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Developing and explaining the open banking model through the approach of soft systems

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ABSTRACT:

Technologically enabled financial innovations are blurring the boundaries and traditional business models and leads to new sources of value creation. Therefore, the current research was conducted with the aim of identifying and determining the impact of the components and indicators of the open banking business model in the Middle East Bank through the soft systems approach. The statistical population of this research in the qualitative part consists of middle-level managers of various branches of the Middle East Bank active in the field of open banking and managers of fintechs, whose sampling was carried out using a targeted and snowball method until reaching theoretical saturation and In th quantitative part he number of managers, employees and customers of the Middle East Bank branches in Tehran is based on the Cochran formula, and the sample size is equal to 370 people. The data collection tool in this research is semi-structured in-depth interviews in the qualitative part and researcher-made questionnaires in the quantitative part. The method of data analysis in the first part is based on the of soft systems methodology and in the quantitative part using confirmatory factor analysis and structural equations.

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Business model, open banking, soft systems Methodology, Applicable Programming Interface (API),

1. Introduction and problem statement

Changes in the financial sector have changed their business models. (Koroma, 2017). In the last few years, the new generation of financial services infrastructure has faced a fundamental change in general, and digitalization has made it possible to create new banking business models, and open banking is one of the necessities in the path of these developments. In recent years, to follow the trend, the innovative open banking (OB) is then becoming a twilight for the banking industry because it not only promotes transaction security and data sharing but also improves efficiency and convenience—both of which are critical for serving customers in this digital era (Daiy & et al, 2021). Open banking is more related to the bank's business instesd of technology. For open banking the prosperity and the knowing its problems in practice, the researches identify the relative importance of banks' crucial factors to select open banking strategic partners, which provide managerial insights and valuable guidance for the banking sector. Business model adaptations can generate positive value creation in terms of efficiency, range of options, customer experience and experimentation of opportunities that can turn into new trends in the future.(Grieco, 2020) As a provider of underlying infrastructure, banks face additional pressures related to maintaining and making changes to running a large-scale operation with the considerations of constant uptime and numerous legacy systems. Banks also operate in a strict and changing regulatory environment. open banking creates new opportunities in service creation and distribution of banking services. The experiences of those banks moving towards open banking is comparable to the first mover experiences of other industries during the past decade and holds major opportunities within a developing yet contested environment ((Gozman & et al, 2018). The fundamental advantages of FinTech firms are their lean business operations and the fact that they are able to attract the best talent and benefit from stateof-the-art technologies that allow for fast and flexible responses to changing consumer preferences. They focus on banking activities with higher returns on equity (ROE) such as payments, advice and the distribution of financial products. FinTech firms have a capital structure with more equity than incumbent banks, but they have to overcome challenges such as the absence of a loyal customer base, limited access to soft information on potential customers, a comparative lack of reputation and brand recognition and a relatively high cost of capital. They have an established, loyal customer base and large quantities of customer data that they can use with ML techniques, a strong reputation and lobbying capacity, strong brand names and the ability to exploit network effects. BigTech platforms have access to valuable business data and can benefit from their scale and network 8 The Bank Business Model in the Post-Covid-19 World effects to provide financial services at a lower cost and at high volume. (Carleti and et al,2020)

Setting up open banking is a very important issue, banks cannot easily set up an open banking infrastructure by themselves, because banks only think about performing a few main operations, and there is a need to create an open banking infrastructure with the participation of partner and specialized companies in this sector. Therefore, by an open banking business model, customers can have the financial services they need at a wider level than banking channels on multiple and diverse software. Fintechs and other third parties can integrate their software and products with banking capabilities to attract more customers with a better experience. Banks will find new sources of revenue and they will be able to attract new customers, and finally, the innovation space in the country's banking industry will become more prosperous. The banking industry in Iran is also considering the new rules of the European Union for European banks and the new regulations of the Central Bank of Iran. Also, the pressures from financial technologists or fintechs have caused additional pressure on banks and financial institutions to adapt their business models to these changes and to implement "open banking". In the way of creating such fundamental changes, banks are facing many challenges such as the need to make fundamental changes in business models. Therefore, the current research tries to answer this main question: 1) What are the components and indicators of the open banking business model in the Middle East Bank using the soft systems method? 2) What is the impact of each component on the open banking business model in the Middle East Bank?

2.Theorical Backround

2.1. Banking Business Model

Profound and wide spreading developments in communication and the information transferring process, which have been created due to the profound changes in technology, information technology and the Internet and, as a result, E-Commerce, have caused digital banking to replace traditional models quickly. In traditional models the competitive advantage of banks depended on the symmetry of information between the debtor and creditor and by developing models, an effective step was taken in the way of optimizing the banking system (Cornet and Saunders, 2018). These developments have challenged the banks and their tradition-oriented value system processes, by creating fundamental changes in the banking business model, the way banks interact with customers, the way they manage the performance of the middle layer and the support layer (Kordnouri et al., 2019). Following these extensive developments, the need to review the business models in the banking industry was more and more considered. However, banks have different

choices. They strategically engage in different intermediation activities and choose their balance sheet structure to suit their business objectives (Roengpitya et al., 2014).

