

## RESEARCH ARTICLE

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## Designing an Open Banking Model by Using the Grounded Theory Approach in Bank Saderat

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### Abstract

This research aims to design an open banking model using a grounded theory approach in bank Saderat Khorasan Razavi. This study is exploratory in nature and mixed-in approach. This research was carried out in two stages among the research projects of the combined method. For this purpose, it collects qualitative data first. In this section, the indicators were identified through reviewing existing documents, papers, and articles and semi-structured interviews with experts, and the grounded theory method was used to select the identified indicators. The statistical population of the qualitative part included academic experts in management fields, organizational and banking experts, including 40 top managers, experts, professors and related people in open banking in Saderat Bank. In the quantitative part, the statistical population includes 96 banking experts in Saderat Bank. Open and axial coding was done and a visual pattern was designed. In second stage was the quantitative part of the research, after the final research model was identified in the qualitative part and the components and indicators of each component were determined, the final questionnaire included all dimensions and components of the identified model based on the five-choice Likert scale and based on dimensions and the components of open banking in the country's banking industry were compiled and distributed among sample people and data were collected. The statistical population in the qualitative part of the research and the process of identifying dimensions and components of open banking in the country's banking industry included organizational experts, these people included senior managers, deputy managers, middle managers, and senior experts. The statistical population in the quantitative part included all managers and senior experts of open banking in the country's banking industry. According to the obtained results, the consequences with an average rank of 2.63 are the priority. Intervening factors with an average rating of 2.55 are the second priority. The central phenomenon with an average rank of 2.43 is the third priority. Contextual factors with an average rank of 2.40 are the fourth priority. Strategies are in the fifth priority with an average rank of 2.39. Causal factors with an average rating of 2.38 are the last priority.

**Keywords:** *Open banking, Bank Saderat, Strategy, Financial system, Business intelligence*

### Introduction

The banking industry is currently facing three main currents including deregulation, new technologies and globalization. In developed countries, these processes are mainly carried out in three phases. The first stage: removal of quantitative controls on bank assets and removal of restrictions on the

ceiling of the interest rate granted to deposits; The second stage: removing the restrictions on the specialization of banks and other financial intermediaries and the third stage: the entry of new institutions into this field of activities (Ozdemirci et al., 2023). An important issue is the role of new information technologies on the banking process. The

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amazing development of information and communication technology and its expansion to the financial and banking markets of the world, in addition to facilitating things for bank customers, has revolutionized and transformed the current banking methods. The technology of banks is the technology of processing, recording, maintaining, feeding and exchanging customer information (Tadayon et al., 2021). This technology has evolved gradually and along with the progress of information and communication, open banking is one of the new developments in banking in the world, which has attracted the attention of many large banks. Open banking provides a platform for software developers to realize their new and creative ideas by accessing banking services (Pinochet et al., 2023).

Open banking, an evolving paradigm that empowers customers to share their banking data securely with fintech firms and other banking institutions, is instigating a wave of transformation in the financial industry. Such a shift has seen a surge of non-banking entities and fintech lenders entering the credit markets, intensifying competitive dynamics. Triggered by technological advancements and the proliferating presence of fintech lenders, this change propels the industry toward a radical restructuring and a transition to a more customer-centric, platform-based model. The consequences of this transformation are broad and include the expansion of the credit market, an increased role for fintech in small business financing, and a 20% acceleration in mortgage application processing times (Odorovic, 2023).

Open Banking is an emerging and relevant topic in the banking industry that has been explored worldwide. This refers to an initiative aimed at promoting the integration of banking systems through an open platform, allowing different financial institutions to share their clients' data and services in a secure and standardized manner. Given the relevance of the subject, there is a need to understand scientific publications on the topic and highlight their contributions to

the Science of Administration. In this sense, this article aims to conduct an integrative analysis of the literature on Open Banking (Dezm et al., 2023).

The main issue of this research is to investigate the function of open banking and its advantages in the country's banking system. In other words, it is very important to investigate what changes the country's banking system will face with the realization of open banking. With the realization of open banking, in addition to the production of various types of banking applications by external developers, it is possible to connect commercial and financial software (such as the accounting system, payroll, stock exchange, recruitment) to the core of the bank. In this case, the bank gives an account to the customers in order to access the bank's services, and since this customer does not have access to the accounts of other customers, there is no problem for the bank in terms of security. On the other hand, open banking is the main source of innovation in the banking industry. For example, open banking can facilitate fast and intense processes from using a bank account from one bank to another, and it can also consider customer transaction information to identify the best products and financial services for them and provide better service. With this approach, customers who make long-term transactions can benefit from savings accounts with higher interest rates and ultimately gain more profit (Fang & Zhu, 2023).

The importance of this research lies in the fact that the implementation of open banking is basically one of the main goals defined by the bank, and in this regard, effective infrastructure measures have been put on the agenda, including the design and production of a new centralized system that will be developed with the efforts of banking specialist personnel and technical and technology-oriented companies under the bank's coverage are being implemented. On the other hand, while electronic banking has focused on using the main parts of banking; but open banking involves opening up all

activities carried out by financial institutions and their customers.

The necessity of this research is to investigate the reason for the desire and trend of banking towards open banking. In this regard, it should be acknowledged that banks seek to be at the center of businesses and collect them by their side, because this capability does not exist in traditional banking, and the branch is the last point of contact of the bank with businesses. It is that the use of open banking enables the presence of businesses inside the bank, and the ability to exchange information means receiving business information while providing services, which shows that open banking is a two-way strategy. The second necessity of the current research is also there, considering that so far no scientific and independent research has been done on the implementation of open banking in Sadart Bank as one of the important Iranian banks, therefore, by conducting this research and answering the questions raised, it is hoped that it will be done. An important and effective step should be taken in the progress and development of banking in Bank Saderat and consequently in the Iran's banking industry.

With these preliminaries, the current research aims to design an open banking model in the Iran's banking industry using the foundation data approach (a case study of Saderat Khorasan Razavi Bank) and the main question of this research is to design an open banking model in the country's banking industry using the foundation data approach (Case study of Bank Saderat Khorasan Razavi) What components does it have? And what is the priority of each of the mentioned components?

