobile banking adoption show that perceived usability and convenience strongly influence customers' acceptance decisions (11, 12). From a service-dominant logic perspective, accessibility enables interaction opportunities through which value emerges collaboratively between banks and customers (3).

Another important result relates to the role of digital identity authentication and banking data security. The model confirmed that secure authentication mechanisms, compliance with standards, and protection of financial information are essential determinants of user needs in smart banking. These findings support arguments that trust formation in digital banking depends heavily on perceived security and transparency of technological infrastructures (10). The significance of this dimension also reflects national strategic priorities emphasizing cybersecurity and digital trust as foundations for financial innovation (17). Customers' willingness to engage in digital platforms increases when institutions demonstrate strong data governance and risk mitigation practices.

The study further identified trust in digital services as a critical mediating dimension connecting technological features with value creation outcomes. Trust was reinforced through service stability, transparency, and user control over information. Previous empirical studies similarly highlight that electronic service quality contributes directly to customer satisfaction and loyalty through trust-building mechanisms (5, 22). In smart banking environments, trust functions as a relational resource enabling customers to participate more actively in value co-creation processes, consistent with interaction-based marketing theories (4).

The findings also confirmed the importance of intelligent financial advisory as a core component of smart banking user needs. The significant path coefficients suggest that customers increasingly expect personalized recommendations, predictive analytics, and automated financial guidance. This result corresponds with emerging research demonstrating that artificial intelligence enhances customer experience by enabling proactive and customized service delivery (6, 7). AI-driven advisory systems transform banks from transactional institutions into financial partners supporting customers' long-term financial decision-making. Moreover, AI-enabled platforms facilitate value co-creation by allowing customers to interact dynamically with intelligent systems (1, 8).

Service guarantees were another influential factor validated in the model. The results revealed that commitment fulfillment, reliability assurance, and proactive communication significantly contribute to user confidence in smart banking services. This finding resonates with marketing literature emphasizing that perceived service reliability strengthens engagement and reduces perceived risk in digital environments (23). Guarantees act as institutional signals reinforcing customers' belief that digital banking interactions are dependable and accountable.

Compatibility with digital lifestyle emerged as a key determinant explaining how banking services integrate into customers' everyday routines. The study indicates that alignment between financial services and users' behavioral patterns enhances perceived usefulness and experiential value. Previous research confirms that value co-creation intensifies when services adapt to customers' contexts, preferences, and consumption behaviors (13). The

integration of banking services into daily digital ecosystems reflects a broader transformation toward lifestyle-oriented service design.

The significance of omnichannel services in the validated model further demonstrates that customers expect seamless experiences across digital touchpoints. Consistency of information and continuity of interaction across channels were shown to strengthen perceived value creation. These findings are consistent with hybrid channel banking studies showing that coordinated service channels enhance customer satisfaction and engagement outcomes (19). Omnichannel integration reduces friction in customer journeys and reinforces institutional reliability.

Customer-future adaptive banking was also confirmed as a major component of user needs. The results suggest that customers value banks capable of anticipating future expectations and delivering proactive solutions. This finding aligns with research highlighting predictive service design as a key competitive advantage in digital banking ecosystems (24). Future-oriented banking reflects the shift from reactive service provision toward anticipatory value creation strategies.

The innovative banking experience dimension demonstrated strong explanatory power within the structural model. Adoption of emerging technologies, platform-based services, and collaborative innovation practices significantly contributed to perceived smart banking value. Prior literature emphasizes that innovation enhances customer engagement by transforming service encounters into experiential interactions rather than routine transactions (9). Innovation also strengthens banks' reputational capital in digital environments characterized by rapid technological change (10).

Collectively, the findings support the theoretical proposition that banking value is co-created through dynamic interactions among technological capabilities, organizational processes, and customer participation. The validated model extends earlier value creation frameworks developed in banking contexts (21, 26) by integrating smart banking characteristics such as artificial intelligence, digital identity systems, and ecosystem-based services. Furthermore, the results align with national development objectives emphasizing digital transformation and intelligent service delivery in Iran's financial sector (16).

The study also contributes to the growing body of literature linking digital transformation with customer-centric strategic management. As banks transition toward smart banking models, understanding user needs becomes essential for designing sustainable competitive strategies. The historical evolution of Bank Melli Iran demonstrates how traditional institutions can leverage digital innovation to remain relevant in rapidly changing financial ecosystems (18). The validated model therefore provides a practical roadmap for aligning institutional modernization with customer expectations.

Overall, the discussion suggests that smart banking success depends on integrating technological innovation with service-dominant logic principles emphasizing interaction, personalization, and co-created value. The empirical confirmation of multidimensional user needs highlights that digital banking transformation is fundamentally a human-centered process rather than a purely technological phenomenon.

Despite the valuable contributions of this study, several limitations should be acknowledged. First, the research was conducted within a single banking institution and a specific geographical region, which may limit the generalizability of findings to other banking systems or cultural contexts. Second, the use of convenience sampling may introduce potential response bias, as participants who actively use digital banking platforms may possess higher technological familiarity than the broader customer population. Third, the cross-sectional design restricts the ability to examine dynamic changes in user needs over time as technologies evolve. Additionally, reliance on self-

reported questionnaire data may be affected by perceptual or social desirability biases. Finally, rapid technological advancements in smart banking mean that user expectations may shift quickly, requiring continuous model reassessment.

Future studies may expand this research by conducting comparative analyses across multiple banks, fintech institutions, or international contexts to examine cultural and institutional differences in smart banking user needs. Longitudinal research designs could investigate how customer expectations evolve as artificial intelligence and digital ecosystems mature. Researchers may also explore moderating variables such as age, digital literacy, financial knowledge, or technology readiness to better understand heterogeneous user segments. Qualitative approaches, including interviews or ethnographic methods, could provide deeper insights into customers' lived experiences with smart banking platforms. Additionally, integrating behavioral data analytics with survey-based research may offer richer explanations of real usage patterns and value co-creation behaviors.

Bank managers should prioritize customer-centric digital transformation strategies that align technological investments with clearly identified user needs. Financial institutions should enhance digital accessibility by simplifying interfaces and ensuring seamless omnichannel integration. Strengthening cybersecurity infrastructures and transparent communication practices can reinforce customer trust in digital services. Banks are encouraged to expand artificial intelligence applications for personalized financial advisory and proactive customer support. Continuous innovation initiatives involving customer participation can improve service design and foster long-term engagement. Training programs aimed at improving digital literacy among customers may also increase adoption and satisfaction. Finally, organizations should establish adaptive strategic frameworks capable of responding quickly to evolving technological trends and customer expectations in smart banking environments.

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Authors' Contributions

All authors equally contributed to this study.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

All ethical principles were adhered in conducting and writing this article.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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