2.2. Cognitive approaches in banking business models

There are two views on the concept of business model. Early researches on business model iteration are influenced by a structural perspective to explain business. On the contrary, in recent literature, the concept of user model has been a cognitive tool for actors inside and outside the organization. (Lambert & et el,2017)

The business model in banking has been discussed through the two approaches of clustering and ontology. The two main approaches of clustering and ontology are the main approaches of the banking business model:

Table 1. cognitive approaches in business models

ontology	clustering
✓ A bank's business logic is a specific configuration of micro-foundations	✓ founded by structural perspective.
✓ Representative of the cognitive structures of the company boundaries, configuration and coordination, creating value and how to become an operational instruction for managers.	✓ Retrospective
✓ leveraging intangible resources and creating competitive advantage through innovation in services and products.	✓ Trying to identify bank operations through financial indicators and financial statement data.
✓ focusing on 1) value creation, 2) customer relationship, 3) infrastructure and collaboration network, and 4) financial aspects.	✓ Trying to find similar features of banking business models.
	✓ Focuses on conventional trade and tangible resources.
	✓ ignoring intangible resources such as dynamic capabilities and communication skills in shaping business models
	✓ Statistical methods are used to classify the commercial orientation of banks.

2.3. Open banking and its requirements

While traditional banking operated under a limited model, according to which financial institutions maintained and controlled the information collected by banks under the title of security and information protection laws and this issue protects traditional banks from the market of extensive competition. On the other hand, open banking tries to create an open banking model where customer and product data are easily recorded, much more secure than the traditional model, and are used by multiple financial service providers (Kim & etal, 2016). Based on this, open banking includes a wide range of rules and regulations and innovations that are versatile in different markets, but the purpose of all of them is to shape and accelerate digital banking and e-commerce models in the future. (Atzori, 2020) Thus, open banking enables individual customers and small

businesses to securely share their data with other banks and third parties, allowing them to manage their accounts without direct access to bank (Gozman & et al, 2018).

Table 2. Traditional banking requirements in the digitalization process

requirements	
Customer/Service/Sales	Developing an omni-channel integrated platform to leverage customer experiences, having multiple channels to address customer needs (online, mobile, social), as well as the ability to acquire, integrate and analyze multiple internal and external sources to better understand the customer and define the relationship and Timeliness for the customer - requires preparation processes based on the customer's perspective (Christian, 2017)
Regulatory dimension/other banks	Integrating risk and compliance in a digital channel should be included in the lifecycle or digital strategy of products and services, rather than relying on customer or regulatory complaints. This requires allowing the underlying business processes to exchange information , to the changing sets of risk, regulatory requirements, rules and constraints, as a dimension of your business process. have access and at the same time continuously provide the data needed to manage business risks (Ramasastri, 2016)
Technology	including core banking, implementation of complex payment systems such as internet banking and mobile banking, e-wallet, omnichannel, data warehouse, service-based architecture, provision of non-critical software on a cloud, voice implementation and network security best practices/ Cyber and information security is the center of security operations, etc. (Stefanelli, 2022)
Data	Implementing best data governance practices that ensure high data quality and leading data management solutions. The success of digital banking depends on the quality of the bank's data (Viuj et al., 2020).
Business process reengineering	Business processes must be continuously monitored to ensure that customers have a pleasant experience. In this dimension, the existing organizational structure of a bank is changed or modified; So that by reusing human resources, internal and external actions of the bank can be guaranteed in the digital way. Therefore, for digitization every bank should focus BRP actions in both customer and non-customer segments. (Rianto et al., 2019).

2.4. Litrature review

Croxon et al. (2022), in a study entitled "Platform-Based Business Models and Financial Inclusion", acknowledged that three types of digital platforms are expanding in financial services: 1) FinTech participants. 2) large technology companies; and 3) increasingly, incumbent financial institutions with platform-based business models. These platforms can dramatically reduce costs

and thereby contribute to financial inclusion. But these same features can create digital monopolies . They acknowledged that to reap the benefits of platforms while mitigating risks, policymakers can 1) enforce existing financial, antitrust, and privacy regulations, (2) adapt old regulations and adopt new ones, an approach combine activity-based and institution-based, and/or 3) provide new public infrastructure.

Ayadi et al. (2021), in the research entitled "Bank business model migrations in Europe: determinants and effects", in response to regulatory reforms after the crisis of European countries during the period of 2010-2017, tried to identify and completing the business models of banks based on cluster analysis and found that changing the business model has a positive effect on banks (i.e. migrant banks increase their profit, stability and cost efficiency). Of course, the impact of this migration from one business model to another depending on the target business model is different, also the positive effect remains when the switches are the result of obtaining or the motivation to comply with the regulations.

Di, Shen, Huang, and Lin (2021) presented a hybrid MCDM model to evaluate open banking business partners in a research. This study used a domestic Taiwanese bank and four non-bank service providers to demonstrate a hybrid approach with a reliability weighted fuzzy evaluation technique. The proposed model may be the first attempt to explore the adoption strategy of open banking with a new approach. However, the results depend on the knowledge of experts in the field. In practice, the research findings identify the relative importance of critical factors for banks to select open banking strategic partners, which provides valuable managerial insight and guidance for the banking sector. The main components of the model were: supervision and regulations, technology, environmental factors and organizational factors.

In his thesis, Greco (2020) studied open banking and its impact on the business model of companies and acknowledged that business model adaptations can have positive value creation in terms of efficiency, range of options, customer experience and testing opportunities that It can become new trends in the future. Current developments in the industry show that new players are disrupting an industry that has historically remained relatively conservative and dominated by a limited number of players.

In her treatise, Nystrom (2020) qualitatively investigated the drivers and possible barriers to the acceptance of open banking services by customers. The findings of this study revealed seven possible drivers and eight possible barriers to customer adoption of open banking third-party service providers (comparative advantages, complexity, trialability, risk barrier, image barrier, traditionality barrier, value barrier, application barriers, and social) and the said findings were logically consistent with the adoption of innovation theories and previous studies on the adoption

of online and open banking services. Management concepts for third-party open banking service providers and traditional banks as well as some limitations in the applied methodological approach were discussed.