### Literature Review

Nowadays, the need for innovation is felt in the banking industry more than in other service industries. It has overshadowed the financial performance of the banking industry (Ahmadi et al., 2022). Considering the important role that the financial services industry plays in society, it is essential to

have a vision of potential changes that can change the banking industry, especially for the activists of this industry (Somville & Vandewalle, 2023). Today, information technology as one of the components of economic growth has played an increasing role in the expansion of financial development and the establishment of the global information system. Such a growing trend has caused tremendous changes in economic structures and the monetary and financial system, one of which is the tendency of banks to open banking (Pandey et al., 2023). One of the simplest and most fluent definitions for open banking is: "improving the provision of banking services and maximizing the quality of customer experience in receiving banking services by using the analysis of customer data and other related data" Another language of open banking is "enrichment of banking services through the use of open technologies" (Hasan et al., 2023). Therefore, open banking is a system that equips the user with a financial network through the use of a functional programming interface. The way to create, share and access financial data is defined by the Open Banking Standard (Dinckol et al., 2023). In open banking, over time, the branch no longer plays a central role and data takes its place, open banking has differences with electronic banking. In this way, in open banking, in addition to using information technology, the system and architecture of the bank will also change, and our banks, which are still paper-oriented, will become data-oriented. Because a lot of bank information is still on paper, while in open banking, a lot of information is opened (Ngoc Luu et al., 2023).

Using different networks instead of centralization, open banking helps financial service customers to share their financial information with other financial institutions in a completely safe and secure way. In this way, it becomes easier to transfer funds and users can choose the best and most economical banking service option by comparing services. According to open banking regulations, banks must publish

accurate and unbiased information online or in the branch to allow customers to evaluate the quality of services provided; This method means moving towards transparency on the part of banks in order to provide the best possible experience to customers (He et al., 2022). The important point is that basically, open banking is the main source of innovation in the banking industry. For example, open banking APIs can facilitate the difficult process of switching bank account services (switching accounts from one bank to another). APIs can also identify consumer transaction data to identify the best financial products and services for them. The move of banks towards open banking is due to the issue of the emergence and presence of open businesses in the society, which has caused banks to be pressured to change the model and this need exists; In fact, customers are asking for changes in services and banks are not looking for changes, which has made open banking not bank-oriented and mainly customer-oriented and open businesses. Today, the data model obtained from the customer is not transactional, and customer preferences and behavior should be converted into a value (Wang et al., 2023).

Open Banking is unique and markedly different from traditional banking arrangements. Traditional banking is effectively based on closed and fragmented systems, that is, systems that are owned and controlled by individual financial service providers. A key, major consequence is that consumer data are effectively locked in by individual providers. By contrast, Open Banking calls for greater systems openness, meaning that providers will have a greater capacity to share consumer data with other providers via their APIs. Although data sharing requires the consumers' explicit consent, the underlying Open Banking arrangements are also associated with unique vulnerabilities, such as greater exposure to new types of risks including fraud, challenges in assigning liability when payments fail and greater risk of consumer privacy loss due to the increased scope for a larger digital footprint that consumers leave

behind due to expanded online interactions in Open Banking settings. The potential materialization of these vulnerabilities increases the risk of violating established privacy legislation (Chan et al., 2023).

In general, open banking consists of four main stakeholders, including banks, third parties, tool developers and customers, and in which banking services are provided in a secure, faster and innovative manner. The four main indicators to describe open banking include 1. New financial services (creating a new solution with full security for bank customers to control financial data) 2. Adaptability to technology (a set of technologies and data standards) which can be used by external developers 3. Account-based services (a new and safe way for bank customers to perform bank account-based payment services) 4. Innovation, creating innovation by using technology and new business models by third parties (Ghossoub, 2023).

So open Banking has created opportunities for banks to serve their customers according to each individual's profile, which increases competition among banks and service providers and helps customers obtain better services at a reduced cost. Open banking also offers customers ease of choice, allowing them to switch between service providers and bringing a new perspective on how customers obtain banking services from banks or any other financial service provider. Thus, customers are the central focus of the Open Banking concept, and data sharing and banking integration aim to facilitate access to bank records by third parties, such as payment service providers, FinTech companies, and other banks (Dezm et al., 2023).

-Ghossoub (2023) article titled: "Economic growth, inflation, and banking sector competition" showed that as the financial sector around the world is becoming more concentrated and subject to tighter regulation, the analysis calls for the need for coordination between monetary and macroprudential policymakers.

-Pedro et al. (2023) research titled: "How to measure banking regulation and supervision" showed that deposit insurance, liquidity, diversification requirements, complementary banking activities, and market discipline are the most reliable indicators to measure regulation? In contrast, resolution activities, the mandate of the head of the supervisory agency, and the report of prudential regulation infractions assume the same role for banking supervision.

-Cosmaet al. (2023) article titled: "Knowledge mapping of model risk in banking" showed that the literature on model risk is still quite young and sparse. The problems to be solved are conceptual, computational, and organizational. The considerations made lead to the question of whether adding further complexity to model risk management is a solution or whether, on the contrary, it creates new model risks.

-Niepmann (2023) research titled: "Banking across borders with heterogeneous banks" showed that the average efficiency of banks that operate abroad is lower for host countries that have a less efficient banking sector, are larger and feature lower impediments to foreign bank entry.

-Elsner & Neumann (2023) article titled: "Caught between path-dependence and green opportunities – Assessing the impetus for green banking in South Africa" showed that Nedbank pushes a holistic narrative of climate change as an inevitable business opportunity. Standard Bank, in turn, relies on a 'narrative of balance' between climate change and other profit-oriented investments to safeguard its stakes in the fossil industry. In so doing, this paper sheds light on greenwashing practices within disclosure specifically and the lack of binding corporate regulation more generally.

-Dehbid et al. (2023) research titled: "Providing Technology Transfer Framework in Electronic Banking" showed that using AHP analysis, the prioritization of the components in the implementation of the technology transfer framework was discussed.

-Nargesian et al. (2023) research titled: "Presenting an evidence-based policy model in the field of digital banking" showed that the digital banking process does not operate in a static environment and should be dynamically or organized. Therefore, the information technology centers of the banks need to adjust the evidence-based policy model in the field of digital banking based on its characteristics and establish a feedback and evaluation system for it and use the necessary measures according to its technology level.

-Ravangard et al. (2023) research titled: "Digital Banking Challenges in Banking Industry" showed that the lack of human resources is a cultural barrier and an educational barrier. The interventionist conditions include two categories: lack of specific goal and strategic vision in the field of digital banking and lack of active, dynamic and flexible organizational structures

-Norouzi et al. (2022). ) research titled: "Modeling of Overdue Receivables in the City Bank Using Factor-based Simulation (Northwestern Provinces of the Country)" showed that the economic recession conditions continue the same way, and considering the low effect of the recession conditions on the businesses of the bank's customers in the next four years, then, the ratio of the bank's current customers will decrease from about 89% to about 81%, while the ratio of the past-due customers of the bank will increase to more than double to about 13%. In the next step, we tried to simulate the future situation of the ratio and the share of the current bank customers" claims in the next 4 years.

