Application of Meta-Synthesis Technique in Bank Profitability Model Considering the Role of Modern Banking Technologies

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Received: 2024-01-17 **Reviewed:** 2024-01-28 **Revised:** 2024-03-04 **Accepted:** 2024-03-23 **Published:** 2024-03-30

Abstract

The profitability of banks, as one of the key performance indicators, depends on their ability to generate income and manage costs. In recent decades, the emergence of modern banking technologies has led to significant transformations in the banking industry, which have had a direct impact on the profitability of banks. The purpose of this study is to apply the meta-synthesis technique to the bank profitability model, considering the role of modern banking technologies. The researcher employed a systematic review and meta-synthesis approach to analyze the results and findings of previous researchers. By following the seven steps of the Sandelowski and Barroso method, the researcher identified the influential factors. Out of 277 articles, 25 articles were selected based on the CASP method, and the validity of the analysis was confirmed with a Kappa coefficient of 0.760. In this context, to assess reliability and quality control, the transcription method was used, and the level of agreement for the identified indicators was found to be excellent. The analysis of the collected data using ATLAS.ti software led to the identification of 52 initial codes in 12 categories. Based on the meta-synthesis technique, the 12 categories were classified according to these concepts. The 12 categories are: system sustainability, cost-effectiveness, system performance, data security, accessibility, regulations, system intelligence, customer satisfaction, system reliability, system documentation, data management, and quality. System sustainability in the bank profitability model, considering the role of modern banking technologies, refers to the bank's ability to maintain and enhance its financial performance in the long term. Modern technologies such as artificial intelligence, blockchain, and advanced security systems help banks effectively manage risks and prevent cyber threats and financial fraud. These technologies increase customer confidence and trust in the banking system and ensure sustainable profitability for banks by reducing costs associated with risks and potential losses.

Keywords: *Profit Optimization, Bank Profitability, Modern Banking Technologies.*

How to cite this article:

Mostafapour H, Keramati M, Mehrinejad S, Minouei M. (2024). Application of Meta-Synthesis Technique in Bank Profitability Model Considering the Role of Modern Banking Technologies. Management Strategies and Engineering Sciences, 6(2), 15-24.

1. Introduction

Financial technology (FinTech) is one of the most commonly used terms in current research within the financial industry [1]. FinTech refers to the application of modern innovative technology in the field of finance [2]. Essentially, FinTech involves the use of innovative and modern technologies to deliver financial services. The concept of FinTech reached its peak in the late 2010s. FinTech met the security needs of investors by providing innovative and secure financial services. Another reason for the rise of FinTech can be attributed to the demand for more cost-effective financial services that offer greater mobility and speed. The primary catalyst for the emergence of FinTech was the 2008 global financial crisis. The global financial crisis was a period during which people lost trust in the financial system and sought something that would provide them with greater assurance in terms of investments. In addition to improving the operational efficiency of banks, modern technologies have stimulated innovation in product development and expanded the range of services offered by banks [3]. Traditional banks often had limited product portfolios and faced challenges in adapting to changing customer demands. However, FinTech startups introduced innovative financial products and services such as peer-to-peer lending, robo-advisors, crowdfunding platforms, and digital wallets [4]. These offerings meet the evolving needs of customers, provide alternative financing options, and promote financial inclusion [4]. Traditional banks have responded to these innovations by partnering with FinTech companies, investing in digital transformation, or developing their internal modern technology capabilities [5]. This collaboration between modern technologies and banks leads to product innovation, enhanced competitiveness, and spurs economic growth in the banking sector [6].

While studies have been conducted to systematically examine FinTech practices, these studies have yet to provide a comprehensive view of the entirety of FinTech practices and their impact on bank profitability. Recent studies have primarily focused on specific FinTech innovations such as peer-to-peer (P2P) lending, third-party payments (TPP), and crowdfunding [7], while considering the potential benefits or challenges that FinTech companies may introduce to the banking sector. On the other hand, the aim of this study is to fill the existing gap in the literature by conducting a comprehensive assessment of FinTech practices at the bank level (e.g., digitization, ATM ratio, and electronic payments) and at the country level (e.g., P2P lending, TPP, and crowdfunding). It elucidates the relationship between this modern technology and bank profitability. Additionally, this trend of emerging modern technology mitigates other critical factors that typically affect profitability in the FinTech era [8].