In an article, Asadollah and et al (2021) discussed the design of open banking business model in the light of open innovation. The results showed that the structure of financial institutions, developers of financial technologies and the systemic model of the business environment had a positive effect on the open banking model; However, customer segmentation had no effect on the open banking model. Also, the open banking business model had an impact on improving the business environment and organizational performance, but had no effect on the acceptance of virtual banking.

Payandeh and et al (2021) analyzed and discovered the cooperation patterns of Iranian banks with fintechs in a research. The results showed: First, the cooperation model of the studied banks is divided into five optimal clusters: the efficient model, the transformational model, the accelerated model, the shrewd model, and the investor model. Second, due to various reasons, including the lack of development of different types of fintech and related business models, most of the studied banks are placed in one cluster and have relatively similar behavior. Thirdly, the clustering results show that the state and private nature of banks cannot be considered as a differentiating factor in the relationship between banks and fintech.

Maftoohi (2019) in his dissertation investigated the impact of customer-enterprise e-commerce models on the design of the concept of open banking. The results of testing the hypotheses of individual variables of customers, infrastructure, company and trust on the concept of open banking showed its influence. Confirming the hypothesis related to the infrastructure variable, in addition to showing the great influence of these factors in creating customer trust in open banking, it also shows the extremely important role of the government as the guardian of providing suitable e-commerce infrastructure. This study showed that customer trust in e-commerce is one of the key factors and one of the main elements of success in open banking.

Khanlari and et al (2019) explained and designed the banking service market formation model based on financial technology (FinTech) in Iran based on the foundation data approach. The findings led to the identification of 9 core codes, 38 main categories and 430 primary codes, in the form of a paradigmatic model including causal conditions (economic and employment factors of 2013, innovation in the economy and changing customer behavior), the main category (institutional vacuum), factors He became an interventionist (fintech challenges), contextual

factors (digital technology development), strategies (fintech ecosystem development) and consequences (future banking model and evolution in the financial services industry).

3. Research Methodology

The study deals with the expansion and development of knowledge in the design of open banking business models and in terms of its purpose it is fundamental and developmental and since it is implemented in bank branches of Middle East Bank, it is among practical researches. In terms of research method, this study is part of mixed research (qualitative-quantitative) and in terms of the nature of data collection, it is descriptive-survey. This research is conducted in two qualitative parts in order to identify the components of open banking and present the business model of open banking using soft systems methodology (SSM) and quantitative part to explain and determine the impact of each of the components of the model in the open banking system that was done by using confirmatory factor analysis. The statistical population of the research in the qualitative part (identifying the indicators and components of the open banking business model in the Middle East Bank) included all the experts in the field of open banking in the Middle East Bank and related fintechs, of which there were 10 people in the way Purposeful and snowball type were selected as a statistical sample. In the second part (quantitative part) which is related to the explanation of the presented model, the statistical population included all middle and executive managers, employees and real and legal customers of 16 branches of the Middle East Bank in Tehran, which due to the large size of the statistical population Cochran's formula was used and the sample size was reduced to 370 people, and sampling was done using a non-random and accessible method. The collection of information in the qualitative part (identification of the components and indicators of the open banking business model in the Middle East Bank) included library studies (examination of valid scientific documents and texts in the field of research) and semi-structured discussions with open questions. In the quantitative part, the research tool included a questionnaire prepared by the researcher based on the components and indicators identified in the open banking business model.

Data analysis in the qualitative part was used to design the open banking business model in the Middle East Bank using soft systems methodology. Also, the data analysis of this section has been done using structural equation method and PLS software.

4.Research findings

4.1. Qualitative research findings

The current study was conducted with the aim of designing and explaining the open banking business model in Middle East Bank. For this purpose, soft systems methodology was used to identify the components and indicators of open banking business, and structural equation modeling was also used to explain the model. In this research, various steps of soft systems methodology have been presented to present the model and finally the final model of open banking business has been tested.