-Gholamian (2021) research titled: "Barriers to the Implementation and Use of Internet Banking in the Keshavarzi Bank" showed that the after reviewing the background and interviewing with 20 experts, 20 open source codes were identified by using theme analysis. The results of qualitative content analysis showed that 20 open source codes were important enough. Convergent validity was performed and the fit of the model was confirmed.

By examining the literature review and theoretical framework, the authors will explain some of the innovations of the current research:

- ✓ Examining the most important challenges facing open banking in Iran
- ✓ Examining the most important opportunities for the establishment of open banking in Iran's banking industry;
- ✓ Identifying the components of open banking in Iran's banking industry;
- ✓ Ranking of open banking components in Iran's banking industry;
- ✓ Designing an open banking model in Iran's banking industry by using the grounded theory approach.

### Research Methodology

In this research, among the types of combined research (exploratory, explanatory, alignment), exploratory research design has been used. This research project is conducted in two stages among the research projects of the combined method. For this purpose, it collects qualitative data first. In this section, indicators are identified through the review of existing documents, papers and articles and semi-structured interviews with experts, and the grounded theory method will be used to select the identified indicators. In this regard, first open coding and then axial coding was done and a visual model was designed. In the second stage which the quantitative part of the research, after the final research model was identified in the qualitative part and the components and indicators of each component were determined, the final questionnaire included all the dimensions and components of the model identified based on the five-choice Likert scale and based on the model design. Open banking in Iran's banking industry is developed and distributed among sample people and data is collected. The stages of conducting research with this plan, taken from the point of view of Creswell and Clark (2011), have been conducted in two stages of literature review:

qualitative and quantitative study will be examined further.

### Statistical population and statistical sample

The statistical population of the research can be defined in two qualitative and quantitative parts. In the qualitative phase of the research in the process of identifying open banking in the Iran's banking industry using the grounded theory approach from the participating team, which includes 40 academic experts in the fields of management, organizational and banking experts includes 96 senior managers, experts, professors and related in open banking in Bank Saderat. Also, the statistical population in the quantitative section includes all banking experts in Bank Saderat. In the qualitative phase of the research and in the process of designing the open banking model in Bank Saderat, using the data theory approach of the GT Foundation, from the participating team, which includes academic and banking experts, in a non-random (targeted) and snowball method, until theoretical saturation is achieved. For this purpose, there were academic experts in management fields, organizational and banking experts, including senior managers, experts, and professors and related in open banking in Bank Saderat, who are selected based on the following criteria:

- Have a Ph.D degree in business management, economics and banking;
- Have 10 years of work experience;
- Be a member of the university faculty in the field of business management, banking and economics;
- Regarding the topic of the current research, they should have publications, articles and research activities.

The sampling method at this stage was stratified random method due to the different number of managers and experts in different cities. In this method, first, the ratio of the number of classes to the population is calculated, then the total number of samples

required for distributing the questionnaire is determined, and finally, the number of people required in each class is determined. Cochran's formula is used to determine the

sample size of classes in this research. Table 1 show the demographic characteristics of the interviewees in the qualitative section:

Table 1.

*Characteristics of the interviewees (by age)*

Row	Indicator	Qty	Percentage	
1	Age	Between 35 and 40 years	10	25
		From 41 to 50 years	15	37.5
		Over 50 years old	15	37.5
2	Education	BS	6	15
		MA	12	30
		Ph.D	22	55
3	Experience and expertise	Between 15 and 20 years	15	37.5
		From 21 to 25 years	15	37.5
		More than 25 years	10	25

### Data collection method

In general, the methods of collecting information and data are divided into two categories: library method and field method, in this research both field and library methods were used to collect information.

### Data analysis method

At this stage, the analysis of the data obtained from the interview of this research is done using the grounded theory method, based on the recipe of Strauss and Corbin (1990). This method includes three main stages of open, axial coding and selective coding.

- ❖ Open coding: It is a process in which the data are separated into meaningful units and can be used at the beginning of the study. The main purpose of open coding is to conceptualize and label the data and form the main concepts;
- ❖ Axial coding: Axial coding is the process of removing and integrating existing concepts into a category or finding links between them. In coding, the key is to move towards discovering relationships and relating concepts to each other. At this stage, the grounded data theorist selects a category of the open coding stage and places it at the center of the process being investigated (central category)

and then other categories such as: "causal conditions", "practices", "contextual conditions", "intervening conditions" and "consequences" relate to it;

- ❖ Selective coding: It is the process of integrating and improving categories. At this stage, the researcher takes the findings of the previous coding steps, selects the central category, systematically relates it to other categories, proves those relationships, and completes the categories that need further improvement and development.

To analyze the data of this research in the quantitative part, two methods of descriptive statistics and inferential statistics (structural equation model) were used. At first, by using descriptive statistics, an understanding of the situation and demographic characteristics of the respondents was obtained. Then, the structural equation model (path analysis and confirmatory factor analysis) was used to test the hypotheses and examine the causal relationships of the variables in the research. In the present study, the Kolmogorov–Smirnov test was used to determine whether it was normal or not. In the current research, descriptive statistics have been used to analyze the information, which includes frequency distribution table, frequency percentage, and frequency distribution chart.

The intended model is presented using the content analysis method and by combining the opinions of experts (the solutions provided by them with existing scientific topics in the field of open banking and taking into account the existing conditions. For the design of the model, points are given to each option in The questionnaire section of the survey is analyzed using spss software and Friedman's test and is prioritized by the graphical ranking evaluation method, and the options that have obtained higher points are prioritized. In this research, in the quantitative section, confirmatory factor analysis Spss software and structural equation method using SmartPLS software was used to check and analyze research hypotheses.

## Findings

### Qualitative section Findings

In the following, in order to familiarize with the coding stage, a part of the interview conducted with one of the participants is given: "*Open banking is one form of modern banking. Open banking means that banks and other traditional financial institutions allow*

*(digital) access to financial information and data to customers and third parties. This process includes the ability to download and share information about account balances, payments, transactions and investments. Allowing a third party to automatically receive from/pay into a customer's account is another feature of open banking. The effort of open banking is to ensure that the process of sharing financial information of customers is done in the ultimate security and only under the conditions that the customer approves. The goal of open banking (ideally) is to provide a better banking experience for consumers".*

### Open coding of concepts

In the following, the obtained primary codes are examined and then the researcher puts the codes that are close to each other in terms of meaning and concept and have so-called semantic affinity with each other in a group and creates new meanings and words. In fact, the researcher categorizes the codes in the form of sub-themes. To learn more about these categories, an example is given in Table 2.

