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Processing and Creating Knowledge in Orchestrating the Digital Banking Ecosystem

Mohammadreza Ebrahimzadeh[1], Behrouz Larisemnani[2,*], Ehsan Ahadmotlaghi[3], Seyedeh Masoumeh Ghamkhari[4]
[1] *PhD Student, Department of Management, Payame Noor University (PNU), Tehran, Iran. mreza.ebrahimzadeh23@gmail.com, 0000-0002-7470-4399*
[2] *Assistant Professor, Department of Management, Payame Noor University (PNU), Tehran, Iran. (Corresponding author) bls@pnu.ac.ir, 0000-0002-5580-9355.*
[3] *Assistant Professor, Department of Management, Payame Noor University (PNU), Tehran, Iran. E.ahadimotlagh@pnu.ac.ir, 0000-0002-6833-9460.*
[4] *Assistant Professor, Department of Management, Payame Noor University (PNU), Tehran, Iran. ghamkhari@pnu.ac.ir, 0000-0001-8396-4363.*

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ABSTRACT

The current research aimed to investigate knowledge in orchestrating the digital banking ecosystem. Considering the need for a deeper application of the theoretical contextualization dimension (compared to the experimental contextualization dimension) in crystallizing orchestrating strategies and approaches from the reduced qualitative research method to enrich the identified categories and frame the results of the context. Theoretical analysis was used. The thematic research method of Brown and Clark (2006) was chosen as the main and central method to answer the final research question. The statistical population of the research includes experts in the banking industry, especially digital banking and digital financial services, who were selected by the snowball sampling method. After conducting 12 interviews, the data was saturated. The content validity ratio and the content validity index were used to evaluate the interview questions' content validity ratio. Three strategies focusing on co-evolution, enrichment, and novelty were identified as the best knowledge-based strategies. Focusing on co-evolution, value enrichment, and up-to-dateness of digital banking ecosystem components as three basic strategies can lead to improved performance, increased value for customers, attraction of new customers, and promotion of the digital banking system's enhancement. These strategies are essential for success and progress in the digital banking ecosystem.

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1. Introduction

In the previous decade, while many studies on the impact of information technology on organizational changes were conducted (Snytnikov, Solovey, & Zelenina, 2023; Volkoff, Diane, & Elmes, 2007), banks also increasingly focused on information technology development. Research in information technology development in the digital industry, including networking, the internet, cloud services, organizational architecture, programming, processing speed, and information communication, has facilitated the implementation of efficient data-driven digital tools (Ahmadi, Sahraei, & Saheb, 2023). Subsequently, the speed of access and the rise in content and information production on social media, along with the widespread use of smartphones, necessitated a shift from focusing solely on information technology to emphasizing the requirements of digitalization in businesses (Fasnacht, 2021; Anand & Mantrala, 2019). Knowledge plays a crucial role as a success factor in the banking system. Therefore, banks strive to manage organizational knowledge more effectively to enhance their performance (Wang, Xiuping, & Zhang, 2021). Recognizing the pivotal role of digital transformation in organizational progress, banks aim not only to maintain their market share but also to outperform competitors by prioritizing and investing more in digital banking (Hornuf, Klus, Lohwasser, & Schwienbacher, 2018). The rise of the digital economy has impacted various industries and business sectors, leading to rapid and intense changes and the generation of intelligence-based knowledge (Omarini, 2022; Cortet, Rijks, & Nijland, 2016). Many knowledge-based companies emphasize enhancing financial services. Furthermore, the advancement of digital technology, particularly in banking and financial services, has prompted banks and financial institutions to adopt competitive digital banking strategies and focus on knowledge creation in intelligence (Garzoni, De Turi, Secundo, & Del Vecchio, 2020). The pressure from digital transformation on the banking ecosystem has reshaped competition structures, consumer behaviors, preferences, business practices, service delivery methods, and fundamentally transformed the banking industry (Xiaogang, Skully, & Brown, 2005). Digital banking and the creation of organizational knowledge are crucial infrastructure elements for societal progress and future generations. The utilization of new technologies in knowledge processing offers effective solutions for knowledge creation, information management, workflow optimization, and more (Guerola-Navarro, Gil-Gomez, H., & Oltra-Badenes, 2022). On the other hand, platforms are one of the pillars of the fourth industrial revolution and the digital economy. Platforms have created disruptive changes in business models. These changes in the banking sector have led to a shift in the traditional business model. Digital banking, based on digital platforms, is a rapidly spreading change in the banking business model, and banks worldwide quickly responded to it and focused their strategies on it (Borgogno and Colangelo, 2020). In a world where traditional incomes are decreasing, banks are adopting platforms to provide services and products (Hanafizadeh and Amin, 2022). In developing these strategies, ecosystems and markets provide an ideal environment for banks to meet the demands of their customers by utilizing their partners and enhancing the digital experience of their customers and partners by offering a superior value proposition (Zetzsche, Buckley, Arner, and Barberis, 2018; Ahlstrom, 2018). It is evident that specific dimensions cannot be provided for the development of the digital banking ecosystem, but the enhancement of digital services is a combination of various dimensions, each of which, in turn, has a necessary impact, including the knowledge and database of the main infrastructure of intelligence and digitalization in the banking industry (Snytnikov et al., 2023). The path to realizing and implementing the goals of developing the digital banking platform is nothing but passing through the open banking paradigm (Dannenberg, Tim, and Cathrin, 2020). Open banking leads banks to coexist and evolve with multiple players in the