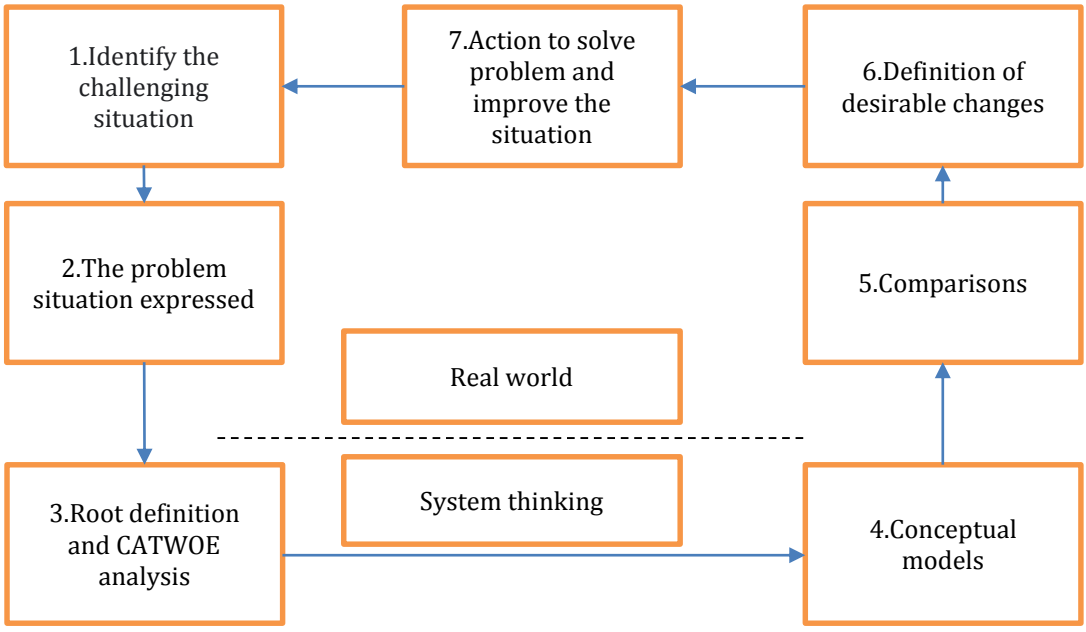

Figure 1. stages of soft system Method

Content analysis of interviews was used to provide conceptual models. In this way, the text of the interviews was reviewed several times by the researcher and from the text of the interviews, open codes related to each intellectual faction related to the topic of the research were find. Then, the relevant codes were classified through multiple revisions (Tables 3, 4, and 5) and the conceptual model related to each faction of thought was presented (Figures 2, 3, and 4).

Table 3. Extracted codes related to the development of open batakari business models based on improving the customer experience

Main codes	Open codes
Software and Hardware	- Providing API banking services - Support for different platforms - Increasing the level of acceptance coverage in electronic payments - Increasing the bandwidth of Internet lines - Data analysis and business intelligence - Business automation - Machine learning and artificial intelligence - Data architecture
Providing a quick feedback platform for bank customers	-Using survey systems in social networks -Setting up feedback registration systems
Venture investment	- Owners of innovative ideas and researchers - Knowledge-based and growth companies - Private risk investors - Innovation and prosperity fund - Bank and fintech investment in the field of capital market, blockchain and cryptocurrency, etc.
Research on customer needs and understanding their needs	-Analysis and customers segmentation - services Personalization -Using big data technology -Determining the activity level of banking system customers in banking systems -Developing the format for receiving bank customer information from banks -Connecting Makna online to the Shatab system in order to check credit card transactions -Tracking customer interactions in various channels -Creating the necessary infrastructure for scoring and rating customers
Operational development of open banking	- help from digital marketing experts -Taking advantage of user experience design based on user research - Taking advantage of software developers familiar with agile approaches and DevApps specialists
CRM and feedback analysis	- Use of data analysis system - Moving towards big data and massive data - Automaticity of customer relationship management system activities - Dynamic structures to respond to the customer

Table 4. Extracted codes related to the development of open business models based on API management

Main codes	Open codes
Demarcation of duties of regulatory bodies	-Regulation of banks -Regulation of payment companies -Regulation of fintechs and fintech startups
Establishing a sandbox (testing innovative products, services and business models in a real market)	-test -Development and nurturing of the sandbox ecosystem (fintech startups, regulators, accelerators and high-risk investors) -no dependency on the regulator for funding -The expert team managing the sandbox -Receive membership fees in the sandbox -Security requirements in the sandbox environment -Facilitating the activity framework for active businesses in sandbox environments
Strengthening validation systems at the national level	- Validation through adaptive technologies such as machine learning - Comprehensive and flexible scoring algorithms based on big data -Scoring algorithms based on artificial intelligence and network quality
Unification of rules and standards for expansion of fintech activities	- Development of open banking standards in accordance with global models - Plans to change to the latest versions of international standards -making infrastructures for security assessment and audit of banking systems and networks - Compliance of the country's electronic payment system with the world standards
Cooperation between fintechs and traditional financial institutions	-Interaction instead of confrontation -Welcoming fintechs and investing in them -Using the expertise of fintechs to create new business models and create new services -Removing legal obstacles and supporting start-up companies to expand activities between fintechs and financial institutions
consumer rights Protection and reduction of related risks	-Customer's right to choose and control access to data -Developing technical standards for routing-based authorizations and authentication flows -Two-factor authentication authorization for the purpose of data protection -Adoption of revised payment service guidelines (PSD2 -Using blockchain and providing digital ID
Using expert human capital	-Expertise in the field of business (market segmentation, service selection criteria by customers and capital markets, as well as the ability to apply this knowledge)

Main codes	Open codes
	-Expertise in the field of processes (measures and tools of human resources) -Expertise in the field of human resource information systems (analytics) -Expertise in the field of change -Expertise in the field of organization and culture (the ability to design and restructure the organization, manage culture and create an innovative culture) -Expertise in personal and interpersonal skills

Table 5. Extracted codes related to the development of open banking business models based on managerial and legal (regulatory) developments.

Main codes	Open codes
Non-interference of the government in how to implement open banking	- Effective, in place and on time control and supervision - Trying to play the role of protecting the consumer and giving them the right to choose - Specifying red lines and necessary frameworks for producers (fintechs)
Facilitating the issuance of licenses to start-ups active in the field of finance and fintechs and reducing administrative bureaucracies	- Removing unnecessary rules - Taking advantage of the opinions of experts to amend the laws - Reduction of licensing guidelines - Creation of a system for registering the information of business owners - automatic Issuance of licenses
Localization of payment standards and systems	- Developing the infrastructure of the Credit Control and Monitoring Center (Makna) as a priority project of the Resistance Economy Command Headquarters - Development of the electronic banking identity system (NIHAB) as an integrated inquiry center for the country's banking system - Developing the country's electronic payment network (Shaparak) in order to organize electronic sales terminals and fully monitor their activities - Setting up the integrated electronic check book issuance system (Sayad) in order to increase the check security coefficients - Management and guidance of all security measures in the space of production and exchange of banking information through Kashif interactive system (Rastak) - Expansion of the new integrated system project of the Central Bank (Nasim) in line with the implementation of the e-government comprehensive plan and providing government services through the electronic system.

After designing the conceptual model for each of the intellectual factions, the final research model was presented in Figure 2 with the consensus and agreement of the experts. The final open banking business model in Middle East Bank included 3 main components: customer-oriented banking, regulatory developments, and AP.