Table 2.

### Open coding of concepts

Dedicated concepts and codes
(1) personal banking; (2) affiliated companies; (3) electronic financial services; (4) payment companies; (5) wealth management companies; (6) crowdfunding company; (7) lending companies; (8) capital market companies; (9) service companies; (10) viral growth; (11) organic growth; (12) scalable growth; (13) disruptive innovation; (14) development of banking; (15) social media; (16) business intelligence; (17) Internet of Things; (18) cloud computing interface; (19) user programming; (20) big data; (21) virtual currency; (22) virtual wallet; (23) Avoiding fault finding people; (24) access to skilled labor; (25) rules and regulations; (26) government support; (27) access to capital; (28) financing strategies; (29) identifying target customers; (30) empowerment; (31) providing new banking services; (32) intention to use the technology; (33) suggested value; (34) provision of services at any location; (35) providing services at any time; (36) localization; (37) Personalization; (38) customer interaction; (39) distribution channels; (40) communication with the customer; (41) Infrastructures; (42) partners and suppliers; (43) competitive advantage of active partners; (44) sharing roles in the value network; (45) openness of the value network; (46) branding strategy; (47) governance model; (48) actor interactions; (49) capabilities; (50) programming; (51) interface integrity; (52) data integrity; (53) support for different platforms; (54) cyber security; (55) accessibility; (56) key activities; (57) configuration of activities; (58) key processes; (59) Management of key financial resources technologies; (60) core competencies; (61) financial aspect; (62) financial management; (63) income; (64) cost; (65) Financial leverage; (66) functional levers; (67) non-financial performance; (68) market share; (69) brand reputation; (70) technological progress; (71) performance improvement; (72) fairness; (73) leadership in action; (74) thanks and appreciation for the hard work of Aran; (75) Avoiding undermining subordinates; (76) annual plan based on strategy; (77) financial system; (78) development of the financial system; (79) Conscientiousness; (80) transparency in the financial field; (81) Avoiding bribery; (82) Avoiding putting power and wealth as the goal; (83) removing doubts and hesitancy; (84) sense of companionship; (85) loyalty to the covenant; (86) saving resources; (87) attracting new customers; (88) increasing customer confidence; (89) Non-renewal of promises; (90) increasing customer



loyalty; (91) cooperative banking; (92) investment security; (93) online self-service; (94) attracting sponsors; (95) increase customer life cycle; (96) effective use of data; (97) improve operational efficiency; (98) improving customer experience; (99) organizational learning

Table 3.  
*Axial coding*

<b>Axial concepts</b>	
<b>Code: Ability</b> (1) Personal banking (2) affiliated companies (3) Electronic financial services (7) Lending companies (9) Service companies (11) Organic growth (43) Competitive advantage of active partners	<b>Code: Creativity</b> (4) Payment companies (8) Capital market companies (10) Viral growth (16) business intelligence (31) Provision of new banking services (40) Communication with the customer (70) Advances in technology
<b>Code: Individual intelligence</b> (12) scalable growth (25) Rules and regulations (45) The openness of the value network (90) Increasing customer loyalty	<b>Code: Empiricism</b> (13) Disruptive innovation (18) Cloud computing interface (30) Empowerment (33) Suggested value (42) Partners and suppliers
<b>Code: Purpose</b> (14) Development of banking (49) Capabilities (69) Brand reputation (53) Support for different platforms (82) Avoiding power and wealth as goals	<b>Code: Intellectual coherence</b> (15) Social media (36) Localization (62) Financial management
<b>Code: Specialization</b> (17) Internet of things (37) Personalization (47) Governance model	<b>Code: Behavioral</b> (19) user programming (35) Provision of services at any time (54) Cyber security
<b>Code: Structural</b> (20) Big data (44) Sharing roles in the value network (59) Management of key financial resources technologies	<b>Code: Legalism</b> (21) Virtual currency (39) Distribution channels (68) Market share (65) Financial leverage (56) Key activities
<b>Code: Communications</b> (22) Virtual wallet (32) Intention to use technology (55) Accessibility (72) Fairness (81) Avoiding bribery	<b>Code: Satisfaction</b> (23) Market access (38) Customer interaction (60) Core competencies (71) Performance improvement
<b>Code: Determination</b> (24) Access to skilled labor (41) Infrastructures (66) functional levers	<b>Code: Performance management</b> (83) Removing doubts and hesitancy (28) Financing strategies (57) configuration of activities (98) Improving customer experience
<b>Code: Integrity</b> (5) wealth management companies (26) Government support (34) Provision of services at any location (52) data integrity (76) Annual plan based on strategy (73) Lead in action	<b>Code: Supervision</b> (6) Crowdfunding company (27) Access to capital (46) Brand strategy (58) Key processes (67) Non-financial performance (75) Avoiding undermining subordinates (78) Development of the financial system (92) Investment security (88) Increasing customer trust
<b>Code: Scientific work</b> (29) Identification of target customers	<b>Code: Content Management</b> (84) sense of companionship

(50) Programming	(64) Cost
(63) Income	(74) Thanks and appreciation for the hard work of Amran
(85) Loyalty to the covenant	(86) Saving resources
(89) Non-renewal of promises	(79) Conscientiousness
	(99) Organizational learning
	(91) Cooperative banking
<b>Code: Business Process</b>	<b>Code: Experiences</b>
(77) Financial system	(94) Attracting sponsors
(93) Online self-service	(48) Actor interactions
(95) Increase customer life cycle	(51) interface integrity
(97) Improve operational efficiency	(61) Financial aspect
(80) Transparency in the financial field	(96) Effective use of data
(87) Attracting new customers	

### Selective coding

After generating the categories and their characteristics, in the axial coding, the categories were regularly expanded and connected to the subcategories, but until the main categories do not join each other and form a larger theoretical plan, the findings of the research will not take the form of a theory. In addition, one of the most important steps is to determine the central category. This category has the power of analysis and brings the categories closer together. This category emerged from existing categories and covers other categories. Among the revealed categories, in the current research, the aforementioned conditions tended to develop open banking. In accordance with

the criteria provided by Strauss and Corbin, the tendency to develop open banking is a category that all categories are related to. Also, this category appeared repeatedly in the data. The tendency to develop open banking can explain the diversity and the main point in the data. Finally, 9 main categories were placed in the form of 6 dimensions of the paradigm model as causal conditions, central category, context, strategies, environmental intervening conditions and consequences. These categories are presented as a model obtained from the development of open banking for professors. In this table, the number of 9 categories and 20 sub-categories and 114 concepts obtained are given.

