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Developing a Process Model for Electronic Banking Development: The Case of Bank Melli Iran

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Abstract

This study aimed to develop a process-oriented model for electronic banking development in Bank Melli Iran by identifying its causal conditions, central phenomenon, intervening conditions, strategic responses, and consequences through a grounded theory approach. This qualitative study employed grounded theory as the principal methodological framework. The study population consisted of managers, specialists, and experts with professional knowledge and experience in electronic banking and banking technologies. Participants were selected through purposive, theoretical, and snowball sampling, and data collection continued until theoretical saturation was achieved. Data were obtained primarily through in-depth semi-structured interviews, supplemented by observations, documents, and researcher memos. The interview data were transcribed and analyzed manually through the three stages of open, axial, and selective coding. Constant comparison was applied throughout data collection and analysis to refine concepts, establish relationships among categories, and develop the final paradigmatic model. The analysis showed that electronic banking development was shaped by four principal causal categories: security, convenience and simplicity, development processes, and reliability. The central phenomenon was identified as the development and enhancement of electronic banking services, encompassing advanced banking services, efficient utilization of technological capabilities, cost reduction, private banking, customer choice, financial advisory services, customer motivation, social value creation, and information provision. Environmental conditions, information technology, and the structure of the banking network emerged as major intervening conditions. The principal strategic categories were value creation and electronic banking intelligence, including needs-based service provision, service customization, customer knowledge management, research and development, business analytics, and organizational agility. The resulting consequences included financial and professional benefits for customers, improved perceptions of service quality and interactions, and strengthened customer retention and loyalty. Selective coding integrated these dimensions into a coherent process model of electronic banking development. The findings indicate that successful electronic banking development requires the simultaneous alignment of technological infrastructure, security, customer-oriented service design, organizational intelligence, regulatory support, managerial capability, and integrated banking processes; coordinated implementation of these dimensions can enhance service quality, reduce costs, strengthen customer relationships, and improve the long-term effectiveness of electronic banking.

Keywords: Electronic Banking; Grounded Theory; Process Model; Banking Services; Digital Banking; Customer Value; Bank Melli Iran



1. Introduction

The banking industry has undergone a profound transformation as digital technologies have altered the architecture of financial service delivery, customer interaction, transaction processing, risk management, and organizational competitiveness. Electronic banking has moved beyond its earlier role as a supplementary delivery channel and has become a central component of contemporary banking strategy, enabling customers to conduct transactions, access information, manage accounts, make payments, and interact with financial institutions without the spatial and temporal limitations of traditional branch-based banking. This transformation has intensified as customers increasingly expect banking services to be immediate, personalized, secure, continuously available, and compatible with mobile and digital lifestyles. Electronic banking therefore represents not merely the digitization of traditional services but a broader reconfiguration of the bank–customer relationship, internal banking processes, service delivery models, and the competitive logic of financial institutions. Studies of electronic banking have increasingly emphasized that the success of digital banking depends on a combination of technological quality, service design, customer attitudes, trust, organizational capability, and the bank's ability to integrate digital channels into its overall business model. In this context, the role of electronic banking in shaping customer satisfaction and organizational outcomes has become particularly important, as the quality and effectiveness of digital banking services can influence both customers' perceptions of value and banks' long-term performance (Minhaj & Khan, 2025). Moreover, the evolution of electronic banking is increasingly linked to broader forms of digital customer engagement and even sustainability-oriented banking practices, demonstrating that electronic banking platforms are becoming multifunctional environments rather than simple transaction interfaces (ul Rehman et al., 2025).

A central theme in the contemporary electronic banking literature concerns the relationship between e-banking adoption, service quality, and customer satisfaction. Customers evaluate electronic banking not only according to whether a transaction is successfully completed, but also according to ease of access, perceived usefulness, responsiveness, system reliability, security, convenience, speed, and the quality of their overall interaction with the bank. These dimensions affect customer satisfaction and subsequently influence loyalty, continued usage, and the broader quality of customer relationship management. Empirical evidence indicates that electronic banking service quality can significantly shape customer loyalty because customers increasingly compare financial institutions according to the quality and convenience of their digital service environments rather than solely according to branch-based interactions (Widayanti & Alam, 2024). Similarly, research has shown that satisfaction with electronic banking services is a multidimensional outcome resulting from the interaction of multiple service attributes, suggesting that banks must consider digital banking development as an integrated managerial process rather than as an isolated technological project (Minhaj & Khan, 2025). The importance of service quality has also been demonstrated in different national and institutional contexts, where accessibility, reliability, responsiveness, assurance, convenience, and technological functionality have emerged as central determinants of customers' assessments of electronic banking services (Traore & Loang, 2023). Evidence from Jordanian banking similarly suggests that the design and delivery of e-banking services are closely connected with customer satisfaction, reinforcing the need for banks to align technological development with customers' service expectations (Tahtamouni, 2023).

Customer acceptance constitutes another major dimension of electronic banking development. Even highly advanced electronic banking infrastructure may fail to generate the expected organizational and customer outcomes if users are unwilling or unable to adopt it. Technology acceptance in banking is shaped by perceived usefulness, perceived ease of use, perceived risk, trust, social influence, security concerns, previous experience, and individual customer characteristics. Research applying technology acceptance frameworks has demonstrated that customers' intentions to use electronic banking depend substantially on whether they perceive digital services as useful, manageable, and sufficiently secure, particularly in environments where cybercrime is a salient concern (Kaulu et al., 2024). Customers' attitudes and behavioral intentions are also influenced by social influence and individual traits, indicating that adoption cannot be fully explained by technological characteristics alone (Liao et al., 2024). Trust is especially important because digital banking reduces direct interpersonal interaction and requires customers to rely on technological systems and institutional safeguards when performing financially sensitive activities. Accordingly, trust and technology acceptance have been identified as important mechanisms through which electronic banking contributes to customer relationship management performance (Pambudi et al., 2021). These findings suggest that the



development of electronic banking requires a process-oriented perspective capable of simultaneously accounting for technology, customer psychology, institutional trust, and service management.

The heterogeneity of customer groups further complicates electronic banking development. Customers differ in digital literacy, age, technological familiarity, financial knowledge, risk perception, and expectations concerning personal interaction. Consequently, a single digital service model may not adequately address the needs of all customer segments. Research on elderly customers, for example, has demonstrated that electronic banking channel selection can be influenced by social networks and interpersonal connections, suggesting that customer behavior is embedded within broader relational environments rather than being determined exclusively by individual utility calculations (Cui & Xu, 2022). At the other end of the demographic spectrum, younger and more educated customers are increasingly familiar with digital banking technologies and may have stronger expectations for immediate, mobile, and technology-enabled service delivery (Nirmala & Kumar, 2024). This demographic diversity highlights the importance of designing electronic banking systems that combine technological sophistication with accessibility and usability. Electronic banking development should therefore involve not only the expansion of digital service channels but also the adaptation of services to different user groups, the provision of appropriate information and education, and the removal of practical and perceptual barriers that may prevent customers from fully utilizing digital banking opportunities.

Technological innovation has also expanded the boundaries of electronic banking beyond conventional Internet banking and mobile payment systems. Artificial intelligence, advanced analytics, augmented reality, fintech platforms, digital assistants, and automated customer-service technologies are increasingly incorporated into financial service environments. Artificial intelligence can support fraud detection, customer segmentation, automated advice, risk assessment, service personalization, and customer acquisition, thereby improving the efficiency and responsiveness of electronic banking systems (Keshtgar & Abbaspour, 2022). Emerging technologies can also intensify customer engagement by creating more interactive and experiential digital service environments. For example, augmented reality has been examined as a mechanism for strengthening customer engagement within electronic banking, reflecting the expanding role of immersive and interactive technologies in financial services (Mukerjee, 2024). These technological developments indicate that electronic banking is no longer defined simply by the migration of conventional banking functions to electronic channels. Rather, it increasingly involves the intelligent integration of data, customer knowledge, automation, personalized communication, and digital interaction. Consequently, banks require development models capable of explaining how technological innovations are connected with organizational processes, customer value creation, and broader strategic outcomes.

At the organizational level, electronic banking has major implications for productivity, innovation, employee roles, cost structures, profitability, and organizational performance. Digital banking can reduce transaction-processing costs, decrease dependence on physical branches, expand customer reach, and improve the efficiency of routine banking operations. At the same time, successful implementation depends on organizational innovativeness, employee capabilities, managerial commitment, job structures, and the capacity to manage technological change. Recent evidence suggests that electronic banking can interact with employee-related and organizational variables such as job security, innovativeness, and productivity in shaping organizational performance, demonstrating that digital banking transformation should not be treated solely as a customer-facing technological initiative (Apendi et al., 2025). The profitability implications of electronic banking are similarly important. In banking systems where digital channels reduce service costs and enable broader market access, electronic banking can contribute to profitability; however, its financial consequences depend on institutional and financial conditions (Adalessossi, 2023). This underscores the importance of considering both internal organizational determinants and external environmental conditions when analyzing electronic banking development.

The business-model implications of digital transformation are equally significant. The emergence of fintech firms and financial startups has challenged traditional banks to reconsider how value is created, delivered, and captured. Competition is no longer confined to conventional banks; technology-driven financial companies increasingly provide payment, lending, investment, and customer-interface solutions that can complement or substitute traditional banking services. This environment requires banks to redesign their electronic banking business models, cooperate with new technological actors, and integrate innovations into their core service architecture. Research on e-banking business models in the context of fintech and financial startups has emphasized the importance of restructuring banking value propositions, technological resources, customer



interfaces, and strategic partnerships to respond to the changing competitive environment (Amanzadeh et al., 2022). Such findings reinforce the argument that electronic banking development must be conceptualized as an organizational process involving strategy, structure, technology, customer relationships, and institutional adaptation rather than as the implementation of individual software products.