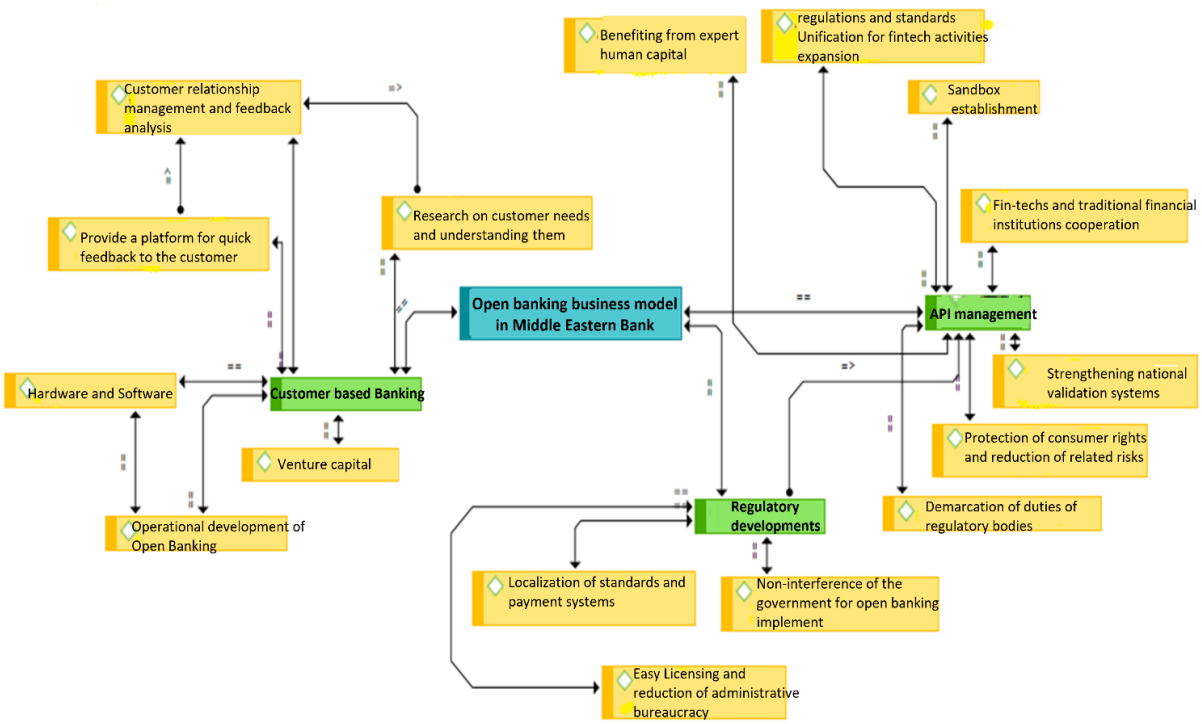

Figure 2. The final model of open banking business in the Middle East BankI management and 16 indicators.

4.2. Open banking business model test in the Middle East Bank

This step is actually the formal statement of the model and this step is one of the most important steps in structural equation modeling. In fact, no analysis is done, unless the researcher first states and specifies his model, which is about the relationships between variables.

4.2.1. Evaluation of reflective measurement models

The first factor that should be considered in the evaluation of reflective models is the one-dimensionality of the indicators. This means that each indicator in the total of indicators should be loaded with a large factor loading value on only one dimension or latent variable. For this purpose, factor loadings above 60% are acceptable. As can be seen in figures 3 and 4 (the model in standard coefficient estimation mode), the numbers or coefficients are divided into two categories. The first category is called measurement equations, which are the relationships between hidden variables (ellipses) and obvious variables (rectangles). These equations are called factor loads. The second category is structural equations, which are the relationships between latent and latent variables and are used to test hypotheses. These coefficients are called path coefficients (Homan, 2007). According to the model in coefficient estimation mode, factor loadings and path coefficients can be estimated. Tables 6 and 7 show the results of factor loadings. All coefficients are significant at

the 95% confidence level. Therefore, the results of factor loadings confirm the high validity of the model.

4.2.2. Evaluation of formative measurement models

One of the ways to evaluate shaping models is the coefficient of determination (R2). The coefficient of determination (R2) examines how many percent of the variance of a dependent variable is explained by the independent variable(s). Therefore, it is natural that this value is equal to zero for the independent variable and is greater than zero for the dependent variable. The higher this amount is, the greater the influence of independent variables on dependent variables (hanafizadeh, 2019). According to the coefficient of determination of the model, it can be said that customer-oriented banking, API management and regulatory developments together have been able to explain 0.661 of the variable variance of the open banking business model. Based on this, it can be concluded that the model has high predictability, the remaining value is related to the prediction error and can include other factors affecting the open banking business model.

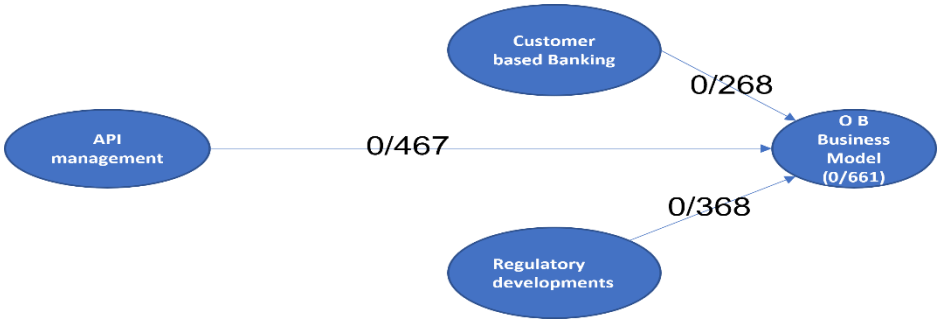

Figure 3. Evaluation of formative assay models

4.2.3. Testing the quality of the measurement model (subscription index)

This index is calculated by joint index with cross validity. This index actually measures the path model's ability to predict observable variables through the values of their corresponding hidden variables. Since all the values are positive, the model has good quality.