Table 4.

*Selective coding (linking concepts with other groups for open banking development processes)*

Main themes	Sub-themes	Concepts (basic themes)
<b>Individual characteristics</b>	Ability	-Personal banking -Affiliated companies -Electronic financial services -Lending companies -Service companies -Organic growth -Competitive advantage of active partners
	Creativity	-Payment companies -Capital market companies -Viral growth -Business Intelligence -Providing new banking services -Communication with the customer -Technological progress
	Individual intelligence	-Scalable growth -Terms and Conditions -The openness of the value network - Increasing customer loyalty -Disruptive innovation

<b>Main themes</b>	<b>Sub-themes</b>	<b>Concepts (basic themes)</b>
	Experience	-Cloud computing interface -Empowerment -Suggested value -Partners and suppliers
<b>Attitudes</b>	Aims	-Development of banking -Capabilities -Brand reputation -Support for different platforms -Avoiding putting power and wealth as the goal Intellectual coherence -Social media -Localization - Financial Management
	Individual intelligence	-Scalable growth -Terms and Conditions -The openness of the value network - Increasing customer loyalty
<b>Organizational characteristics</b>	Specialization	-Internet of Things -Personalization -Governance model
<b>Limitations</b>	Behavioral	-User programming -Providing services at any time -Cybersecurity
	Structural	-Big data -Share roles in the value network -Management of key financial resources technologies
<b>Micro level</b>	Legalism	-Virtual currency -Distribution channels -Market share -Financial leverage -Key activities
	Communications	-Virtual wallet -Intention to use technology -Accessibility -Fairness - Avoiding bribery
<b>Macro level</b>	Satisfaction	-Access to the market -Customer interaction -Core competencies -Improved performance
	Decisiveness	-Access to expert workforce -Infrastructures -Functional levers
<b>Individuals promotion</b>	Performance management	-Removing doubts and hesitancy -Financing strategies -Configuration of activities -Improve customer experience
<b>Environmental consequences</b>	Integrity	-Wealth management companies -Government support - Providing services in any place -Data integrity -Annual plan based on strategy -Leadership in action
	Supervision	-Crowdfunding company -Access to capital Brand strategy -Key processes -Non-financial performance -Avoiding undermining subordinates

Main themes	Sub-themes	Concepts (basic themes)
<b>Development of open banking in Iran's banking industry</b>		-Development of the financial system -Investment security -Increasing customer trust
	Scientific work	-Identification of target customers -Programming -Income -Loyalty to the covenant -Non-fulfillment of promises
	Content management	-A sense of companionship -Cost -Thanks and appreciation for the hard work of Ameran -Save resources -Conscientiousness -Organisational Learning -Partnership banking
	Business process	-Financial system -Attracting sponsors -Online self-service -Increasing customer life cycle -Improve operational efficiency -Transparency in the financial field -Attracting new customers
	Experiences	-Actor interactions -Interface integrity -Financial aspect -Effective use of data

Table 5.

*Dimensions and indicators of the research model*

Model components	Dimensions	Indicators
<b>Causal conditions</b>	Attitudes	Aims
		Intellectual coherence
<b>Main concept</b>	Open banking	Supervision
		Scientific work
		Content management
		Business process
		Experiences
<b>Contextual conditions</b>	Individual characteristics	Ability
		Creativity
	Organizational characteristics	Individual intelligence
		Experience
<b>Intervening conditions</b>	Limitations	Specialization
		Behavioral
<b>Strategies</b>	Micro level	Structural
	Macro level	Legalism
		Communications
<b>Consequences</b>	Individual consequences	Satisfaction
		Decisiveness
	Environmental consequences	Performance management
		Integrity

## The final research model

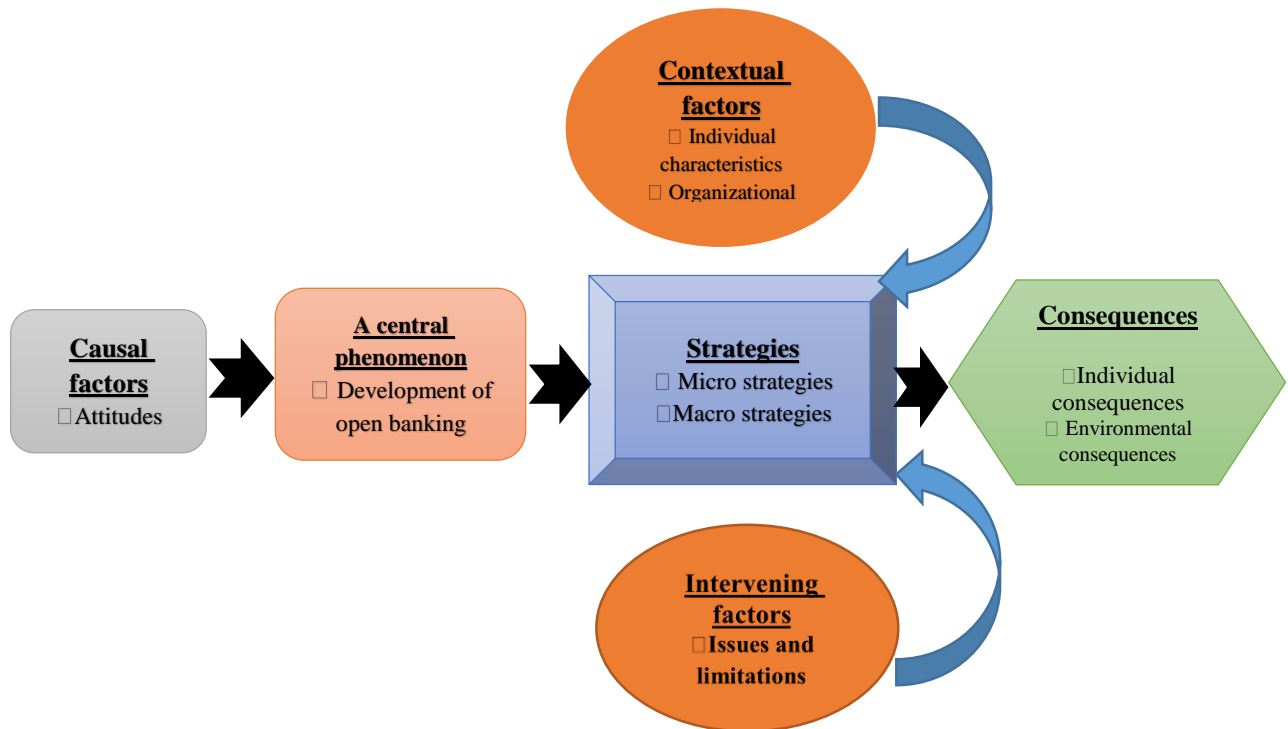


Figure 1. *The final research model*

### Qualitative section Findings

#### Validity and reliability of tool

##### Content validity of the questionnaire

In this research, the quantitative content validity of the questionnaire was calculated using the method of content validity ratio and content validity index.