Despite the benefits of electronic banking, substantial barriers may impede its development and use. These barriers may include infrastructure limitations, inadequate software systems, cybersecurity concerns, insufficient digital literacy, legal and regulatory uncertainty, weak interoperability, customer distrust, and organizational resistance to change. Research on digital e-banking services has identified operational and institutional impediments that can restrict the effectiveness of digital banking, particularly where infrastructure, customer readiness, and organizational capability are unevenly developed (Patel & Patel, 2024). From the customer perspective, the availability of electronic payment products alone is not sufficient; customers also evaluate their accessibility, utility, ease of operation, security, and suitability for everyday financial needs (Mehta, 2022). These constraints can be particularly important in banking systems undergoing gradual digital transformation, where traditional processes and electronic systems coexist. Under such conditions, electronic banking development becomes a complex change process that requires coordination among technological, organizational, regulatory, cultural, and customer-related dimensions.

Service failure and recovery represent another important but sometimes overlooked dimension of electronic banking. Digital systems can create considerable convenience, but system interruptions, unsuccessful transactions, delayed responses, security incidents, or poor recovery mechanisms may have disproportionate effects on customers because financial services involve high levels of perceived risk and trust. Customers' emotional responses to e-service failures can influence subsequent evaluations of satisfaction and recovery quality, highlighting the importance of responsive service-recovery systems in electronic banking environments (Nyagadza et al., 2022). Electronic banking development should therefore incorporate mechanisms for reliability, problem resolution, transparent communication, and rapid recovery from service failures. These factors connect directly with system security and trust because customers' willingness to continue using digital banking services depends not only on positive experiences but also on how effectively the bank responds when technological or service failures occur.

The development of electronic banking also has a social and relational dimension. Digital channels can extend the reach of financial institutions and create more frequent interactions with customers, but they may simultaneously reduce face-to-face relationships traditionally associated with banking. Banks therefore need to use digital technology not only for transactions but also for communication, engagement, relationship building, and personalized value creation. The growing emphasis on digital engagement is reflected in research examining new mechanisms through which electronic banking platforms can create emotional, experiential, or interactive value for users (Mukerjee, 2024). Likewise, emerging research on gamified and sustainability-oriented banking indicates that customers' positive affect and their experiences of e-banking services may mediate their engagement with newer forms of digital banking behavior (ul Rehman et al., 2025). This suggests that the evolution of electronic banking is increasingly intertwined with behavioral design, social value, and broader customer experiences. Consequently, process models of electronic banking should be sufficiently comprehensive to explain how technological, relational, and experiential elements interact in shaping banking outcomes.

Although the existing literature has generated valuable evidence regarding customer satisfaction, service quality, technology acceptance, profitability, digital innovation, trust, and organizational performance, much of this research examines individual relationships among variables rather than the integrated process through which electronic banking develops within a specific banking organization. Studies have investigated e-banking service quality (Traore & Loang, 2023), customer satisfaction (Tahtamouni, 2023), technology acceptance and cybersecurity concerns (Kaulu et al., 2024), behavioral intention (Liao et al., 2024), customer loyalty (Widayanti & Alam, 2024), and trust-based customer relationship outcomes (Pambudi et al., 2021), while other studies have focused on profitability (Adalessossi, 2023), organizational performance (Apendi et al., 2025), emerging technologies (Keshtgar & Abbaspour, 2022), or business-model transformation associated with fintech development (Amanzadeh et al., 2022). These contributions demonstrate the multidimensional nature of electronic banking but also indicate the need for integrative research capable of identifying how the different dimensions are connected within a coherent developmental process.



This need is particularly important in large, established banking institutions where electronic banking transformation occurs within complex administrative structures, legacy systems, regulatory constraints, diverse customer populations, and long-standing organizational routines. Bank Melli Iran constitutes an important context for examining these issues because electronic banking development in such an institution requires coordination among information technology infrastructure, security, customer needs, managerial capabilities, organizational processes, legal conditions, service quality, and emerging technological opportunities. A grounded theory approach is especially suitable for such a context because it enables the development of an empirically grounded explanation of how different conditions, actions, strategies, and outcomes are interconnected. Rather than imposing a predefined model on the banking environment, grounded theory allows the principal categories and relationships to emerge systematically from the experiences and knowledge of individuals directly involved in the phenomenon. This is especially important where existing models may not fully capture the institutional and contextual characteristics influencing electronic banking development.

Accordingly, the present study seeks to address the need for an integrated, context-sensitive process model that can explain electronic banking development through the interrelationship of causal conditions, the central phenomenon, intervening conditions, strategic actions, and resulting consequences. By focusing on the perspectives of managers and specialists with direct experience of electronic banking, the study can identify the organizational and technological mechanisms underlying the development process while simultaneously incorporating customer-oriented, environmental, and institutional dimensions. Such a model can contribute theoretically by integrating fragmented dimensions identified in previous studies and practically by providing banking decision makers with a structured understanding of the factors that should be coordinated when designing and implementing electronic banking development initiatives. In particular, greater attention to security, convenience, trust, intelligent service delivery, value creation, environmental conditions, and banking-network structure may enable a more comprehensive understanding of why some electronic banking development initiatives generate sustained customer and organizational benefits while others remain limited to isolated technological improvements.

Therefore, the aim of this study was to develop a grounded, process-oriented model of electronic banking development in Bank Melli Iran by identifying and integrating its causal conditions, central phenomenon, intervening conditions, strategies, and consequences.

2. Methods and Materials

This study adopted a qualitative approach and employed grounded theory to derive its findings. Grounded theory is a qualitative research methodology through which a theory is developed on the basis of systematically collected data, such that the resulting theory explains a process, action, or interaction at a broader level. In this research approach, inquiry does not begin with an existing theory that is subsequently tested; rather, the study begins with an area of inquiry and allows the theoretical explanation to emerge over the course of the research process (Dolatpour, 2020). Grounded theory research, through the systematic use of data-collection procedures, can facilitate the inductive development of theory. In this process, the researcher interprets the data and, through a dynamic and active approach, continually redefines or elaborates the emerging theoretical analyses. In fact, the primary objective of grounded theory research is to explain patterns that constitute the social processes embedded in the data (Ansari & Haghshenas Gorgabi, 2016). Because the purpose of the present study is to develop a theory—that is, to understand how the tacit knowledge of employees and managers of Bank Melli Iran can be elicited and documented—a qualitative research approach is employed to develop an electronic banking model and achieve three principal objectives:

1. To uncover the intended concept, which constitutes a relatively underexplored phenomenon.
2. To obtain subtle and detailed insights into the concept that would be difficult to capture through quantitative methods.
3. Rather than merely attempting to explain causal relationships, to interpret issues associated with the phenomenon under investigation and clarify its various dimensions.

Grounded theory supports a distinctive perspective on the purposeful and specific selection of individuals for interviews or observations, distinguishing it from other approaches to data collection. Unlike sampling in quantitative studies, sampling in grounded theory cannot be completely planned prior to the commencement of the study; rather, specific sampling decisions emerge during the research process. In grounded theory, sampling initially begins with convenient or accessible cases,



subsequently moves purposefully toward maximizing variation among the emerging concepts, and ultimately develops into theoretical sampling (Munhall, 2012). Put simply, grounded theory is a qualitative research method aimed at generating a theory in the form of a set of interrelated propositions derived through constant comparison of the data. Researchers employing this method identify the principal concerns of participants and seek to explain how these concerns are resolved or managed (Maarefi, Asadollah, & Hassanpour, 2020). In grounded theory, data are used to generate theory through a coherent set of procedures that lead to the emergence of conceptual categories. These interconnected categories provide a theoretical explanation of the actions through which participants address their primary concerns within the domain under investigation (Danaeifard & Imami, 2007).

To formulate the research topic and framework within the paradigmatic model of grounded theory, the study population comprised managers and experts who possessed comprehensive knowledge of modern electronic banking. Given the qualitative nature of this stage and the objective of developing the research model, no predetermined sample size was initially specified. Sampling continued until theory development reached theoretical saturation. In other words, sampling was continued until the researcher determined that obtaining additional cases no longer added new findings to the process theory under development. The population of the present study consisted of specialists, experts, and professional managers in the field of electronic banking located in Tehran Province. The sample consisted of 16 participants who were selected purposively. In-depth interviews were conducted until theoretical saturation was achieved. In addition, by applying the grounded theory research strategy, the study sought to provide a clear representation, in model form, of how knowledge-based companies are established and developed in the humanities. The relevant research questions were used for this purpose.