Table 6. Quality test of measurement model or sharing index

1-sse/sso	Variables
0.685	Softwares and Hardwares
0.575	Providing a quick feedback platform for bank customers
0.654	Venture capital
0.711	Researching customer needs and understanding their needs
0.494	Operational development of open banking
0.644	CRM and feedback analysis
0.491	Demarcation of duties of regulatory bodies

0.464	Establishing a sandbox (testing innovative products, services and business models in a real market)
0.508	Strengthening validation systems at the national level
0.774	Unification of rules and standards for expansion of fintech activities
0.796	Cooperation between fintechs and traditional financial institutions
0.423	consumer rights Protection and reduction of related risks
0.440	Benefiting from expert human capital
0.413	The absence of governance in how to implement open banking
0.517	Facilitating the issuance of licenses to start-ups active in the field of finance and fintechs and reducing administrative bureaucracies
0.419	Localization of payment standards and systems
0.612	Open banking business model

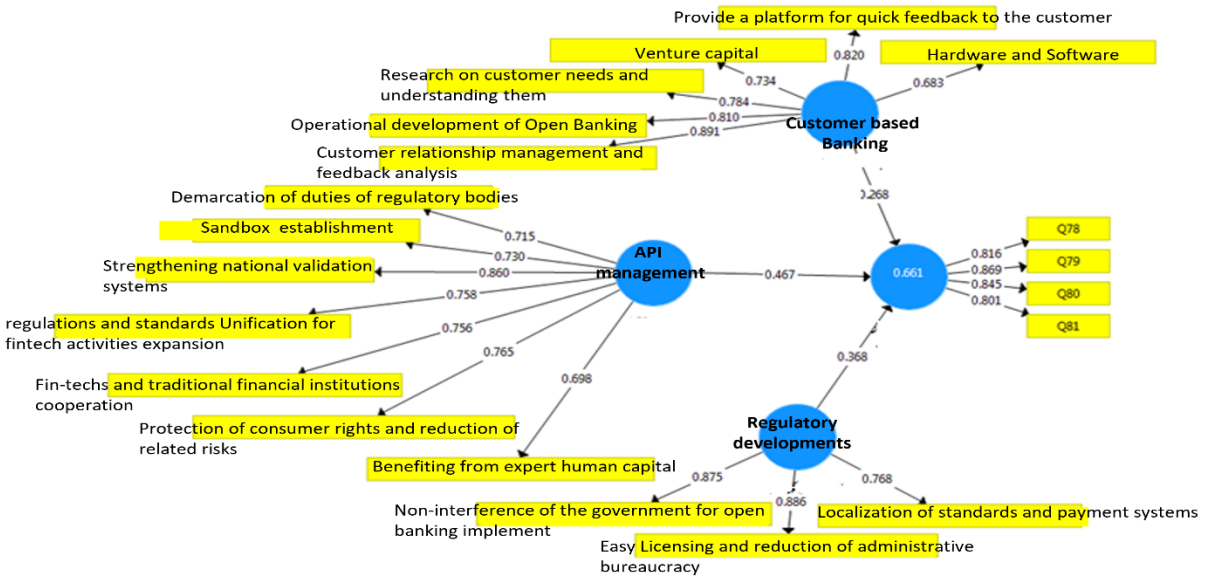

Figure 4. Research model in standard coefficient estimation mode for main hypotheses