banking ecosystem. The bank sells its products to institutions close to the customer or facilitates the exchange of financial products and services between multiple distributors and producers on a (Bachtiar, Diningrat, Kusuma, Izzati, and Diandra, 2020).

The primary reason for coordinating the digital banking ecosystem is to enhance customer experience and increase efficiency for banks and financial institutions. By integrating the digital banking ecosystem, different components of this industry, such as technologies, services, processes, and information, are interconnected to establish a comprehensive and cohesive environment. This orchestration is a response to changes in consumer behavior and customer expectations regarding the banking experience, as well as the growing competition from new entrants and innovators in the financial sector.

Furthermore, coordinating the digital banking ecosystem helps banks gain greater efficiency from emerging technologies and big data, improve their processes, and deliver digital-based services to customers. It can also contribute to cost reduction, increased security, enhanced customer experience, and improved access to financial services for individuals in different regions.

In general, coordinating the digital banking ecosystem creates a cohesive platform for financial interactions in the digital world, providing greater efficiency for all participants in this ecosystem.

Banks determine their desired future business model through an inspiring roadmap. In addition to actions related to capabilities and competencies in digitalization, it is crucial to recognize and manage the ecosystem in a coordinated manner.

2. Literature Review

In the digital ecosystem, solutions tailored to customer needs are provided proactively based on customer behavior and big data analysis related to banks' products and their partners (Aminullah et al., 2022; Broby, 2021). The platform can adapt to customers' habits, preferences, and behavior to offer personalized solutions. In terms of security, banks should implement security identification and verification processes for new partners (Adamson et al., 2003; Aliyu et al., 2018). The online platform of the ecosystem allows customers to access account information, financial statements, and various financial services offered by the bank, including transactions, loans, investments, funding, and financial advisory services. Customers can utilize products and services from other financial providers not part of the bank's core activities. These providers, often fintech companies, connect directly to customers' bank accounts through APIs (Mor and Gupta, 2021). This allows banks to focus on their primary business while fintech companies offer additional financial services to customers at a lower cost (Saroy et al., 2023). Online banks must have a sophisticated and "active" digital knowledge management strategy. With increased competition, banks will face more product and service comparisons, leading to customers seeking more information about banks online than ever before. Banks should prioritize digital knowledge and public information about their business available online (Adrian et al., 2016). The importance of customer support increases, as recommendations significantly influence customer choices. Therefore, banks need a comprehensive and proactive review strategy across the entire digital ecosystem (Hanna, 2018; Anagnostopoulos, 2018). Barker (2018) highlighted the essential role of knowledge management in digital banking. Ahmadi et al. (2023) emphasized that technology serves as a tool to aid organizations in performing tasks and transferring data to databases, playing a crucial role in the knowledge management process. Creating an open and trust-based environment is crucial to establish a suitable platform and cultural infrastructure for knowledge sharing. Without the willingness of individuals to exchange and transfer knowledge, technology alone cannot complete this task. Singh (2023) discussed the significance of cooperation, information, and data sharing in the digital and intelligent space of the banking industry. Optimal knowledge exchange can help control