##### A) Content validity ratio (CVR)

In this research, according to the number of experts, which is 14 people, the items for which the CVR value is 0.51 or more are acceptable. Therefore, according to table (6), since in this research the value of CVR for all items is more than 0.51, it can be said that these items have the necessary validity.

Table 6.

*CVR values for questionnaire items*

Row	Objects	Number of necessary options	CVR	Result
1	Personal banking	13	0.85	Confirmed
2	Affiliated companies	13	0.85	Confirmed
3	Electronic financial services	12	0.71	Confirmed
4	Lending companies	11	0.57	Confirmed
5	Service companies	13	0.85	Confirmed
6	Organic growth	13	0.85	Confirmed
7	Competitive advantage of active partners	12	0.71	Confirmed
8	Payment companies	11	0.57	Confirmed
9	Capital market companies	13	0.85	Confirmed
10	Viral growth	14	1	Confirmed
11	Business Intelligence	11	0.57	Confirmed
12	Providing new banking services	11	0.57	Confirmed
13	Communication with the customer	11	0.57	Confirmed
14	Technological advancement	12	0.71	Confirmed
15	Scalable growth	12	0.71	Confirmed

Row	Objects	Number of necessary options	CVR	Result
16	Terms and Conditions	13	0.85	Confirmed
17	The openness of the value network	11	0.57	Confirmed
18	Increase customer loyalty	13	0.85	Confirmed
19	Disruptive innovation	14	1	Confirmed
20	Cloud computing interface	14	1	Confirmed
21	Empowerment	14	1	Confirmed
22	Value proposition	12	0.71	Confirmed
23	Partners and suppliers	14	1	Confirmed
24	Development of banking	13	0.85	Confirmed
25	Capabilities	13	0.85	Confirmed
26	Brand reputation	13	0.85	Confirmed
27	Support for different platforms	11	0.57	Confirmed
28	Avoiding power and wealth as a goal	13	0.85	Confirmed
29	Social media	12	0.71	Confirmed
30	Localization	14	1	Confirmed
31	Financial Management	12	0.71	Confirmed
32	Internet of Things	12	0.71	Confirmed
33	Personalization	12	0.71	Confirmed
34	Governance model	14	1	Confirmed
35	User programming	11	0.57	Confirmed
36	Providing services at any time	13	0.85	Confirmed
37	Cybersecurity	11	0.57	Confirmed
38	Big data	12	0.71	Confirmed
39	Sharing roles in the value network	14	1	Confirmed
40	Management of key financial resources technologies	14	1	Confirmed
41	Virtual currency	12	0.71	Confirmed
42	Distribution channels	11	0.57	Confirmed
43	Market share	13	0.85	Confirmed
44	Financial leverage	11	0.57	Confirmed
45	Key activities	11	0.57	Confirmed
46	Virtual wallet	11	0.57	Confirmed
47	Intention to use technology	12	0.71	Confirmed
48	Accessibility	13	0.85	Confirmed
49	Fairness	14	1	Confirmed
50	Avoiding bribery	14	1	Confirmed
51	Market access	13	0.85	Confirmed
52	Customer interaction	14	1	Confirmed
53	Competence	11	0.57	Confirmed
54	Improve performance	14	1	Confirmed
55	Access to skilled labor	12	0.71	Confirmed
56	Infrastructures	12	0.71	Confirmed
57	Functional levers	12	0.71	Confirmed
58	Removing doubts and hesitation	11	0.57	Confirmed
59	Financing strategies	11	0.57	Confirmed
60	Configuration of activities	13	0.85	Confirmed
61	Improve customer experience	14	1	Confirmed
62	Wealth management companies	13	0.85	Confirmed
63	Government support	12	0.71	Confirmed
64	Providing services anywhere	12	0.71	Confirmed
65	Data integrity	12	0.71	Confirmed
66	Annual plan based on strategy	13	0.85	Confirmed
67	Leadership in action	12	0.71	Confirmed
68	Crowdfunding company	11	0.57	Confirmed
69	Access to capital	11	0.57	Confirmed
70	Brand strategy	14	1	Confirmed

Row	Objects	Number of necessary options	CVR	Result
71	Key processes	11	0.57	Confirmed
72	Non-financial performance	12	0.71	Confirmed
73	Avoiding undermining subordinates	13	0.85	Confirmed
74	Development of the financial system	13	0.85	Confirmed
75	Investment security	13	0.85	Confirmed
76	Increase customer trust	12	0.71	Confirmed
77	Identify target customers	14	1	Confirmed
78	Programming	11	0.57	Confirmed
79	Income	12	0.71	Confirmed
80	Loyalty to the covenant	12	0.71	Confirmed
81	Failure to renege on promises	14	1	Confirmed
82	A sense of companionship	13	0.85	Confirmed
83	Cost	13	0.85	Confirmed
84	Appreciation for Ameran's efforts	14	1	Confirmed
85	Save resources	11	0.57	Confirmed
86	Conscientiousness	11	0.57	Confirmed
87	Organisational Learning	14	1	Confirmed
88	Cooperative banking	12	0.71	Confirmed
89	Financial system	12	0.71	Confirmed
90	Attracting sponsors	12	0.71	Confirmed
91	Online self-service	14	1	Confirmed
92	Increase customer life cycle	14	1	Confirmed
93	Improve operational efficiency	11	0.57	Confirmed
94	Transparency in the financial field	13	0.85	Confirmed
95	Attracting new customers	13	0.85	Confirmed
96	Actor interactions	12	0.71	Confirmed
97	Interface integrity	13	0.85	Confirmed
98	Financial aspect	13	0.85	Confirmed
99	Effective use of data	11	0.57	Confirmed

### B) Content validity index (CVI)

According to Table 9, the validity index value for all items is higher than 0.79 and the average of these values, which indicates the content validity index for the entire

questionnaire, is equal to 0.91. Therefore, it can be concluded that the research questionnaire is in a suitable condition in terms of content validity index.