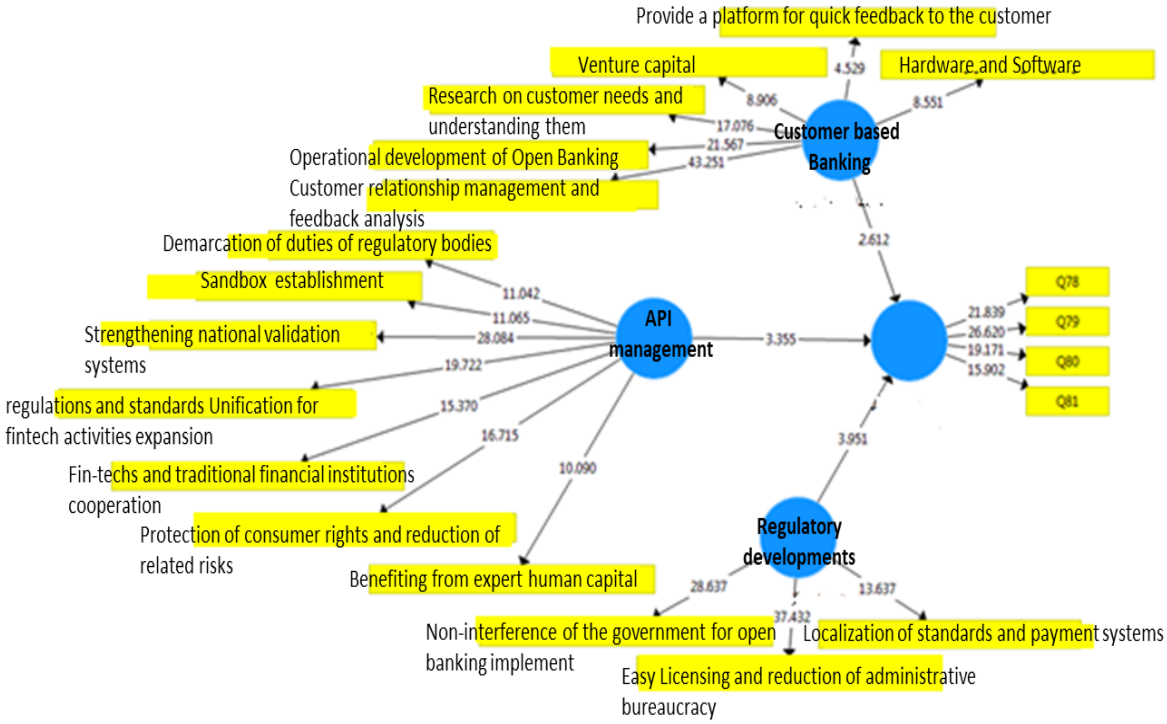

Figure 5. Significant coefficients of the main hypotheses in the model

This model actually tests all measurement equations (factor loadings) and structural equations (path coefficients) using t-statistics. According to the type of hypotheses expressed in the present research, naturally, the hypotheses will be confirmed when the relevant path coefficient is positive and its significant number, which is the same as the t-statistic, is significant. According to this model, the path coefficient and factor load are significant at the 95% confidence level if the value of the t statistic is outside the range (-1.96 to +1.96) and if the value of the t statistic is within this range, then the factor load Or the path coefficient is not significant. According to the results obtained from the t-test, all factor loadings have become significant at the 95% confidence level and have played a significant role in the measurement of their constructs.

4-3. Validation of the measurement model

4-3-1. Internal consistency reliability

Usually, the first criterion that is controlled in reflective measurement models is internal consistency reliability. Alpha is a classic index for reliability analysis based on the internal correlation of the indicators. The value of acceptable alpha coefficient is different based on the theories of different researchers. Some researchers have accepted an alpha coefficient above 0.6

as an acceptable alpha coefficient. The results of Cronbach's alpha values for model variables are shown in the following table:

Table 7. Internal consistency reliability coefficient values

composite reliability (CR)	Cronbach's alpha	Variables
0.949	0.928	Software and hardware
0.919	0.864	Providing a quick feedback platform for bank customers
0.944	0.925	Venture capital
0.957	0.933	Researching customer needs and understanding their needs
0.906	0.846	Operational development of open banking
0.943	0.924	CRM and feedback analysis
0.911	0.884	Demarcation of duties of regulatory bodies
0.896	0.825	Establishing a sandbox (testing innovative products, services and business models in a real market)
0.898	0.848	Strengthening validation systems at the national level
0.967	0.953	Unification of rules and standards for expansion of fintech activities
0.983	0.980	Cooperation between fintechs and traditional financial institutions
0.872	0.776	consumer rights Protection and reduction of related risks
0.884	0.827	Benefiting from expert human capital
0.884	0.804	The absence of governance in how to implement open banking
0.841	0.776	Facilitating the issuance of licenses to start-ups active in the field of finance and fintechs and reducing administrative bureaucracies
0.895	0.827	Localization of payment standards and systems
0.912	0.804	Open banking business model

As can be seen, Cronbach's alpha values for all variables are above 0.7. Based on the obtained alpha coefficients, it can be concluded that the model has good internal consistency reliability.

4-3-2. Convergent and divergent validity

In this research, for convergent validity, Fornell and Larcker (1981) suggest the average variance extracted AVE as a measure of convergent validity. The minimum value of AVE equal to 0.5 indicates sufficient convergent validity, which means that a latent variable can explain on average more than half of the dispersion of its indicators. As can be seen in the AVE table, all AVE values for all research variables are greater than 0.5. According to the values shown, it can be said that the model has good convergent validity.

Table 8. Convergent validity

√ AVE Convergent validity	AVE	Variables
0.907	0.822	Software and hardware
0.891	0.793	Providing a quick feedback platform for bank customers
0.879	0.772	Venture capital
0.939	0.882	Researching customer needs and understanding their needs
0.873	0.763	Operational development of open banking
0.877	0.769	CRM and feedback analysis
0.795	0.631	Demarcation of duties of regulatory bodies
0.862	0.742	Establishing a sandbox (testing innovative products, services and business models in a real market)
0.832	0.692	Strengthening validation systems at the national level
0.937	0.879	Unification of rules and standards for expansion of fintech activities
0.923	0.825	Cooperation between fintechs and traditional financial institutions
0.936	0.699	consumer rights Protection and reduction of related risks
0.811	0.658	Benefiting from expert human capital
0.847	0.717	The absence of governance in how to implement open banking
0.835	0.698	Facilitating the issuance of licenses to start-ups active in the field of finance and fintechs and reducing administrative bureaucracies
0.811	0.658	Localization of payment standards and systems
0.848	0.719	Open banking business model

Divergent validity means that the items or indicators related to a variable only measure the same variable. In PLS analysis, according to Fornell and Locker (1981), the square root of AVE of a variable should be greater than the correlation of that variable with other research variables. The AVE root values placed on the diameter of the correlation matrix are larger than the correlation values of that variable with other variables, which indicates the validity of the model divergence.

4-4. Evaluation of formative measurement models

One of the ways to evaluate shaping models is the coefficient of determination (R2). The coefficient of determination (R2) examines how many percent of the variance of a dependent variable is explained by the independent variable(s). This value is equal to zero for the independent variable and is greater than zero for the dependent variable. The higher this amount is, the greater the influence of independent variables on dependent variables (Hanfizadeh and Zare Ravasan, 2011). According to the coefficient of determination of the model in the model, it can be said that customer-oriented banking, API management and regulatory developments together have been

able to explain 0.661 of the variable variance of the open banking business model; The researchers have introduced three values of 0.19, 0.33 and 0.67 as criteria values for weak, medium and strong values of R2. Based on this, it can be concluded that the model has high predictability, the remaining value is related to the prediction error and can include other factors affecting the open banking business model.