Sampling in qualitative research is generally nonprobabilistic because probability sampling is not an appropriate method for identifying information-rich individuals who themselves constitute primary sources of data. Moreover, because a grounded theory approach was employed in the qualitative phase, theoretical and snowball sampling methods were used. Theoretical sampling is the process of collecting data for theory generation through which the analyst simultaneously collects, codes, and analyzes data and determines what data should subsequently be collected and where such data can be found in order to refine the emerging theory. In snowball sampling, participants are asked to identify other individuals who possess substantial knowledge concerning the phenomenon under investigation (Creswell, 2005). Accordingly, snowball sampling was initially employed to ensure appropriate participant selection. Following the first interview, the interviewee was asked to recommend one or more individuals possessing extensive knowledge of electronic banking. The study subsequently proceeded through theoretical sampling. Thus, the sampling method used in the present research was purposive and of the snowball type. In snowball sampling, one member of a social network introduces another member, who in turn introduces another individual. In this manner, the sample is developed through a chain-referral process (Farmani, 2020). Accordingly, interviews were generally conducted with individuals possessing at least 10 years of professional experience. According to the grounded theory approach proposed by Strauss and Corbin, an appropriate sample may consist of approximately 10 to 25 participants, while any increase in sample size depends on the attainment of theoretical saturation; that is, data collection continues until interviews yield no further new information or data.

Following transcription of the interviews, the collected data were analyzed through coding and classified through three stages: open coding, axial coding, and selective coding. In its simplest form, grounded theory refers to the process of constructing a systematic theory through organized data collection and inductive analysis in order to address emerging research questions in qualitative studies for which sufficient theoretical foundations are unavailable. In this method, data may be organized according to the chronological order of interviews, the sequence of events, or another relevant criterion. Data organization should make it possible to observe both the sequence of events and the logic underlying the chain of relationships among them. Coding constitutes the principal analytical procedure applied to data collected in grounded theory research. Given that the use of specialized software did not provide sufficient added value relative to the time required to work with such tools, and because labels, codes, and conceptual classifications were repeatedly and substantially modified until the final stage of grounded theory analysis—that is, theoretical coding—the researcher decided that manually conducting open coding and structuring the data extracted from the interviews would be more effective. Owing to the iterative nature of data collection and analysis, these processes were not sequential but occurred simultaneously in a zigzag pattern, which constitutes the essence of theoretical sampling. At each stage, the analysis of previously collected data provided a basis for deciding which data should



subsequently receive attention and which cases should be sought. Throughout the coding process, the data were decomposed, conceptualized, and ultimately reassembled in new configurations.

3. Findings and Results

In this section, the grounded theory strategy adopts an inductive approach. In other words, the process of theory formation proceeds from specific observations toward more general theoretical propositions. This method employs a series of systematic procedures to develop an inductively derived theory concerning the phenomenon under investigation. The research findings comprise a theoretical organization of the reality under study rather than merely a series of numerical values or a collection of disconnected materials. The objective of grounded theory is to construct and elaborate a theory that is both valid and illuminating within the specific context under investigation.

Throughout the present research, the researcher had 30 years of professional experience in Bank Melli Iran, banking operations, and the banking industry. Comprehensive expansion of information technology infrastructure represents one of the fundamental requirements that should be considered for the development of electronic banking at Bank Melli Iran. Nevertheless, the development of information and communication technology infrastructure in Iran continues to encounter various challenges. One of the essential prerequisites for the realization and expansion of electronic commerce is the establishment of an electronic banking system within Bank Melli Iran that operates in coordination with global financial and monetary systems and facilitates activities associated with electronic commerce. Indeed, it can be argued that implementation of electronic commerce requires the realization of electronic banking. For this reason, the use of electronic systems by financial and credit institutions worldwide has expanded rapidly, while the number of users of electronic banking services has increased continuously. The rapid growth and expansion of communication technologies have generated profound changes across multiple dimensions of human life and organizational performance. These technologies have transformed the methods of operation and perspectives of individuals, organizations, and governments and have contributed to the emergence of new industries, new occupations, and innovative approaches to performing activities. The emergence of phenomena such as electronic business, electronic commerce, and electronic banking represents one of the principal outcomes of the penetration and expansion of information technology within the economic sphere. Iran remains relatively young in terms of the adoption and implementation of electronic commerce and electronic banking and still faces a considerable distance before reaching the desired level of development. The Electronic Commerce Law was enacted in January 2004. Although extensive activities have been undertaken in the field of electronic banking, the absence of certain infrastructures across various dimensions has slowed these developments. Accordingly, this dissertation and the present chapter analyze concepts and definitions, characteristics, process development requirements, and the requirements of electronic commerce and electronic banking within Bank Melli Iran, as well as electronic banking instruments and channels. The status of each component and element is also reviewed and analyzed in general terms.

It can be argued that widespread access among Iranian citizens to the global Internet and the expansion of electronic communication among individuals and different organizations through the virtual environment have created an appropriate infrastructure for commercial and economic transactions supported by the banking system. Electronic banking represents one of the most important achievements of the application of technology in economic activities. The utilization of this technology contributes to trade development, facilitates communication among economic actors, creates opportunities for small and medium-sized enterprises, improves productivity, reduces costs, and saves time. Information and communication technology also enhances organizational competitiveness and contributes to the creation of new occupations.

Step One: Initial Implementation and Operational Design of the Research

At the beginning of the grounded theory process, and in accordance with grounded theory methodology, the researcher sought to identify the components and elements of electronic banking, determine how its process development should be applied, understand the research environment, and formulate the interview questions required for data collection. Initially, the research topic and the problems associated with it were examined theoretically through the review of books, journal articles, publications, and websites. These findings were subsequently integrated with the researcher's personal experiences and the consultative perspectives of other individuals in order to develop a relatively comprehensive understanding of the phenomenon under investigation. On the basis of this understanding, the questions to be presented to experts and specialists were formulated.



Although the semi-structured interview questions varied according to the experts' responses, the overall structure of the interview protocol used within the grounded theory approach corresponded to the questionnaire presented in the appendices.

Step Two: Data Generation and Collection

At this stage, after the relevant components and elements had been identified, a list of experts from the bank was provided to the researcher by the managers. Because both current and potential technology specialists of Bank Melli Iran were considered in the present study, the final selection of technology experts and interviewees was based on three fundamental criteria. The first criterion was knowledge of financial and banking regulations: technology experts were required to be familiar with the most recent banking and financial laws, regulations, and guidelines and remain sufficiently up to date to apply them effectively in their work. The second criterion was effective communication skills: because experts regularly interact with bank customers, they needed to establish effective and appropriate communication while maintaining respect and correctly identifying customers' electronic banking needs. The third criterion was accuracy and concentration, practical work skills, and familiarity with information technology: contemporary banking systems are extensively automated and electronic banking has become increasingly widespread; therefore, bank employees must possess sufficient computer skills and be familiar with the most recent developments in banking information technology.

Ultimately, based on the list provided by the bank, accessibility to qualified interviewees, and their willingness to participate in the study, 10 individuals were interviewed through snowball sampling. Following each interview with a technology expert, the participant was asked to identify other qualified experts, after which the subsequent participant was selected on the basis of the information obtained. The interview process was terminated after theoretical saturation had been reached and no new points had emerged during the final three interviews. Data collection was conducted in a highly flexible manner. Interviews, observations, existing documents, and similar sources constituted suitable means of collecting data. Because theory development depends on continuous comparison, data were collected in a manner that facilitated such comparisons. One important concept within this process was theoretical saturation, meaning that cases were added until they no longer generated additional insights and the researcher observed recurring information.

In the present study, interviews were conducted with 10 experts. Of the 20 interviews conducted, 14 were undertaken face-to-face and six were conducted by telephone. To ensure adequate examination of the data, all interviews were recorded using a mobile telephone after obtaining participants' consent. Subsequently, the audio recordings of all interviews were transcribed to facilitate more effective analysis. Following each interview and throughout open coding, constant comparison was conducted among the points extracted from the completed interviews in order to identify similarities and differences. Table 1 demonstrates the process through which theoretical saturation was reached across the interviews.

Table 1. Fundamental Framework for Achieving Theoretical Saturation Across Interviews

No.	Interviewee Code	Gender	Total Number of Codes	Number of New Codes
1	A1	Male	35	35
2	A2	Male	34	22
3	A3	Male	47	17
4	A4	Female	53	26
5	A5	Male	61	32
6	A6	Male	66	25
7	A7	Male	47	19
8	A8	Male	52	16
9	A9	Male	37	11
10	A10	Male	42	13
11	A11	Female	38	17
12	A12	Male	30	18
13	A13	Male	25	10
14	A14	Male	22	12
15	A15	Male	18	9
16	A16	Female	8	5
17	A17	Female	11	2
18	A18	Male	12	—
19	A19	Male	8	—
20	A20	Male	6	—



During the second stage, the interview process began face-to-face with participant A1, an expert from the branch management division who had been introduced by one of the heads of branch management, and subsequently continued with participant A2. Unfortunately, the first two interviews were accompanied by several challenges, including the researcher's insufficient initial mastery of the interview process, limited experience in adapting questioning techniques to participants' responses, and disruptions in recording the conversations. In view of these issues, after the interviews had been transcribed, the researcher contacted the participants again by telephone to clarify ambiguous or insufficiently explored issues from the initial interviews. To achieve a deeper understanding of the underlying dimensions and latent layers of participants' perspectives, the interview strategy was subsequently changed from a relatively structured approach to a more probing and intensive interviewing approach.

Accordingly, before presenting the principal research questions, simple and general questions were initially posed to encourage participants' engagement and cooperation. These included questions such as: What are the components and elements of the process model for electronic banking development in Bank Melli Iran? How are the components and elements of the process model for electronic banking development in Bank Melli Iran related to one another? How do you evaluate the current state of electronic banking? Furthermore, because expressions such as "causal conditions" and "context" were relatively ambiguous for some participants, the questions associated with each grounded theory dimension were reformulated in greater detail and asked in a more probing manner, similar to an intensive investigative interview, according to the responses provided by each expert.