financial stability and cost management in digital banking. Osei et al. (2023) showed that the digital banking ecosystem is based on fintech, blockchain, mobile financial service applications, artificial intelligence, mobile banking service platforms, and sustainable business models, all of which are data-driven and knowledge-based. Therefore, it is clear that the creation of knowledge in the digital banking ecosystem can improve performance, service quality, innovation, and customer experience, making the digital banking ecosystem dynamic, secure, and successful. Creating knowledge to coordinate the digital banking ecosystem is one of the most fundamental factors for success and progress in this field. This process enhances information and awareness about technologies, methods, processes, and challenges governing digital banking. This information enables banks, financial technology companies, and other entities participating in the ecosystem to make better and timely decisions. With access to new knowledge, the digital banking ecosystem can create more innovative products and services, leading to continuous improvements in financial and banking services. This attracts new customers and enhances the satisfaction of existing customers. Knowledge creation in digital banking enables the improvement of customer experience. By understanding customers' needs and preferences, banks can tailor their services to enhance customer experience. This process fosters cooperation and co-evolution among members of the digital banking ecosystem. By sharing knowledge and experiences, banks and other institutions can implement the best solutions and strategies, making more effective efforts to achieve common goals. Therefore, this research conducts a qualitative analysis and examines the current state of digital banking and the context of knowledge processing and creation, focusing on orchestrating the digital banking ecosystem.

3. Methodology

Considering the need for a deeper application of the theoretical contextualization dimension (compared to the experimental contextualization dimension) in crystallizing Orchestrating strategies and approaches from the reduced qualitative research method to enrich the identified categories and frame the results of the context, Theoretical analysis was used (Braun & Clarke, 2006). The thematic research method of Braun & Clarke (2006) was chosen as the main and central method to answer the final research question. One of the reasons for choosing the thematic method is the limited operational experience in managing the digital banking ecosystem of Iran. The statistical population of the research includes experts in the banking industry, especially digital banking and digital financial services, who were selected using the snowball sampling method. After conducting 12 interviews, the data reached saturation. In evaluating the content validity of the interview questions, the content validity ratio (CVR) and the content validity index (CVI) were used. The CVR value was 1, meeting the acceptance level of 0.99, indicating reliable measurement. The CVI was 0.93, confirming content validity. Additionally, in the reliability evaluation of the research, the Kappa coefficient for the first and second assistants was calculated as 0.69 and 0.71, respectively, indicating reliability. The final model was approved by experts, confirming the research's reliability. To further explain the function and role of the presented framework in managing the ecosystem of a digital bank, a case study of operational strategies of a digital bank was utilized. This approach conceptualized and explained the function of strategies and the role of the concept of ecosystem Orchestrating in related operational strategies within a digital bank. After determining the key questions, the keywords were selected: "coordination", "digital banking", "ecosystem + digital banking", "digital banking models", "coordination + ecosystem", "coordination+ digital banking", "Coordination + Digital Businesses", "Coordination + Actors + Ecosystem", "Orchestarting", "Digital Banking", "Ecosystem + Digital Banking", "Ecosystem + Orchestrating", "Orchestarting + Digital Banking", "Ecosystem + Player + Orchestarting",

"Orchestarting + Digital Business".

4. Findings

The coding steps were organized according to the method suggested by Brown and Clark (2006). Thematic analysis includes three stages: data preparation, organization and selection. The themes indicate important information about the data and the research question, providing a meaningful pattern of the data set's themes. Out of a total of 106 concepts identified, 18 concepts were from interviews (experimental contextualization) and 88 concepts were from theoretical contextualization (thematic method). Among the identified concepts, there are 36 concepts under the overarching theme of "focus on co-evolution", 38 concepts under the overarching theme of "focus on value enrichment and 32 concepts under the overarching theme of "focus on updatedness Finally, constructive themes were conceptualized as approaches to achieve orchestrating strategies. The table below shows a part of how the topics are organized in the interviews.