Table 7.

*CVI values for questionnaire items*

Row	Objects	Number of options 3 and 4	CVR	Result
1	Personal banking	12	0.85	Confirmed
2	Affiliated companies	12	0.85	Confirmed
3	Electronic financial services	12	0.85	Confirmed
4	Lending companies	13	0.92	Confirmed
5	Service companies	12	0.85	Confirmed
6	Organic growth	13	0.92	Confirmed
7	Competitive advantage of active partners	13	0.92	Confirmed
8	Payment companies	14	1	Confirmed
9	Capital market companies	14	1	Confirmed
10	Viral growth	13	0.92	Confirmed
11	Business Intelligence	13	0.92	Confirmed
12	Providing new banking services	13	0.92	Confirmed
13	Communication with the customer	13	0.92	Confirmed
14	Technological advancement	12	0.85	Confirmed
15	Scalable growth	14	1	Confirmed

Row	Objects	Number of options 3 and 4	CVR	Result
16	Terms and Conditions	13	0.92	Confirmed
17	The openness of the value network	13	0.92	Confirmed
18	Increase customer loyalty	12	0.85	Confirmed
19	Disruptive innovation	12	0.85	Confirmed
20	Cloud computing interface	12	0.85	Confirmed
21	Empowerment	13	0.92	Confirmed
22	Value proposition	14	1	Confirmed
23	Partners and suppliers	12	0.85	Confirmed
24	Development of banking	13	0.92	Confirmed
25	Capabilities	12	0.85	Confirmed
26	Brand reputation	12	0.85	Confirmed
27	Support for different platforms	12	0.85	Confirmed
28	Avoiding power and wealth as a goal	12	0.85	Confirmed
29	Social media	12	0.85	Confirmed
30	Localization	13	0.92	Confirmed
31	Financial Management	14	1	Confirmed
32	Internet of Things	14	1	Confirmed
33	Personalization	13	0.92	Confirmed
34	Governance model	14	1	Confirmed
35	User programming	12	0.85	Confirmed
36	Providing services at any time	13	0.92	Confirmed
37	Cybersecurity	13	0.92	Confirmed
38	Big data	13	0.92	Confirmed
39	Sharing roles in the value network	13	0.92	Confirmed
40	Management of key financial resources technologies	14	1	Confirmed
41	Virtual currency	13	0.92	Confirmed
42	Distribution channels	12	0.85	Confirmed
43	Market share	12	0.85	Confirmed
44	Financial leverage	12	0.85	Confirmed
45	Key activities	14	1	Confirmed
46	Virtual wallet	13	0.92	Confirmed
47	Intention to use technology	14	1	Confirmed
48	Accessibility	12	0.85	Confirmed
49	Fairness	12	0.85	Confirmed
50	Avoiding bribery	12	0.85	Confirmed
51	Market access	13	0.92	Confirmed
52	Customer interaction	14	1	Confirmed
53	Competence	13	0.92	Confirmed
54	Improve performance	13	0.92	Confirmed
55	Access to skilled labor	13	0.92	Confirmed
56	Infrastructures	12	0.85	Confirmed
57	Functional levers	14	1	Confirmed
58	Removing doubts and hesitation	13	0.92	Confirmed
59	Financing strategies	14	1	Confirmed
60	Configuration of activities	12	0.85	Confirmed
61	Improve customer experience	14	1	Confirmed
62	Wealth management companies	13	0.92	Confirmed
63	Government support	13	0.92	Confirmed
64	Providing services anywhere	12	0.85	Confirmed
65	Data integrity	12	0.85	Confirmed
66	Annual plan based on strategy	12	0.85	Confirmed
67	Leadership in action	13	0.92	Confirmed
68	Crowdfunding company	12	0.85	Confirmed
69	Access to capital	14	1	Confirmed
70	Brand strategy	13	0.92	Confirmed



Row	Objects	Number of options 3 and 4	CVR	Result
71	Key processes	13	0.92	Confirmed
72	Non-financial performance	12	0.85	Confirmed
73	Avoiding undermining subordinates	14	1	Confirmed
74	Development of the financial system	13	0.92	Confirmed
75	Investment security	12	0.85	Confirmed
76	Increase customer trust	12	0.85	Confirmed
77	Identify target customers	13	0.92	Confirmed
78	Programming	13	0.92	Confirmed
79	Income	12	0.85	Confirmed
80	Loyalty to the covenant	13	0.92	Confirmed
81	Failure to renege on promises	14	1	Confirmed
82	A sense of companionship	14	1	Confirmed
83	Cost	12	0.85	Confirmed
84	Appreciation for Ameran's efforts	14	1	Confirmed
85	Save resources	13	0.92	Confirmed
86	Conscientiousness	13	0.92	Confirmed
87	Organisational Learning	13	0.92	Confirmed
88	Cooperative banking	14	1	Confirmed
89	Financial system	13	0.92	Confirmed
90	Attracting sponsors	12	0.85	Confirmed
91	Online self-service	12	0.85	Confirmed
92	Increase customer life cycle	12	0.85	Confirmed
93	Improve operational efficiency	13	0.92	Confirmed
94	Transparency in the financial field	12	0.85	Confirmed
95	Attracting new customers	13	0.92	Confirmed
96	Actor interactions	14	1	Confirmed
97	Interface integrity	12	0.85	Confirmed
98	Financial aspect	13	0.92	Confirmed
99	Effective use of data	13	0.92	Confirmed

### Ranking of research variables

Friedman's test is a non-parametric test that is used to compare three or more groups measured at the rank level. This test is the non-parametric equivalent of the dependent F test in repeated measures analysis of variance. In the Friedman test, the null hypothesis is based on the equality of the average ranks among the groups. Rejecting the null hypothesis means that at least two groups have a significant difference among the groups. The results of the Friedman test are given in the following tables.

Table 8.

#### *Friedman ranking of succession dimensions*

Variable	Average	Friedman's rating	Priority
Contextual factors	3.4132	2.40	4
Intervening factors	3.4702	2.55	2
A central phenomenon	3.4165	2.43	3

Variable	Average	Friedman's rating	Priority
Causal factors	3.4126	2.38	6
Strategies	3.4129	2.39	5
Consequences	3.4511	2.63	1

Table 9.