Step Three: Open Coding

In this study, open coding refers to the analytical process through which electronic banking concepts and components were identified and their properties and dimensions were discovered in the data. At this stage, grounded theory generates preliminary categories concerning the phenomenon under investigation by segmenting the available information. The researcher applies categories to all collected data, including interviews, observations, events, and personal field notes (Creswell, 2005, p. 397). Open coding constitutes a data-analysis process in which data are broken down, compared, labeled, conceptualized, and ultimately categorized. During open coding, the data were divided into discrete parts and examined to identify their similarities and differences. During the labeling process, each event, occurrence, and idea identified in the data was assigned a name. This name constitutes a label or symbol representing that event, occurrence, or idea. Such names are referred to as codes or concepts and function as distinct conceptual labels attached to events, incidents, and other aspects of the phenomenon.

Although more than 358 initial codes were identified during the research process, the researcher ultimately obtained 226 secondary codes and a set of final conceptual labels that were subsequently classified according to their similarities. The purpose of developing concepts was to employ them in the generation of broader categories. Concepts must be more abstract than initial and secondary codes while remaining less abstract than categories. At the same time, they must encompass the most important indicators and codes in such a manner that an appropriate number of categories can subsequently be derived from them. Concepts should be both analytical and sensitizing. A concept is analytical when its level of abstraction is sufficient to enable analysis through various properties, codes, and indicators. A concept is sensitizing when it provides a representation that facilitates understanding of the phenomenon through personal and empirical experiences. The process of conceptual analysis ultimately resulted in confirmation of numerous indicators, introduction of new indicators, and revision of previous indicators. These indicators could overlap or differ from one another; on the basis of such proximity and distance, concepts could subsequently be grouped into categories.

Memo writing during interviews with bank technology experts may be described as the process of writing or otherwise recording key information relating to electronic banking. It represents an important component of the research process. Notes taken during presentations or discussions in interview sessions may function as study aids, while notes taken during interviews may subsequently contribute to the dissertation. Simultaneously with data collection, the researcher continuously recorded ideas and interpretations arising from interaction with the data. In other words, continuous interaction with the data needed to be systematically documented. This was achieved through memo writing and note-taking procedures. In grounded theory, data collection continues until the researcher becomes confident that additional data collection will no longer contribute new knowledge. Accordingly, data collection continued until saturation was achieved. One indication of saturation is the recurrence of previously obtained data. Throughout the research process, the researcher continuously recorded ideas and reflections



concerning the research phenomenon. These notes were repeatedly used throughout the coding process and during development of the final model.

Step Four: Axial Coding

The fundamental objective of this stage was to establish relationships among categories. Coding occurs around a central category and focuses on identifying one category as the principal category to which other subcategories are connected. At this stage, the researcher's task was to classify and compare the themes and labels extracted from the data. This process requires considerable time and careful reflection because relationships among categories are not always immediately apparent. Axial, or paradigmatic, coding encompasses a set of conditions, contextual circumstances, actions and interactions, and consequential phenomena and focuses on discovering and validating relationships among categories.

Within this sampling process, rather than simply recording incidents, events, and similar phenomena, the researcher attempts to identify existing differences and their associated consequences within particular conditions, contextual circumstances, and action/interaction processes. Through identifying differences and variations, categories are expanded during the research process and differentiated at the dimensional level. Furthermore, through the constant comparative method, comparison of different concepts enables the researcher to discover additional common dimensions, thereby allowing similar concepts to be grouped within the same categories. The use of this technique creates the foundation for identifying shared conceptual dimensions, which constitutes axial coding. The outcome of this stage is the formation of categories or components.

Axial coding is the process through which subcategories are related to a broader category. It constitutes a complex process of inductive-deductive reasoning comprising several stages. As in open coding, this process is conducted through comparison and questioning. However, in axial coding, these techniques are applied in a more focused manner and directed toward discovering and connecting categories according to the structure of the model. Axial coding therefore involves linking subcategories to a category through a complex flow of inductive and deductive reasoning involving several stages. Similar to open coding, axial coding is performed through comparison and questioning; however, the procedures become increasingly focused and oriented toward identifying relationships and linking categories within a paradigm or theoretical model.

Categorization of Open Codes

In categorizing open codes, each category may generally be located along continua such as good versus poor, effective versus ineffective, or strong versus weak. For example, customers' satisfaction with electronic banking may be either favorable or unfavorable. Axial coding involves identifying the properties associated with each dimension; for instance, satisfaction with modern banking services is related to characteristics reflecting positive perceptions and experiences. Accordingly, after concepts had been established, they were classified at a higher level of abstraction as categories. As previously explained, a category is a concept that possesses a higher level of abstraction than the concepts from which it is derived. Table 2 presents the classification of concepts into categories.

Table 2. Classification of Concepts and Their Dimensions

No.	Category	Concepts	Dimensions
1	Security	Applying managerial controls and safeguards through auditing policies and internal controls; establishing a comprehensive software security-control process; accurate authentication of electronic banking customers; establishing auditability of electronic banking transactions; controlling authorization for database implementation and other security systems and protocols; information integration through core banking systems and data warehouses; maintaining information confidentiality and implementing confidentiality protocols; establishing adequate capacity for 24-hour support and contingency planning; transparent accountability and coverage of unexpected requests and incidents; documenting systems and establishing backup sites; using and updating operating systems, security software, antivirus systems, etc.; employing encryption mechanisms, digital signatures, and one-time passwords	Low/High; Favorable/Unfavorable; Weak/Strong; Efficient/Inefficient
2	Convenience	Easy access to banking services regardless of place and time; convenience in paying utility bills; removal of barriers to opening accounts	Low/High; Favorable/Unfavorable; Weak/Strong; Efficient/Inefficient
3	Physical Evidence	Neatness and cleanliness of branches; physical branch facilities; modern equipment consistent with current technology; locating bank branches in accessible and appropriate locations; availability of electronic banking services and relevant infrastructure anytime and anywhere; employees' occupational knowledge, professional skills, awareness, and up-to-date information; expansion of electronic services to reduce direct branch visits, including ATMs; technical infrastructure; point-of-sale terminals, Internet banking, and telephone banking	Low/High; Favorable/Unfavorable; Weak/Strong; Efficient/Inefficient



4	Reliability	Individual dimensions; organizational dimensions; trust in the system; website-related dimensions; interactive dimensions; perceived risk; economic and social coverage; self-efficacy; efficiency	Low/High; Favorable/Unfavorable; Weak/Strong; Efficient/Inefficient
5	Artificial Intelligence	Enabling layers; applications and impacts arising from the adoption of artificial intelligence; service delivery through chatbots and robots; facilitation of mobile banking; enhancement of security and fraud detection; algorithmic trading; cognitive computing	Low/High; Favorable/Unfavorable; Weak/Strong; Efficient/Inefficient
6	Audiences	Informational; interactive; transactional	Low/High; Favorable/Unfavorable; Weak/Strong; Efficient/Inefficient
7	Process	Integrated expansion of the national monetary and financial system in accordance with successful international models; strengthening governance and realization of central-bank independence; gradual withdrawal from unrelated executive activities and delegation to the financial network and commercial banks; establishment of integrated financial-market structures based on international standards; modernization of the central bank's comprehensive information system through advanced technologies; establishment of banking associations to enable participation of commercial banks in policymaking; development of instruments required for the central bank's core operations and responsibilities, including monetary and foreign-exchange policies, supervision, and payment systems	Low/High; Favorable/Unfavorable; Weak/Strong; Efficient/Inefficient
8	Profitability	Factors under managerial control and internal bank parameters; factors beyond managerial control and external bank parameters; modern banking technologies	Low/High; Favorable/Unfavorable; Weak/Strong; Efficient/Inefficient
9	Cultural Factors	Lack of an appropriate cultural foundation and insufficient trust in electronic banking services; shortage of specialized human resources in electronic banking; restrictive regulations concerning specialized training; departure of effective and key specialists from the national banking system; insufficient diffusion of an electronic banking culture within society and inadequate customer education	Low/High; Favorable/Unfavorable; Weak/Strong; Efficient/Inefficient
10	Technology Acceptance	Perceived usefulness of technology; ease of use; perceived enjoyment; provision of information; security and confidentiality; Internet quality and connectivity	Low/High; Favorable/Unfavorable; Weak/Strong; Efficient/Inefficient
11	Political Factors	Fiscal policies; monetary policies	Low/High; Favorable/Unfavorable; Weak/Strong; Efficient/Inefficient
12	Social Factors	Credibility; dependability; confirmability; transferability	—
13	Legal Factors	Absence of electronic banking laws and regulations in executive and judicial systems; lack of clarity in existing laws and directives and failure to update them; unresolved legal infrastructure, particularly digital signatures, within the banking system; insufficient information-technology knowledge among judicial authorities handling relevant claims and complaints; absence of a specialized research authority for securing electronic banking	Low/High; Favorable/Unfavorable; Weak/Strong; Efficient/Inefficient
14	Software	Absence of software and security standards for implementing electronic banking systems; absence of backup sites during incidents; lack of access to certain software and new technologies because of sanctions or existing restrictions; support and security risks associated with open-source software versions; limited domestic production of banking software due to obstacles such as the absence of intellectual-property legislation; lack of a comprehensive centralized banking system corresponding to operational requirements; lack of comprehensiveness in banking customers' databases; outdated software and obsolete hardware systems	Low/High; Favorable/Unfavorable; Weak/Strong; Efficient/Inefficient

Causal conditions were examined from the perspective that electronic banking requires a developmental process. Traditional banking services currently included in banking service portfolios are incapable of adequately addressing the needs of large businesses. Consequently, contemporary developments in corporate banking must be examined in parallel with the advancement of the national banking sector. Furthermore, the use of specialized consultants and the design of systems according to the particular circumstances of each bank represent issues that banks must explicitly consider. The transition to new banking business models also requires strong management, and this transition phase must be managed in a targeted and systematically planned manner.