Table 1. *Part of the organization of interview themes in the field of strategy category*

Interview code	Organizer themes	Basic themes	The text of the interview
I2	Value proposition management	Development of service value and user experience	We and all our competitors are basically looking for the development of our services and products. Also looking to provide a good user experience for the customer.
I4	Managing the value proposition of actors	Develop interactions	We interact with independent identities in our ecosystem to expand our services.
	Development of co-growth platform	Development of actors' capabilities	We even have to empower some of those members so that we can provide more productive services.
I7	Development of technology-oriented capabilities	Partnership in technology and infrastructure development	Our business is such that we have to have high partnership and cooperation with fintechs. They develop our software, infrastructure, applications. In fact, they develop the technology for the bank.

Overarching themes are introduced as a main component of the strategy category. These themes include a focus on co-evolution, enrichment (value), and novelty. Lower-level themes, known as organizing-themes, were recognized as approaches to achieving the strategy. These concepts were developed after several revisions and a back-and-forth approach, making the necessary corrections. One crucial component in the Orchestrating category is defining roles in the digital banking ecosystem. By defining the roles of the coordinator and the actors within the ecosystem, the groundwork is laid for implementing Orchestrating strategies. The coordinator can be effective in three roles: actor, facilitator, and supporter. The main roles and activities of these roles are presented in the table below.

Table 2. *Orchestrating of the approach of defining roles in the digital banking ecosystem*

Harmonizing roles	Activities
Actor	Performing activities to achieve goals Improve competitive advantage As an architect in realizing sequence and proportion Control approaches Management of competition and confrontations of digital banking ecosystem actors
Facilitator	Focusing on the interests and demands and requirements of the actors of the digital banking ecosystem Creating interaction channels and orchestrating between ecosystem actors Connecting ecosystem actors to related resources Creating a network of targeted actors to achieve digital banking goals Activate roles Less control and more influence Focus on creating and developing value without focusing on purely financial approaches
Supportive	Increasing the focus of ecosystem actors on orchestrating strategies and goals Focus on knowledge sharing Help share resources Development of persuasive and encouraging approaches in the ecosystem

In addition to the coordinating role, recognizing and developing the role of ecosystem players is effective in accelerating the development of digital banking goals. For

example, regulators play an important role in controlling and even stimulating digital banking. Acknowledging the uncertainties and concerns of regulators can be a signal to help and collaborate with them to create a clearer roadmap. This makes the conditions for investment smooth. In the form of the second example, by recognizing the impact and role of platform owners in the digital banking business and understanding their policies, it is possible to determine the approaches to determine the level of cooperation and participation of the bank with them, then develop it by managing business relationships and interactions. The same concept can be applied to the players of payment companies or startups and fintechs.