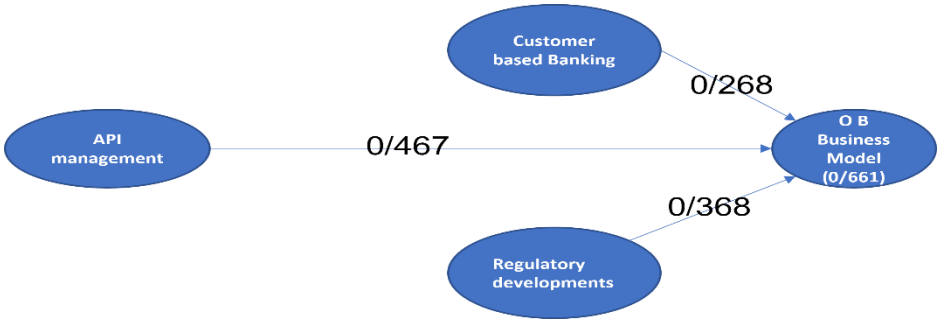

Figure 6. Evaluation of formative assay models

4-5. Testing the quality and fit of the measurement model

This index is calculated by sharing index with cross validity. This index actually measures the path model's ability to predict observable variables through the values of their corresponding hidden variables. Since all the values are positive, the model has good quality.

Table 9. Quality test of measurement model or sharing index

communality	1-sse/sso	Variables
0.920	0.685	Software and hardware
0.914	0.575	Providing a quick feedback platform for bank customers
0.887	0.654	Venture capital
0.902	0.711	Researching customer needs and understanding their needs
0.897	0.494	Operational development of open banking
0.910	0.644	CRM and feedback analysis
0.884	0.491	Demarcation of duties of regulatory bodies
0.921	0.646	Establishing a sandbox (testing innovative products, services and business models in a real market)
0.874	0.508	Strengthening validation systems at the national level
0.886	0.774	Unification of rules and standards for expansion of fintech activities
0.913	0.796	Cooperation between fintechs and traditional financial institutions
0.897	0.423	consumer rights Protection and reduction of related risks
0.922	0.440	Benefiting from expert human capital
0.904	0.413	The absence of governance in how to implement open banking

communality	1-sse/sso	Variables
0.817	0.517	Facilitating the issuance of licenses to start-ups active in the field of finance and fintechs and reducing administrative bureaucracies
0.915	0.419	Localization of payment standards and systems
0.910	0.612	Open banking business model

6-4. Fit of the research model

In addition to this, the general criterion of fit (GOF) can be obtained by calculating the geometric mean of the mean of sharing and R2. The average value of the sharing values index from the following formula is:

Communality= 1/N*∑ Communality

The subscription value is: 0.898. R2 is also equal to 0.997. This value can be seen based on the output of path coefficients in standard mode. According to the GOF calculation formula, we have:

GOF=√0/898*0/997=0/946

The limits of GOF index are between zero and one. Wetzles et al. (2005) introduced three values of 0.01, 0.25 and 0.35 as weak, medium and strong values for GOF, respectively. According to the value of 0.946, the research model is highly desirable.

4-7. General results of research hypotheses

In table (10), the results of all research hypotheses can be shown:

Table 10. General results of research hypotheses

Reject or confirm the hypothesis	meaningful	t statistic	Standardized path coefficient β	**Hypotheses**
The main hypotheses				
Confirmed	Sig<0.05	2.612	0.268	Customer-oriented banking → open banking business model
Confirmed	Sig<0.05	3.355	0468	API Management → Open Banking Business Model
Confirmed	Sig<0.05	3.951	0.368	Regulatory developments → open banking business model

5. Conclusions and suggestions

In recent decades, new technologies are revolutionizing financing methods and creating more efficient and cheaper financial services around the world. Open banking is one of the new banking trends in the world, which has attracted the attention of many large banks and has been implemented in some of the world's banks and is expanding. The present research was conducted

with the aim of presenting the open banking business model in the Middle East Bank with the approach of soft systems. The research method of soft systems focuses on the accurate and correct understanding of the nature and structure of the research problem in order to achieve a clearer understanding of the problem in order to improve the existing situation by using the opinion of experts and interested people in the problem and ultimately the agreement between the interests of these stakeholders. Based on this, in the present study, during the first four steps of designing the research conceptual model, 94 codes extracted from interviews with experts were categorized into 74 concepts, 16 categories and 3 categories. It is worth mentioning that the results related to the explanation and fitting of the obtained model also show that the resulting model has high validity, considering that the model is in the coefficient estimation mode at the confidence level of 95%, so the model has high validity. Also, according to the calculated values, the coefficient of determination (R2), it can be acknowledged that the model has a high predictive ability. The results related to the fit of the presented model (GOF) also indicate that the obtained model has strong suitability. The results related to the test of research hypotheses, including three main hypotheses, were confirmed according to the results obtained from the positive path coefficient and t-statistics (outside the range of negative 1.96 to positive 1.96). The findings of this study with the results of customer-oriented banking research with the results of Wewege et al. (2020), Lin et al. (2020), Chen (2020), Larson et al. (2019), Kõrvemaa (2017), Sanavi Fard and Co-worker (1400), Maftoohii (2019) and Khanlari and Co-worker (2019), Asadolah and Co-worker (2018) and Rudbaki (2018) and Latifi and Co-worker (2017).

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