Causal conditions refer to incidents or events that lead to the occurrence or development of a phenomenon. Causal conditions, sometimes referred to as antecedent conditions, are often expressed in the data through terms such as “because,” “due to,” “as a result of,” “since,” “while,” or “when.” When such linguistic markers are absent, causal conditions can frequently be identified by examining the phenomenon itself, systematically reviewing the data, and identifying incidents or

events that temporally preceded the phenomenon. The phenomenon represents the primary event or occurrence toward which a sequence of actions and interactions is directed for purposes of control and management. The researcher therefore asks: What do these data indicate? What is this action or interaction about?

Table 3. Codes, Concepts, and Categories of Causal Conditions

No.	Category	Concepts	Secondary Codes
1	Security	Customer information security	Standardizing information security for effective and appropriate implementation; securing the stages of design, implementation, evaluation, and modification; establishing the organizational arrangements required to create and maintain information security
		Security vulnerabilities	Damage to the reputation and credibility of a monetary and financial institution; loss of customer and investor trust; disruption of the ongoing processes of monetary and financial institutions; different approaches to managing security risks; legal consequences arising from failure to establish a secure system and negative spillover effects on other monetary and financial institutions
		Security architecture	Identification and authentication of users; authorization; reliability; integrity; non-repudiation; availability; privacy; auditability
2	Convenience and Simplicity	Perceived ease of use	Awareness of services and benefits; unrestricted and 24-hour access; provision of diverse services based on customer preferences; ease of system updating; simplicity and convenience in using products and services; need-focused offerings designed for specific customers; customers' perceptions of the ease and simplicity of system use
		Perceived usefulness	Customers' perceptions that use of a particular technology—electronic banking—improves occupational performance within the organization; limited mental effort required to learn the system; customer perceptions regarding system usefulness and utility
3	Development Process	Increasing development of Internet use	Quality of Internet access and appropriate web-page design; information management and use of information for processing; reduction of transaction-processing costs
		Application development	Applications for installation on internal networks; applications used in Internet-based systems
		Electronic banking development	Information dissemination and transfer; information- and communication-compatible systems; two-way communication; increased transparency in competition among banking systems; increased speed of banking transactions; lower-cost provision of banking services; creation of an efficient commercial environment for domestic producers and consumers; establishment of the coordination required for communication with foreign banks; creation of opportunities for new national and international commercial relationships; rapid and continuous access by business actors to required information; greater convenience for businesses; convenient Internet-based buying and selling; provision of banking guidance and other advisory services; facilitation of commercial contracting
4	Reliability	Customer perception of trust	Improvement of customer service delivery and maintenance of customer satisfaction; previous experience with services; timely and continuous availability; appropriate service support; responsiveness consistent with customer needs
		Desired status	Provision and development of telecommunications infrastructure and equipment, including hardware and software; development of legal rules and regulations required for electronic banking; education to promote trust, acceptance, and utilization of new methods; creation of incentives within state-owned banking structures for outsourcing IT services to private companies; technical, strategic, and applied employee training; development of an organizational culture supportive of improvement

Theory development in electronic banking generated a process through which the **central category** came to confirm the role of the researcher as the author of the theoretical reconstruction. This category emerges during selective coding. In particular, the storyline represents the final conceptualization of the central category. Selective coding follows axial coding and develops through the continuation of open coding and repeated comparisons. According to Corbin and Strauss, the continuing process of coding and analysis ultimately generates a storyline. The “story” refers simply to a descriptive account of the principal phenomenon under investigation, whereas the storyline is its conceptualization, abstract explanation, and condensed representation. Following analysis, the storyline becomes the principal category of the research.

The main or central category can be conceptualized as the sun positioned in a systematic and orderly relationship with surrounding planets. The central category refers to the category that explains the greatest variation in behavioral patterns and is linked to other categories discovered within the data. It has also been argued that the central category provides the descriptive foundation for constructing a grounded theory. According to Strauss, the central category possesses six principal characteristics:

- It repeatedly appears throughout the data.
- It establishes multiple structural relationships among the data.
- Because it is central, it explains variation across the entire dataset.
- It can be applied to a broader theoretical explanation.
- It is analytically divisible and therefore possesses developmental potential.



- It facilitates analysis of the maximum possible number of variables.

Table 4. Overall Structure of Codes, Concepts, and Categories Associated With the Central Phenomenon

No.	Central Phenomenon	Concepts	Secondary Codes
1	Banking Services	Advanced banking services	Access to up-to-date and readily available financial services without the limitations associated with in-person visits; collection, classification, recording, and issuance of current financial documents and events; design and implementation of advanced financial reports; development of diverse reporting systems
		Appropriate and efficient use of facilities	Adoption of a user-centered approach in electronic banking; closer relationships with customers and diversification of communication channels; banks' communication channels with the public; rapid technological advancement
		Cost reduction	Cost reduction and service improvement as long-term determinants of customer satisfaction; banking costs as a major determinant of the cost of funds within the banking system; role of central-bank directives in implementing electronic banking and reducing the cost of funds; cost reductions through expanded communication infrastructures and branches; cost reduction through increasing the number of online branches; use of telephone banking, Internet banking, and point-of-sale terminals to reduce customer branch visits and enhance satisfaction
		Development of private banking	Establishment of investment portfolios in accordance with customer risk tolerance; delivery of specialized services aligned with customer needs; recognition of the unique financial profile of customers, including personal objectives, strategic objectives, and investment horizons; time-consuming and complex nature of personal financial management; need for specialized expertise in professional asset management
		Customer choice	Simplicity and convenience in account opening; ability to review and select account turnover information and generate reports conveniently; ability to monitor accounts, balances, and transactions anytime and anywhere; 24-hour support as an important customer choice criterion; broad choice and diversity of banking services
		Advice to capital owners	Convenient receipt and payment facilities for employers and employees; increasing the speed of monetary circulation, settlements, and banking exchanges; greater control over capital and continuous access to account balances and transactions
		Creating enthusiasm and motivation	Motivation and improvement of operational and practical banking programs to increase employee capability and productivity; justice and efficiency indicators in the banking system; service quality and effective support; savings in time and cost and ease of use; information and transaction security and confidentiality
		Social value	Social bonds reflecting personalized relationships between customers and the bank; social bonding as the second level of relationship marketing for ensuring customer loyalty; establishment of reciprocal relationships and empathy with customers; provision of customer support and responsiveness and development of a sense of attachment and shared experiences
		Information provision	Information concerning banking services and processes through public or private information networks established by the bank; ability to disseminate information and provide services in less time, at lower cost, and on a broader scale; important role of public relations and information provision in interactions with bank customers; information and communication technology as a managerial instrument for public relations

The provision and use of electronic banking services are directly dependent on users' habits and available facilities. With the introduction and development of electronic banking, four dimensions must be considered in regulating the relevant relationships.

Intervening conditions represent broader and more general circumstances that influence the ways in which action and interaction occur. These conditions include time, space, culture, economic status, technological level, occupation, personal history, and life events. Grounded theory is an approach to theory development oriented toward action and interaction. Regardless of whether the unit of study is an individual or a group, interaction occurs with the purpose of managing, responding to, accomplishing, or reacting to a phenomenon as it is perceived within specific contextual conditions. The interaction element is directed both toward the individual and toward reciprocal behavior involving other members of the group.

Table 5. Concepts and Categories of Intervening Conditions

No.	Category	Concepts	Secondary Codes
1	Environmental Conditions	Economic conditions	Unfavorable business conditions in recent years; economic allocation of resources by the government; foreign-exchange fluctuations; national economic recession; emphasis on cost reduction while maintaining service quality
		Political conditions	Instability in central-bank policies concerning credit facilities and bank profitability; international sanctions against domestic banks; banks' adaptation to changes in governments; uniform conditions governing provision of facilities and services to banks
2	Information Technology	IT technology	Integration of systems and connection of customers to the complete range of banking operations; use of e-commerce strategies; reduction of transaction-processing and information-processing costs; provision of services to target-market customers; generation of broader and more appropriate revenues; reduction of operating, transaction-processing, and information-processing costs



3	Banking Network Structure	Professional management	Strategic ideas and thinking; management of arbitrary approaches in customer relationships; managerial experience in customer relations
		Planning and policymaking	Optimization of customer-relationship infrastructure; adoption of a scientific managerial approach to electronic banking; managerial policymaking to support participation in business management; financial and credit policies of the bank

Table 6. Concepts and Categories of Strategies

No.	Category	Concepts	Secondary Codes
1	Value Creation	Needs-based services	Compatibility of services with the needs of specific customers; customization of service delivery according to customer needs; productive utilization of idle capital; provision of value-creating services through electronic banking; ensuring congruence between service characteristics and customer needs
		Service customization	Customization of service quality; customization of customer communication channels; customization of service-delivery speed
2	Intelligence	Electronic banking intelligence	Environmental scanning and market analysis; customer knowledge management; standardization of service-related knowledge among employees through knowledge sharing; timely monitoring of information; appropriate validation of information; knowledge sharing among employees and branches; standardization of service-related knowledge across bank branches and cities
		Research and development	Assessment of customer satisfaction and loyalty; classification of different customer groups; understanding customers' brand experience in sensory, behavioral, intellectual, and emotional dimensions; periodic and systematic assessment of customers' business status; measurement of customer satisfaction and loyalty
		Organizational agility	Rapid decision-making by bank authorities; adoption of new business models, such as universal banking; business analytics; social responsibility toward the market; integration of organizational actions

It may be argued that actions and reactions undertaken to confront, manage, or control a phenomenon produce consequences that cannot always be predicted and are not necessarily those originally intended by the actors involved. Actions and interactions may generate consequences for individuals, places, or objects. Consequences may also take the form of incidents or events; for example, a patient who disregards a prescribed diet may experience deterioration in health.