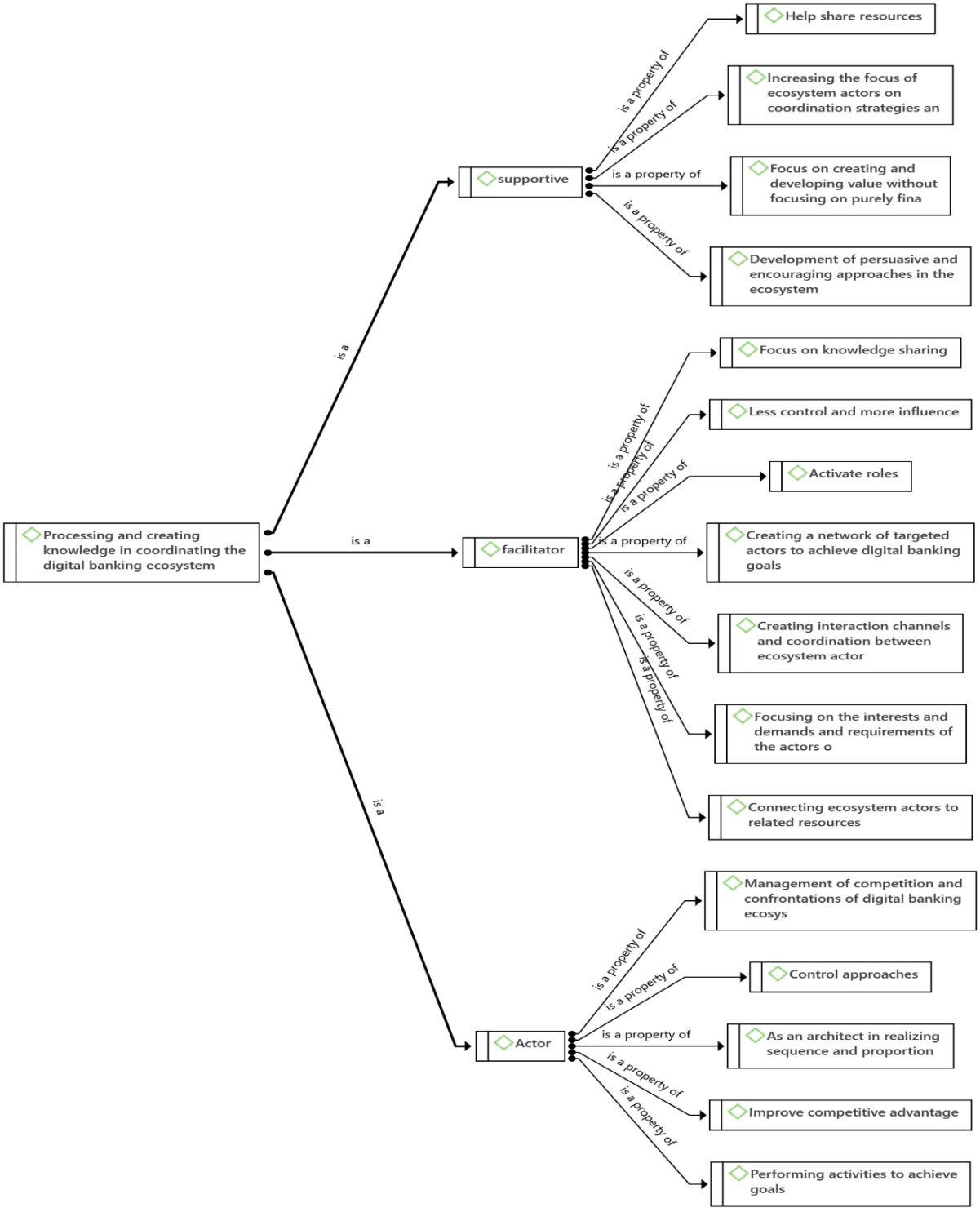

Figure 1. *Identification of components in the category of Orchestrating strategies with the help and focus on the thematic method*

5. Discussion

The purpose of the current research was to process and create knowledge in orchestrating the digital banking ecosystem. Three strategies focusing on co-evolution, enrichment, and novelty were identified as the best knowledge-based strategies. In the following, the three identified strategies were explained. One of the important strategies known in harmonizing the digital banking ecosystem is to focus on co-evolution. The growth of key players in the digital bank ecosystem, including service providers and digital bank value chain, fintechs, start-ups, platform suppliers, payment companies, and technology supply companies, is very effective in the overall growth of that bank. Therefore, the development of the organization's capabilities through the creation of platforms for growth in physical, facility, educational, financial, consulting, technology, partnership, and interactive links can be very effective in two-way growth. On the other hand, using the concepts of co-creation and organizing the formation and implementation of this concept through interactions with ecosystem actors can be very efficient in developing banking services and increasing the value of banking services proposition. After knowing the capabilities of the actors and their ability to create value through co-creation, there is a need to coordinate the actors to organize the co-creation of value. In another dimension, according to the type of digital banking strategies and the maturity of the bank and the digital banking industry in Iran, there is a need to recognize the appropriateness in matters related to growth and economy of scale, absorption of technology, development of banking services, and development of partnerships and strategies. Therefore, recognizing or selecting the key actors of the digital banking ecosystem and preferring the level of interactions and focusing on the level of cooperation and partnership with them requires orchestrating so that the digital bank develops in a harmonious way. Focus on enrichment (value) One of the other important strategies known in harmonizing the digital banking ecosystem is focusing on value enrichment. If banking, financial, and non-financial services are institutionalized in other products and services, interactions with service providers and suppliers of infrastructure and services/products become vital, and improving the value proposition of digital bank services requires understanding the needs and value. It has suggestions. What actor, what service and with what value and how to exchange is important. Therefore, stimulating and motivating actors to participate and cooperate is effective in the success of the platform. The bank can institutionalize its services in the exchange of values. For example, Digital Bank provides banking facilities (and Commonwealth services), increasing deposit accounts, payment gateways, foreign exchange facilities, shares, insurance, corporate banking services, and other digital financial and non-financial services on this platform. It can lead to the growth of the platform and digital bank. Understanding values and commonalities becomes more necessary when there is competition. As a result, the need to coordinate values among actors is evident. Focus on being current. One of the very important strategies is to focus on updating and developing technology and infrastructure, as well as using super technologies such as blockchain and artificial intelligence in digital banking. Therefore, mobilizing and concentrating actors and elements of the ecosystem to achieve a superior technology-based experience will be prioritized. Forming networks of technology and infrastructure development players, innovators, and developers of applications and software, as well as cooperation with developers of super technologies, including blockchain and artificial intelligence, as well as forming a professional and continuous network of developers. Customer experience platforms provide the conditions to create a differentiating capability in technology development and acceleration. The needs of sequence, parallelism, proportionality, cost, capital, and integration in the realization of technology development justify the requirement to compile a vision and roadmap for technology and infrastructure development. As a result, by coordinating ecosystem actors through interaction