Bank profitability, as one of the key performance indicators, depends on their ability to generate income and manage costs. In recent decades, the emergence of modern banking technologies has led to significant transformations in the banking industry, which have had a direct impact on bank profitability [9]. These technologies, including digital banking, blockchain, artificial intelligence, and machine learning, have enabled banks to offer new and optimized services to customers while reducing their operational costs. As a result, the use of these technologies has emerged as a competitive advantage and plays a crucial role in enhancing bank profitability [3].

One of the most significant impacts of modern banking technologies on profitability is the increase in operational efficiency of banks. By utilizing digital banking systems, banks are able to automate many of their manual and paper-based processes. This not only reduces costs associated with human resources and operations management but also improves the speed and accuracy of service delivery [10]. For example, the use of artificial intelligence in credit processes and customer data analysis allows for more accurate credit risk assessment and faster decision-making. This leads to a reduction in credit losses and an increase in profitability [11].

Modern banking technologies also play a vital role in the development and diversification of banking products and services. By using technologies such as blockchain and digital payments, banks can offer innovative services such as digital currencies, electronic wallets, and smart contracts to their customers [12]. These services not only help attract new customers but also increase non-interest income through fees and charges associated with these services. Furthermore, banks can offer personalized recommendations and products by analyzing customer data and using advanced algorithms, which leads to increased customer satisfaction and loyalty, and ultimately, higher profitability [13].

Another advantage of modern banking technologies is the improvement in risk management. By utilizing advanced data analysis tools and machine learning, banks can continuously monitor their financial, credit, and operational risks and adopt appropriate strategies for managing these risks [14]. This leads to a reduction in risk-related costs and

enhances the sustainability of profitability in the long term [7]. Additionally, the use of modern security technologies, such as encryption and multi-factor authentication, protects banks from cyber threats and financial fraud, which can reduce unexpected losses and maintain sustainable profitability [13, 15].

Overall, modern banking technologies significantly impact bank profitability by improving operational efficiency, developing new services, increasing revenues, and reducing risks. Banks that invest in these technologies and adopt innovative strategies can lead the competitive banking market and significantly enhance their profitability [16]. These developments are not only beneficial for banks but also for customers and the entire economy, as they improve access to financial services and increase the stability of financial systems. Therefore, this research seeks to answer the question: How does the bank profitability model consider the role of modern banking technologies?

2. Methodology

The present study, in seeking to identify the factors and components influencing the optimal bank profitability model considering the role of modern banking technologies, follows a meta-synthesis approach and is qualitative in nature. The research employs a library-based method, using the meta-synthesis technique in the domain of business agility. Meta-synthesis is a subset of meta-study methods that involves systematically reviewing sources to extract, evaluate, combine, and, if necessary, statistically summarize previous research conducted on a specific subject area. In essence, meta-synthesis involves examining and analyzing the extracted information and findings from other studies with related and similar topics. The data gathered from these studies are qualitative rather than quantitative. Consequently, the selected sample for meta-synthesis is chosen based on its relevance to the research question. Meta-synthesis is not merely an integrated review of qualitative principles or the analysis of secondary and primary data from selected studies, but rather an analysis of the findings from these studies. In other words, meta-synthesis combines the interpretations of the primary data from the selected studies. The analysis was conducted using ATLAS.ti software.

3. Findings

Stage One: Formulating the Core Research Questions

The first step in the Sandelowski and Barroso method is formulating the research questions. These questions are typically structured around the four parameters: what, who, when, and how. Once the research questions are formulated based on the study's objectives, the systematic review of the literature begins. Table 1 presents the answers to these fundamental and essential questions related to the meta-synthesis method:

Table 1. Research Questions

Parameter	Research Question
What?	Identifying the indicators of the bank profitability optimization model considering the role of modern banking technologies
When?	Reviewing articles and books within the time frame of 2000 to 2024
How?	Reviewing articles using the CASP method with the related formula

Stage Two: Systematic Literature Review

To collect research data, secondary data referred to as past documents and records are used. As previously mentioned, the two primary research databases considered were Scopus and Web of Science, with special focus given to the following publishing platforms within these databases: Emerald Insight, Springer Link, Science Direct, Taylor & Francis Online, SAGE Journals, and Wiley Online Library. Additionally, for Persian articles, the Islamic World Science Citation Center (ISC) and the Comprehensive Portal of Humanities (CPH) were also considered.