Table 7. Concepts and Categories of Consequences

No.	Category	Concepts	Secondary Codes
1	Benefits to Bank Customers	Customers' financial benefits	Increased customer income; reduction of customers' financial and banking problems; reduction in customer costs through fee discounts, more favorable interest rates, improved credit conditions, and similar mechanisms
		Customers' professional benefits	Saving customers' time through reduced physical branch visits; provision of business-related ideas by the bank for designing appropriate products; alignment between the individual objectives of bank employees and the bank itself with customer objectives, and vice versa; improvement of customers' business conditions; receipt of personalized support; reduction of risks associated with industry and market recession; reduction of administrative bureaucracy in the provision of credit facilities; rapid and appropriate resolution of potential problems
2	Mutual Effects	Improvement in customers' perceptions of service and interaction quality	Receipt of premium and high-quality services; facilitated service delivery; integrated receipt of expected services; removal of barriers to accessing services; continuous provision of high-quality services to specific customers; consolidation of diverse banking services within one bank; delivery of services based on customer needs and circumstances; provision of service quality differentiated from competitors
		Customer retention	Stability in the relationship and reduction of customer confusion; facilitation of bank selection and decision-making processes for important customers; avoidance of fragmented relationships with multiple banks; unwillingness to select a bank other than the focal bank; reciprocal loyalty between the bank and customer; continued customer relationship with the bank even under less-than-ideal circumstances; customer commitment to continued cooperation with the bank

Given the rapid development of information technology and its effects on banking activities, it is necessary to continually update existing laws and develop new regulations. This process requires sustained effort, adequate time, and the participation of specialized experts.

New methods of conducting transactions, new instruments, and innovative services require specific legal definitions, recognition, and authorization. For example, digital signatures are essential in electronic banking, and the banking system must develop, codify, and enforce specific regulations governing their use.

International coordination of electronic regulations must receive particular priority. Such coordination requires defining operations across national boundaries and establishing appropriate supervisory mechanisms, coordination procedures, and local, regional, and international regulations. Large-scale electronic banking inherently involves diminishing the significance of geographical boundaries and enabling transactions without traditional territorial restrictions so that citizens can rapidly conduct their banking transactions across national borders.



Process integration encompasses issues associated with information technology and related operational risks in the implementation and supervision of banking operations, including their security, safety, and operational rationality.

Step Five: Selective Coding

During the axial coding process, continuous comparison led to the gradual emergence of the central category representing the **process of electronic banking development**. This central category, which explained the greatest variation in the concerns expressed by the participants, became the primary focus of the study and guided the selective collection of data during subsequent stages and interviews. It should be noted that the central category of the present research began to emerge from the eighth interview onward. As explained in the methodology section, the central category represents the principal concern expressed by participants in relation to the core research problem.

Once the central category had become evident and emerged from the data, selective coding began, and subsequent interviews were coded in relation to this central category. Selective coding concerns coding for, and in relation to, the central category. The central category represents a principal concept or social process linked to the other concepts identified in the data. The central category constitutes the focal point of grounded theory by integrating the various components of the theoretical explanation. Through this process, a fully developed theory emerges during the selective coding stage.

According to Strauss, selective coding involves systematically selecting the principal components, relating them to other categories or components, validating the relationships among them, and filling conceptual gaps with categories requiring additional refinement or development. During selective coding, the researcher builds on the preceding analytical stages to further consolidate the concepts and components. At this stage, the organized data are classified within broader categories and a more limited set of dimensions.

During the final stage, discriminant sampling is employed. At this point, individuals, locations, and documents are deliberately and systematically selected both to confirm and validate the central categories and the overall theory and to achieve saturation in categories that remain insufficiently developed. In other words, this form of sampling is used during selective coding to maximize opportunities for confirming the emerging propositions and relationships among categories, completing incomplete categories, integrating categories across dimensional levels, shaping the theory, establishing consistency and coherence among theoretical statements, elaborating categories that require further explanation, and ultimately achieving the appropriate development of the theoretical categories.

Sampling at this stage must be highly focused, carefully considered, and based on conscious choices regarding the individuals and phenomena under investigation so that the required data can be obtained. Selective coding proceeds through a process in which the first step involves identifying the central storyline. The second step consists of relating complementary categories to that storyline. The third step involves linking categories to one another at a higher analytical level. The fourth step consists of validating these relationships against the data. The final step involves completing categories that require further modification, elaboration, or expansion.

These stages are not necessarily implemented in a strictly sequential order. Rather, the researcher continuously moves back and forth among them. Selective coding reaches its final stage when theoretical saturation is achieved. Theoretical saturation means that additional coding merely reinforces existing categories without generating substantively new knowledge. At the same time, grounded theory remains sufficiently flexible to enable the researcher to revisit the same sources, texts, and even codes developed during open coding from a different analytical perspective in order to construct a grounded theory addressing another phenomenon.

Within grounded theory, subcategories are integrated into a structured set of relationships surrounding the central category. These relationships represent the causal conditions associated with the phenomenon, the contextual conditions, intervening conditions, action and interaction strategies, and consequences. On the basis of the findings obtained during axial coding, the grounded theory model concerning the process development of electronic banking is presented in the following figure.



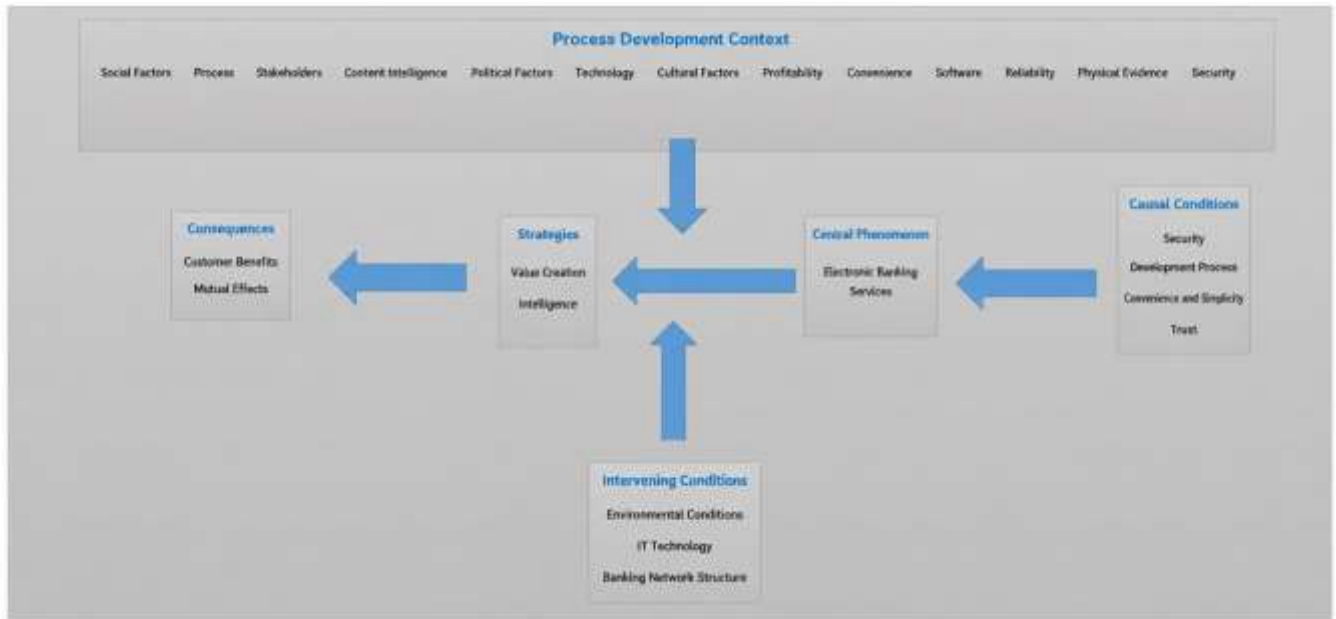


Figure 1. Paradigmatic Model of Grounded Theory: The Process Development of Electronic Banking

4. Discussion and Conclusion

The present study developed a process-oriented model of electronic banking development in Bank Melli Iran through grounded theory and identified a set of interrelated causal conditions, a central phenomenon, intervening conditions, strategic responses, and consequences. The findings showed that security, convenience and simplicity, the development process, and reliability constitute the principal causal conditions underlying electronic banking development. The central phenomenon was represented by the expansion and enhancement of electronic banking services, including advanced banking services, more efficient use of available technological facilities, cost reduction, development of private banking, greater customer choice, advisory services for investors and capital owners, motivation and engagement, social value creation, and information provision. The findings further indicated that environmental conditions, information technology, and the structure of the banking network function as intervening conditions that shape the effectiveness of electronic banking development. Two principal strategic categories, namely value creation and intelligence, emerged as the dominant action-oriented responses. Finally, the consequences of successful electronic banking development were reflected in customer financial and professional benefits, improved perceptions of service and interaction quality, and stronger customer retention. Taken together, these findings suggest that electronic banking development is not a purely technological process but a multidimensional organizational transformation in which technical, behavioral, strategic, structural, and environmental dimensions must be coordinated.