management and creating strategic alignment with technology actors, the conditions for achieving the technological vision will be possible. Borgogno et al. (2020) showed the innovation resulting from data analysis and knowledge processing in the banking industry. Ameme et al. (2016) showed that the digital banking ecosystem process facilitates profitability and increases customer satisfaction. Ekinci (2021) considered the smartness of the bank based on digital developments to optimize the economy. In the meantime, he recommended the creation of a digital banking ecosystem based on the database.

6. Conclusion

In this research, it was shown that the processing and creation of knowledge in orchestrating the digital banking ecosystem is achieved through three main strategies: focusing on co-evolution, emphasizing value enrichment, and staying up-to-date. In digital banking, co-evolution entails communication and collaboration among various components of the banking ecosystem. This strategy underscores the significance of sharing and cooperation among banks, financial technology companies, startups, and other economic institutions. Through co-evolution, data and user experiences are shared, leading to enhanced overall performance of the banking ecosystem, resulting in improved service and customer experience. The strategy of focusing on value enrichment revolves around creating value through process enhancements, product and service innovations, and enhancing banks' efficiency. By integrating new technologies, enhancing service quality, improving transaction speed and security, and elevating customer experience, added value is generated for the entire banking ecosystem. This value enrichment aids in attracting new customers and retaining existing ones.

In the field of digital banking, technologies and methods are rapidly changing and updating. The strategy of focusing on staying up-to-date involves keeping pace with market changes, technologies, and customer needs. Banks and financial institutions should stay current by consistently studying and analyzing the market, comprehending customer needs, and forecasting technology trends, thereby maintaining the ability to compete in the market.

Focusing on co-evolution, value enrichment, and up-to-dateness of digital banking ecosystem components as three fundamental strategies can lead to improved performance, increased value for customers, attraction of new customers, and promotion of the enhancement of the digital banking system. These strategies are crucial factors for success and advancement in the digital banking ecosystem. Subsequently, practical suggestions based on the obtained results are presented:

Banks and financial technology companies should implement systems that facilitate the sharing of knowledge and experiences among members of the banking ecosystem. These systems can consist of shared platforms, forums, and websites where digital banking experts can exchange their insights and opinions on strategies, technologies, and challenges in the field.

Using data analysis and artificial intelligence as tools for processing information and creating knowledge is considered a very important matter in digital banking. These technologies can help banks identify customer patterns and trends, recognize unusual behaviors, and make more accurate predictions about customer needs.

Banks can transfer knowledge to customers, employees, and other members of the ecosystem by creating content and providing training related to digital banking issues. This content can include guides, videos, articles, and training courses that help customers and employees learn about the best methods and processes of digital banking and take advantage of its features.

Banks can access new technologies and innovative ideas by collaborating with startups and innovators in the financial technology field. These partnerships can facilitate the creation of new knowledge, digital banking innovations, and enhance the banking ecosystem.

Always focusing on digital security and protecting customer information is vital.

Banks must use advanced methods and technologies to protect customer information and prevent hacks and security breaches.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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