#### *Friedman test statistic*

Qty	275
Chi- squared test	7.215
Degrees of freedom	3
Significance level	0.045

In Table 9, it can be seen that the value of the chi-squared is equal to 7.215 and the significance value is calculated to be equal to 0.045, which is smaller than the error level of 0.05 and shows the significance of the coefficient, so the hypothesis H<sub>0</sub> is rejected. And the claim of the same rank (priority) of these variables is not accepted, which means there is a difference in the rank of the tested variables. Therefore, it can be said with a

probability of 95 that there is a significant difference in the rank of the factors. According to the results obtained in Table 11:

- ❖ Consequences with an average rating of 2.63 are in the first priority;
- ❖ Intervening factors with an average rating of 2.55 are in the second priority;
- ❖ A central phenomenon with an average rank of 2.43 is in the third priority;
- ❖ Contextual factors with an average rating of 2.40 are in the fourth priority;
- ❖ Strategies with an average rank of 2.39 is in the fifth priority;
- ❖ Casual factors with an average rating of 2.38 are in the last priority.

### Discussion and Conclusion

Open banking is also known as "open bank data." Open banking is a banking practice that provides third-party financial service providers open access to consumer banking, transaction, and other financial data from banks and non-bank financial institutions through the use of application programming interfaces (APIs). Open banking will allow the networking of accounts and data across institutions for use by consumers, financial institutions, and third-party service providers. Open banking is becoming a major source of innovation that is poised to reshape the banking industry.

Under open banking, banks allow access and control of customer's personal and financial data to third-party service providers, which are typically tech startups and online financial service vendors. Customers are normally required to grant some kind of consent to let the bank allow such access, such as checking a box on a terms-of-service screen in an online app. Third-party providers APIs can then use the customer's shared data (and data about the customer's financial counterparties). Uses might include comparing the customer's accounts and transaction history to a range of financial service options, aggregating data across participating financial institutions and

customers to create marketing profiles, or making new transactions and account changes on the customer's behalf.

In this research, the open banking model was used in the country's banking industry, as a result of which factors were introduced; Then, knowing that these factors in the real world do not have the same priority and are not independent of each other, internal and inherent dependencies were used. All businesses and individuals and legal organizations, banks, financial institutions, etc. are able to become members and operate in the open banking system. In fact, until now, these same members have developed this banking system with their creative initiatives and made it attractive with newer services. But we can still boldly say that the room for growth, improvement and definition of services is strongly felt. Customer authentication (KYC) or know your customer, will be the key to prevent fraud, money laundering and any misuse of services by fake identities. On the other hand, despite the many attractions of KYC or know-your-customer services, a number of banks still avoid accepting the large benefits of these services for any reason and do not burden themselves with sharing customer data with third-party sources. Experts believe that the legal vacuum is one of the effective reasons for this resistance of banks. Basically, the approved regulations will drastically change the behavior of banks according to past experiences. The elders and influencers of the world's financial market should note that with this influx of online banks, virtual credit cards and other new and emerging Fintech services, there will be no fate other than removal from the market if they do not accept open banking. Open banking is the driving force of innovation in the banking industry. By relying on networks rather than centralization, open banking can help financial services customers share their financial data securely with other financial institutions. For example, open banking APIs can facilitate the sometimes difficult process of switching the use of a checking account service from one bank to another. The API

can also look at consumer transaction data to identify the best financial products and services for them, such as a new savings account with a higher interest rate than their current savings account or a different credit card with a lower interest rate. Through the use of networked accounts, open banking can help lenders get a more accurate picture of a consumer's financial situation and risk level in order to offer more profitable loan terms. Open banking can also help consumers get a more accurate picture of their finances before paying off debt. An open banking app for homebuyers could automatically calculate what they can afford based on all the information in their accounts, perhaps giving a more reliable picture than mortgage lending guidelines currently offer. Another app might help visually impaired customers better understand their finances through voice commands. Open banking can also help small businesses save time through online accounting and help fraud detection companies better monitor customer accounts and identify problems earlier.

Through the use of networked accounts, open banking could help lenders get a more accurate picture of a consumer's financial situation and risk level in order to offer more profitable loan terms. It could also help consumers get a more accurate picture of their own finances before taking on debt. An open banking app for customers who want to buy a home could automatically calculate what customers can afford based on all the information in their accounts, perhaps providing a more reliable picture than mortgage lending guidelines currently provide. Another app might help visually impaired customers better understand their finances through voice commands. Open banking can also help small businesses save time through online accounting and help fraud detection companies better monitor customer accounts and identify problems sooner.

The results of this research are in line with the results of Ghossoub (2023), Elsner & Neumann (2023) and Gholamian et al.

(2021). But it is not in line with the results of Niepmann (2023) and Dehbid et al. (2023).

Considering that appropriate mapping should be established between the suggestions and findings of the research, based on the data and results, some practical and research suggestions have been presented in order to make new approaches in this field available to bank managers, universities and researchers.

- ✓ *Customers' ability to control information:* In the past and before the digitization of affairs and processes, customers' financial data was in the hands of banks and financial institutions. That is, customers kept most of their information in only one place and were not able to transfer it. But in today's world where information and data can be shared, customers are accustomed to customer-centric apps, integrated accounts, and similar experiences. Open banking is the first step towards digitizing financial data and allowing customers to exercise control over their data;
- ✓ *Encouraging financial institutions or companies to more compete:* With new regulations and little competition, banks have stuck to their old systems, hierarchical structure and approach to their old customers. One of the main objectives of the Open Banking Directive is to encourage more innovation in the financial space. By sharing customer data, third parties, or financial service providers, can innovate to offer better consumer products and force banks to improve their products to keep customers on their platform;
- ✓ *Improving products and services:* Open banking creates more innovations in the financial space. Apart from the fact that banks will be innovative, customers will be able to use new and much improved products. These programs range from personal financial management

programs that help consumers better manage their money to loan programs that provide results in minutes and release funds in less than 24 hours;

- ✓ *Data sharing*: In open banking, banks are obliged to share their customers' data. That is, bank customer data must be accessible through an API, which a licensed third party can access;
- ✓ *Obtaining permission to use data*: companies or third parties who intend to use the data of banks and financial institutions must have the necessary permissions, including. AISP license allows companies and individuals to have access to a specific bank account if needed, but this access is only visual and does not have the ability to make changes to the desired bank account. Services and tools associated with AISPs include price comparison, money management tools, financial activity analysis, faster and more accurate access to financial products, and speeding up manual processes such as loan applications, etc. The PISP license also allows authorized companies and third parties to access individuals' bank accounts and pay bills from their accounts. People use financial applications that have this license and feature in order to balance the balance of various accounts, avoid overdraft losses and pay debts on time.

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