Stage Three: Searching and Selecting Literature

To refine the articles extracted from the literature, four stages were followed, with the final stage based on the opinions of five expert reviewers involved in this study. These experts provided their opinions on each final filtered article to assess the quality based on an approach introduced later. Articles that scored below the established threshold were excluded from the process.

After eliminating studies inconsistent with the research objectives and questions, the researcher must evaluate the methodological quality of the studies. The purpose of this step is to discard studies whose findings the researcher cannot rely on. The tool typically used for assessing the quality of primary qualitative research is the "Critical Appraisal Skills Programme" (CASP), which, through ten questions, helps determine the accuracy, validity, and significance of qualitative studies. These questions focus on

the following areas: 1. Research objectives, 2. Methodological rationale, 3. Research design, 4. Sampling method, 5. Data collection, 6. Reflexivity (referring to the relationship between the researcher and participants), 7. Ethical considerations, 8. Accuracy of data analysis, 9. Clear and explicit presentation of findings, and 10. Research value.

Table 2. Selected Articles

Article Code	Title	CASP Score
C01	Examining the differences in the impact of Fintech on the economic capital of commercial banks' market risk: Evidence from a panel system GMM analysis	39
C02	Strategic control model for establishing digital banking in the Iranian banking system	37
C03	Industry 4.0 and intellectual capital in the age of FinTech	42
C04	A Systematic Review of Fintech and Banking Profitability	43
C05	A model for improving the financial performance of banks based on modern financial technologies	39
C06	Fintech: From budding to explosion-an overview of the current state of research	44
C07	Fintech and Islamic banking growth: New evidence	32
C08	Role of Digital Transformation on Digital Business Model Banks.	32
C09	Strategies to improve financial profitability in the banking industry	37
C10	The impact of FinTech firms on bank financial stability.	42
C11	Blockchain technology-based FinTech banking sector involvement using adaptive neuro-fuzzy-based K-nearest neighbors algorithm	31
C12	Achieving a strategic fit in fintech collaboration—A case study of Nordea Bank.	33
C13	What Do We Know about Crowdfunding and P2P Lending Research? A bibliometric Review and Meta-Analysis.	32
C14	The Impact of Digitalization on Performance Indicators of Russian Commercial Banks in 2021.	33
C15	Empowering financial inclusion through fintech	38
C16	Do financial technology firms influence bank performance	39
C17	Determinants of Banks' Profitability: Evidence from EU 27 Banking Systems.	37
C18	The Changing Landscape of Retail Banking and the Future of Digital Banking	41
C19	Fintech credit, bank regulations and bank performance: A cross-country analysis.	40
C20	The impact of the FinTech revolution on the future of banking: Opportunities and risks	37
C21	FinTech revolution: The impact of management information systems upon relative firm value and risk.	37
C22	Prospects of Artificial Intelligence and Machine Learning Application in Banking Risk Management.	35
C23	Financial stability of Asian Nations: Governance quality and financial inclusion	45
C24	Fintech, bank concentration and commercial bank profitability: Evidence from Chinese urban commercial banks	39
C25	Impact of E-Banking on the Islamic bank profitability in Sub-Saharan Africa: What are the financial determinants?	43

Stage Four: Data Extraction

This stage involves reviewing the remaining articles and extracting texts for coding in the next stage. This step focuses on separating the results, outcomes, and interpretations of these outcomes alongside the final discussion and conclusions of the researchers. In this stage, 25 articles were entered into the ATLAS.ti software for initial review, where scattered and selective portions of the articles were reviewed, and random and dispersed coding was performed to allow the researcher to familiarize themselves with the existing data. In this way, the researcher became acquainted with the general discussion and the prevailing context.