The identification of security as a major causal condition is consistent with the broader electronic banking literature, which repeatedly emphasizes that customers' willingness to adopt and continue using digital financial services depends strongly on perceived security, privacy, risk, and confidence in the technological system. In the present study, security encompassed information protection, authentication, authorization, confidentiality, integrity, auditability, non-repudiation, and the prevention of security vulnerabilities. This finding aligns with research showing that cybercrime concerns can significantly affect customers' intentions to adopt electronic banking and that perceptions of risk and system security constitute essential components of digital banking acceptance (Kaulu et al., 2024). Similarly, the importance of trust found in the present study is supported by evidence indicating that trust mediates the relationship between acceptance of electronic banking technology and customer relationship management performance (Pambudi et al., 2021). The results also correspond with studies suggesting that service reliability and security are integral to customers' evaluations of e-banking service quality (Traore & Loang, 2023). From a process perspective, these findings indicate that security cannot be treated as an isolated technical function. Rather, it

must be embedded within the entire electronic banking development cycle, from system design and infrastructure development to customer communication, service delivery, monitoring, and recovery procedures.

The findings regarding convenience, simplicity, and perceived usefulness similarly support established technology acceptance perspectives. Participants in the present study emphasized 24-hour access, ease of use, reduction of geographical and temporal constraints, ease of system updating, simple transaction procedures, and the perceived usefulness of electronic banking in improving performance and facilitating customer activity. These findings correspond closely with studies demonstrating that customers' attitudes and behavioral intentions toward electronic banking are shaped by perceived usefulness, ease of use, and customer-specific characteristics (Liao et al., 2024). They are also consistent with findings that technology acceptance in electronic banking is affected by customers' assessments of usefulness and convenience, particularly when these assessments interact with concerns regarding cybercrime and digital risk (Kaulu et al., 2024). In addition, research among younger and more educated customer groups suggests that familiarity with electronic banking and perceived convenience can facilitate growth in digital banking usage (Nirmala & Kumar, 2024). Therefore, the present results reinforce the argument that the development of electronic banking should be evaluated not only by the number of digital services provided but also by the degree to which customers perceive those services as simple, useful, accessible, and compatible with their banking needs.

The central phenomenon of the model, namely electronic banking services, reflected a broad set of service-development priorities rather than a narrow focus on transaction digitization. The participants emphasized advanced banking services, more efficient utilization of technological facilities, cost reduction, personalized and private banking, greater customer choice, financial consultation, customer motivation, social value creation, and systematic information provision. This finding is consistent with studies showing that electronic banking quality is a multidimensional construct that influences customer satisfaction through different service dimensions rather than through a single technological characteristic (Minhaj & Khan, 2025). It also aligns with evidence that customers' satisfaction with electronic banking is influenced by the quality and accessibility of banking services and by the extent to which digital channels provide a satisfactory alternative to conventional branch-based services (Tahtamouni, 2023). In a similar vein, the role of electronic banking and service quality in strengthening customer loyalty has been highlighted in previous research (Widayanti & Alam, 2024). Thus, the centrality of service development in the present model confirms that electronic banking transformation should ultimately be judged by the value and quality of services received by customers, rather than by technological modernization alone.

The emphasis on cost reduction and profitability also deserves attention. Participants associated electronic banking development with reducing processing costs, decreasing the need for physical presence in branches, increasing the use of online channels, and improving the cost efficiency of financial service delivery. These observations are compatible with evidence that electronic banking can contribute to bank profitability, although the extent of this contribution depends on financial and institutional determinants (Adalessossi, 2023). From an organizational perspective, electronic banking may improve performance not only by reducing transaction costs but also by increasing productivity, enabling innovation, and redesigning employee roles. Research has shown that electronic banking, employee job security, innovativeness, and productivity can jointly affect organizational performance (Apendi et al., 2025). Accordingly, the present findings extend previous work by suggesting that profitability and efficiency are not independent outcomes but emerge from the interaction of technological infrastructure, organizational processes, employee capabilities, and customer-oriented service delivery.

Another important finding concerns the role of information technology and the banking network structure as intervening conditions. In the present model, information technology involved system integration, customer connection to the full range of banking operations, use of e-commerce strategies, reduction in information-processing and transaction costs, and creation of broader revenue opportunities. At the same time, the banking network structure incorporated professional management, strategic thinking, customer relationship experience, planning, policymaking, and infrastructure optimization. These results are consistent with studies emphasizing that electronic banking development requires business-model transformation rather than merely the introduction of new delivery channels. Research on e-banking business models in the context of fintech and financial startups indicates that digital transformation requires restructuring value propositions, partnerships, service architecture, and organizational capabilities (Amanzadeh et al., 2022). The present findings therefore suggest that IT infrastructure provides



the technical foundation of electronic banking, whereas managerial and structural arrangements determine whether this infrastructure is converted into sustainable service innovation.

The findings also identified environmental conditions, including economic and political circumstances, as important intervening factors. Exchange-rate volatility, recession, governmental resource allocation, central-bank policy instability, and international sanctions were among the conditions that participants considered relevant to electronic banking development. This result highlights the contextual nature of banking transformation. Electronic banking strategies are not implemented in an institutional vacuum; rather, they are influenced by national economic circumstances, regulatory arrangements, access to technologies, and external restrictions. Studies examining barriers to digital e-banking services similarly indicate that organizational and infrastructural development may be constrained by external and institutional obstacles (Patel & Patel, 2024). Furthermore, customer evaluations of available e-banking payment products depend on the practical availability and usability of digital financial systems within their specific institutional environment (Mehta, 2022). The current findings therefore demonstrate why contextual and environmental factors must be incorporated into any realistic model of electronic banking development, especially in large public or historically established banking institutions.

The strategy of **value creation** emerged as one of the most important components of the model. Value creation involved adapting services to the needs of specific customers, customizing service quality and communication channels, accelerating service delivery, and transforming idle resources into productive financial opportunities. This result is consistent with the increasing emphasis in financial service research on personalized and customer-centered digital experiences. The literature indicates that new technologies can enhance customer engagement by enabling more interactive and individualized banking experiences (Mukerjee, 2024). Similarly, studies of electronic banking service dimensions suggest that customer satisfaction is enhanced when the digital service environment responds effectively to customer expectations and preferences (Minhaj & Khan, 2025). The present study extends these observations by positioning customization not simply as a marketing technique but as a strategic mechanism within the overall process of electronic banking development. In other words, customer value creation becomes a bridge connecting technology investment to customer outcomes.

The second major strategy, **electronic banking intelligence**, included environmental scanning, market analysis, customer knowledge management, timely information monitoring, knowledge sharing among employees and branches, research and development, customer segmentation, customer-experience assessment, business analytics, and organizational agility. This category reflects the growing importance of data-driven and knowledge-based banking. The finding is consistent with research showing that artificial intelligence can improve electronic banking performance and facilitate customer acquisition through more accurate analysis, automation, and decision support (Keshtgar & Abbaspour, 2022). It also corresponds with the broader movement toward innovative digital banking experiences in which advanced technologies are used to deepen customer engagement and strengthen service personalization (Mukerjee, 2024). Moreover, the interaction between e-banking and innovative organizational practices reported in previous research supports the present finding that intelligence and agility are necessary for translating digital capability into improved organizational performance (Apendi et al., 2025). Accordingly, the present results suggest that successful electronic banking requires the capacity not only to collect information but also to transform information into knowledge, knowledge into decisions, and decisions into responsive banking services.

The consequences identified in the present study further support the customer-centered logic of the proposed process model. Customer benefits included increased income opportunities, reduced financial and banking problems, reduced transaction and service costs, time savings, reduced branch visits, more personalized support, and improved business conditions. These outcomes are consistent with studies showing that customers evaluate electronic banking according to both functional and experiential benefits (Mehta, 2022). The results also align with evidence that customer satisfaction is strongly affected by the quality of e-banking services (Tahtamouni, 2023) and that improved service quality can strengthen customer loyalty (Widayanti & Alam, 2024). The current findings indicate that customer benefits emerge most strongly when electronic banking is designed around actual banking needs rather than around technological availability alone.

Improved perception of service quality and customer retention constituted another major outcome. Participants emphasized the importance of premium service delivery, integrated provision of services, removal of access barriers, differentiated service quality, reduced fragmentation across banks, and reciprocal loyalty between the bank and customer. These findings are



compatible with studies demonstrating that emotions and customer evaluations during e-service failure and recovery can substantially influence overall satisfaction (Nyagadza et al., 2022). This suggests that retention depends not only on successful routine transactions but also on how effectively the bank manages service disruptions and customer dissatisfaction. Likewise, the relationship between trust, technology acceptance, and customer relationship management performance reported by (Pambudi et al., 2021) reinforces the present conclusion that sustainable electronic banking relationships require both functional reliability and relational confidence. Furthermore, the influence of social factors and customer traits on electronic banking behavioral intention reported in prior research (Liao et al., 2024) indicates that customer retention should be approached as a behavioral and relational process rather than simply as an outcome of technological access.