Stage Five: Analysis of Qualitative Findings

During the analysis, the researcher seeks out themes that emerge among the existing studies in the meta-synthesis. This is known as "thematic analysis." Once themes are identified and defined, the reviewer forms a classification and places similar and related classifications into a theme that best describes them. Themes provide the foundation for creating explanations, patterns, theories, or hypotheses. In this research, initially, all factors extracted from the studies were considered as identifiers, and then, considering the meaning of each, the identifiers were defined within a similar concept. Then, similar concepts were categorized into explanatory themes to identify the key themes explaining the study's indicators as the main and subcomponents of the research. In Table 3, in the "Source" column, each article is indicated by the letter "C" and the article's number.

Table 3. Main Categories and Related Codes

Category	Subcategory	Frequency

System Sustainability	Enhancing business operational capacity	C5, C2, C19, C20, C23, C25, C7, C10, C17
	Increasing system complexity and stability	C1, C10, C4, C6, C7, C9, C18, C22, C13, C12
	Reducing banking process risks	C3, C4, C9, C14, C13, C8
Cost Reduction	Reducing IT costs	C6, C10, C14
	Reducing transaction costs	C14, C15, C19, C20, C3, C7
	Eliminating banking paperwork	C5, C8, C17, C21
	Reducing document storage and handling costs	C3, C9, C12, C21, C8
	Reducing research and development costs	C1, C6, C7, C10, C11, C13, C18, C19, C25, C16
System Performance	Increasing investment	C2, C3, C4, C7, C8, C9, C11, C15, C17, C18, C22, C24, C10, C19
	Reducing response time	C1, C2, C5, C11, C14, C18, C9, C15, C20, C16, C17
	Improving energy efficiency	C2, C4, C6, C7, C8, C9, C12, C14, C18, C22, C10
	Enhancing administrative process management	C1, C5, C7, C8, C10, C15, C16, C22, C25
	Creating an IoT-based system	C1, C3, C5, C9, C10, C12, C14, C15, C17, C18, C23, C27, C8
	Direct connection between supplier and producer	C1, C5, C8, C11, C19
	Increasing bank efficiency	C6, C9, C10, C11, C14, C21, C25, C22
Data Security	Increasing transparency	C7, C9, C11, C12, C19, C25
	Decentralization	C7, C8, C9, C10, C11, C19, C20, C23
	Controlling information records	C10, C16
	Reducing fraud	C7, C15, C19, C17, C9, C23
	Modern and secure encryption	C23, C12
Accessibility	Ability to track goods and services	C19, C20
	Improving bank insurance management	C11, C15, C18, C22, C19, C10
	Customer relationship management	C3, C4, C17
	Access to global markets	C3, C4, C12, C19, C22
	Privacy protection	C2, C18
	Intellectual property protection	C6
Regulations	Identifying fraud and financial corruption	C4, C5
	Regulations related to the centralized blockchain ledger	C9, C21
	Access to international regulations	C1, C2, C6, C15, C19, C23
System Intelligence	Access to contracts	C10, C17, C19, C21, C25, C22
	Smart contract	C1, C2, C5, C9, C16, C19, C20
	Reducing registration errors	C13, C16, C22
	Information sharing and registration	C18
	Invoice and tax review	C18, C19, C10, C11
Customer Satisfaction	Access to new customers	C13, C16, C17, C19, C20, C23, C21
	Increasing customer investment	C1, C13, C17
	Customer access to timely and accurate information	C4, C9, C10, C18, C20, C21, C17
System Reliability	Preventing data manipulation	C1, C2, C6, C18, C13
	Continuous information updates	C6, C8, C16
	IoT-based data verification	C19, C21, C20
System Documentation	Access to online records	C5, C19
	Ability to access customer feedback	C4, C8, C18
	Ability to track identity and record borrowers' history	C16, C20
	Access to accounting processes	C12, C18
Data Management	Eliminating human errors	C17
	Predicting possible errors	C9, C14, C16, C25, C32
	Eliminating transaction duplication	C4, C6, C10, C13, C19, C21, C24, C18
	Improving data recording quality	C1, C3, C8, C11, C19, C6, C9
Quality	Increasing order in banking processes	C3, C7, C9, C15, C20, C22, C17, C11
	Improving project management	C1, C5, C6, C9, C11, C15, C17, C2, C8, C10
	Reducing fraud	C9, C10, C17, C18, C10, C1
	Increasing service quality	C4, C19, C22

Stage Six: Output Quality Control

In this study, to control the concepts extracted from the reviewed studies, the researchers also compared their opinions with another expert. For this purpose, a 52-question questionnaire consisting of identified indicators was designed. The data obtained were analyzed using SPSS version 23 and the transcription index. The calculation results are shown below, with the transcription index value obtained at 0.760, which falls within the valid agreement level.