The findings concerning different customer groups and patterns of service use also reinforce the importance of a differentiated approach to electronic banking development. Previous studies have shown that elderly customers' selection of electronic banking channels may depend on social networks and relational influences (Cui & Xu, 2022), while younger educated customers may be more willing to adopt and expand their use of digital banking services (Nirmala & Kumar, 2024). These studies support the present model's emphasis on stakeholders, audiences, cultural factors, technology acceptance, and service customization. They imply that effective electronic banking development should avoid a uniform service architecture and instead account for variation in age, technological literacy, financial experience, risk perception, and communication preferences. Such segmentation is also consistent with the intelligence strategy identified in the present research, particularly customer classification and systematic assessment of customer experiences.

Finally, the proposed model suggests that electronic banking development increasingly extends beyond transactional efficiency toward broader forms of customer engagement, organizational learning, and social value. Electronic banking platforms can become environments through which banks strengthen relationships, encourage participation, communicate value, and support broader behavioral objectives. Research on green gamified banking demonstrates that positive affect and e-banking services can contribute to new forms of customer engagement with digitally mediated banking behavior (ul Rehman et al., 2025). This perspective complements the present finding that social value, information provision, customer motivation, and relationship building form part of the electronic banking development process. Overall, the results of the present study are largely aligned with previous research but provide a more integrated explanation by connecting security, convenience, trust, technological infrastructure, organizational structure, customer value creation, intelligence, and customer outcomes within a unified process framework.

The present study has several limitations that should be considered when interpreting its findings. First, the research was conducted within the context of Bank Melli Iran and relied primarily on the experiences and perceptions of managers and specialists associated with electronic banking; consequently, the resulting model reflects the organizational and institutional characteristics of this particular banking environment and should not automatically be generalized to all public, private, or international banks. Second, the qualitative grounded theory design emphasizes conceptual depth rather than statistical generalizability, and the identified relationships were not quantitatively tested for effect size, predictive power, or relative importance. Third, the use of purposive, snowball, and theoretical sampling may have resulted in greater representation of participants within interconnected professional networks. Fourth, differences in the reported numbers of participants and interview sessions in different stages of the research process should be interpreted carefully and should be clarified in the final methodological reporting. Finally, the rapid pace of technological change means that some emerging electronic banking technologies, regulatory developments, cybersecurity threats, and customer behaviors may evolve beyond the conditions captured during the data-collection period.

Future studies should quantitatively validate the proposed process model by developing measurement scales for the identified categories and testing the structural relationships among causal conditions, the central phenomenon, intervening conditions, strategies, and consequences using structural equation modeling or partial least squares structural equation modeling. Comparative studies involving public and private banks could determine whether the proposed categories function similarly across different ownership structures and competitive environments. Future research could also examine differences among customer segments based on age, digital literacy, type of banking relationship, geographic location, and intensity of electronic banking use. Longitudinal studies would be particularly useful for examining how the relative importance of security, trust, artificial intelligence, service customization, and organizational agility changes over time. Additional research may focus



specifically on the roles of artificial intelligence, open banking, fintech collaboration, blockchain, digital identity, and advanced fraud-detection systems within the proposed process model. Cross-national research could also evaluate the extent to which economic, political, legal, and technological environments alter the electronic banking development process and its consequences.

Bank managers should approach electronic banking development as an integrated organizational transformation rather than as a series of isolated IT projects. Priority should be given to strengthening cybersecurity, customer authentication, privacy protection, system reliability, backup capabilities, and rapid incident-response mechanisms because trust in digital banking depends on the perceived integrity of the entire service environment. Banks should simplify customer journeys, reduce unnecessary steps, maintain continuous access, and design services around the actual needs of different customer groups. Investment in integrated IT infrastructure should be accompanied by managerial reforms, employee training, knowledge sharing, and the development of business analytics and customer intelligence capabilities. Banks should systematically segment customers and personalize services, communication channels, and support mechanisms according to customer characteristics and banking needs. Senior managers should establish cross-functional teams that integrate technology, risk management, marketing, customer service, compliance, and strategic planning. Finally, performance evaluation should extend beyond transaction volumes to include customer satisfaction, service recovery, customer retention, cost efficiency, trust, digital engagement, and the extent to which electronic banking creates measurable value for both customers and the bank.

Ethical Considerations

All procedures performed in this study were under the ethical standards.

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Conflict of Interest

The authors report no conflict of interest.

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References

- Adalessossi, K. (2023). Impact of e-banking on the Islamic bank profitability in Sub-Saharan Africa: What are the financial determinants? *Finance Research Letters*, 57. <https://doi.org/10.1016/j.frl.2023.104188>
- Amanzadeh, M., Sanavifard, R., & Hamidizadeh, A. (2022). E-banking Business Model Based on the Emergence of Fintechs and Financial Startups. *Journal of Technology Development Management*, 7(2), 195-248. <https://doi.org/10.22104/jtdm.2019.3508.2214>
- Apendi, D. A. O., Li, K., Pea-Assounga, J. B. B., & Bambi, P. D. R. (2025). Investigating the impact of e-banking, employee job security, innovativeness, and productivity on organizational performance: Perspectives from South Africa. *Sustainable Futures*, 9, 100605. <https://doi.org/10.1016/j.sfr.2025.100605>
- Cui, X., & Xu, J. (2022). Understanding the E-Banking Channel Selection Behavior of Elderly Customers: A Small-World Network Perspective. *Journal of Organizational and End User Computing (JOEUC)*, 34(6), 1-21. <https://doi.org/10.4018/JOEUC.300765>
- Kaulu, B., Kaulu, G., & Chilongo, P. (2024). Factors influencing customers' intention to adopt e-banking: a TAM and cybercrime perspective using structural equation modelling. *Journal of Money and Business*, 4(1), 38-53. <https://doi.org/10.1108/JMB-01-2024-0007>
- Keshtgar, N., & Abbaspour, R. (2022). Investigating AI's impact on improving e-banking performance and customer acquisition. 4th International Conference on Management, Tourism & Technology, <https://en.civilica.com/doc/1461075/>
- Liao, Y. K., Nguyen, H. L. T., Dao, T. C., Nguyen, P. T. T., & Sophea, H. (2024). The antecedents of customers' attitude and behavioral intention of using e-banking: The moderating roles of social influence and customers' traits. *Journal of Financial Services Marketing*, 29(3), 1037-1061. <https://doi.org/10.1057/s41264-023-00254-4>
- Mehta, A. D. (2022). "E-Banking Payment Products and Systems in Gujarat State: From E-Customers' Perspectives". *Skips Anveshan*, 3(1), 120-130. <https://doi.org/10.53031/skips.3.1.2022.09>
- Minhaj, S. M., & Khan, M. A. (2025). Dimensions of E-Banking and the Mediating Role of Customer Satisfaction: A Structural Equation Model Approach. *International Journal of Business Innovation and Research*, 36(1), 42-57. <https://doi.org/10.1504/IJBIR.2025.143944>
- Mukerjee, K. (2024). Augmented reality and customer engagement in the context of e-banking. *Journal of Financial Services Marketing*, 29(4), 1559-1571. <https://doi.org/10.1057/s41264-024-00284-6> 10.1057/s41264-024-00290-8



- Nirmala, M. M., & Kumar, N. S. (2024). A Study on E-Banking Services and Its Growth Among the Educated Teenagers in Bangalore. In *Information and Communication Technology in Technical and Vocational Education and Training for Sustainable and Equal Opportunity: Education, Sustainability and Women Empowerment* (pp. 481-493). Springer Nature Singapore. https://doi.org/10.1007/978-981-99-6909-8_42
- Nyagadza, B., Mazuruse, G., Muposhi, A., Chuchu, T., Makoni, T., & Kusotera, B. (2022). Emotions' influence on customers' e-banking satisfaction evaluation in e-service failure and e-service recovery circumstances. *Social Sciences & Humanities Open*, 6(1). <https://doi.org/10.1016/j.ssaho.2022.100292>
- Page | 21 Pambudi, A., Widayanti, R., & Edastama, P. (2021). Trust and Acceptance of E-Banking Technology Effect of Mediation on Customer Relationship Management Performance. *ADI Journal on Recent Innovation*, 3(1), 87-96. <https://doi.org/10.34306/ajri.v3i1.538>
- Patel, B. A., & Patel, R. (2024). Hindrance of Digital E-Banking Services: An Analytical Investigation on Cooperative Banking. *Library Progress International*, 44(1s), 292-303. <https://bpasjournals.com/library-science/index.php/journal/article/view/792>
- Tahtamouni, A. (2023). E-banking services and the satisfaction of customers in the Jordanian banks. *Journal of Science and Technology Policy Management*, 14(6), 1037-1054. <https://doi.org/10.1108/JSTPM-06-2021-0082>
- Traore, K., & Loang, O. K. (2023). The Factors That Influence E-Banking Service Quality In Guinea's Commercial Banks. *International Journal of Accounting*, 8(46), 153-167.
- ul Rehman, O., Zhongjun, T., & Shahzad, M. F. (2025). Positive Affecter and the Path to Green Gamified Banking: Unveiling the Mediation effect of E-banking Services. *Review of Marketing Science*, 23(1), 275-312.
- Widayanti, A., & Alam, I. A. (2024). The Influence of E-Banking and Service Quality on Loyalty in Customers of Bank Bri Unit Bukit Kemuning Lampung Utara. *Formosa Journal of Multidisciplinary Research*, 3(2), 305-316. <https://doi.org/10.55927/fjmr.v3i2.8262>