Stage Seven: Final Summary

In this stage of the meta-synthesis method, the findings from the previous stages are presented. The research indicators were identified. From the indicators extracted from the related articles, by eliminating synonymous and frequently repeated indicators and finally categorizing the final indicators, 42 categories and 9 dimensions were obtained. In this coding stage, the main and subcategories of the research were identified.

Based on the Shannon entropy method, data processing in content analysis is discussed from a new perspective, both quantitatively and qualitatively. According to this method, data analysis in content analysis is much stronger and more reliable. Entropy in information theory is an index used to measure uncertainty expressed by a probability distribution. Based on this method, known as the compensatory model, the content of the plan was analyzed. In the first step, a decision matrix was formed. The scores obtained from the decision matrix concerning the issue are presented in Table 4:

Table 4. Determining the Importance and Emphasis of Past Research on Identified Factors

Code	Frequency	$\sum \left[P_{ij} \times knP_{ij} \right]$	Uncertainty Ej	Importance Coefficient Wj	Rank
Enhancing business operational capacity	9	-0.0893	0.0200	0.0211	5
Increasing system complexity and stability	10	-0.0965	0.0216	0.0227	4
Reducing banking process risks	6	-0.0660	0.0148	0.0156	8
Reducing IT costs	3	-0.0385	0.0086	0.0091	11
Reducing transaction costs	6	-0.0660	0.0148	0.0156	8
Eliminating banking paperwork	4	-0.0483	0.0108	0.0114	10
Reducing document storage and handling costs	5	-0.0574	0.0129	0.0135	9
Reducing research and development costs	10	-0.0965	0.0216	0.0227	4
Increasing investment	14	-0.1225	0.0274	0.0289	1
Reducing response time	11	-0.1033	0.0231	0.0243	3
Improving energy efficiency	11	-0.1033	0.0231	0.0243	3
Enhancing administrative process management	9	-0.0893	0.0200	0.0211	5
Creating an IoT-based system	12	-0.1099	0.0246	0.0259	2
Direct connection between supplier and producer	5	-0.0574	0.0129	0.0135	9
Increasing bank efficiency	8	-0.0819	0.0183	0.0193	6
Increasing transparency	6	-0.0660	0.0148	0.0156	8
Decentralization	8	-0.0819	0.0183	0.0193	6
Controlling information records	2	-0.0279	0.0062	0.0066	12
Reducing fraud	6	-0.0660	0.0148	0.0156	8
Modern and secure encryption	2	-0.0279	0.0062	0.0066	12
Ability to track goods and services	2	-0.0279	0.0062	0.0066	12
Improving bank insurance management	6	-0.0660	0.0148	0.0156	8
Customer relationship management	3	-0.0385	0.0086	0.0091	11
Access to global markets	5	-0.0574	0.0129	0.0135	9
Privacy protection	2	-0.0279	0.0062	0.0066	12
Intellectual property protection	1	-0.0158	0.0035	0.0037	13
Identifying fraud and financial corruption	2	-0.0279	0.0062	0.0066	12
Regulations related to the centralized blockchain ledger	2	-0.0279	0.0062	0.0066	12
Access to international regulations	6	-0.0660	0.0148	0.0156	8
Access to contracts	6	-0.0660	0.0148	0.0156	8
Smart contract	7	-0.0742	0.0166	0.0175	7
Reducing registration errors	3	-0.0385	0.0086	0.0091	11
Information sharing and registration	1	-0.0158	0.0035	0.0037	13
Invoice and tax review	4	-0.0483	0.0108	0.0114	10
Access to new customers	7	-0.0742	0.0166	0.0175	7
Increasing customer investment	3	-0.0385	0.0086	0.0091	11
Customer access to timely and accurate information	8	-0.0819	0.0183	0.0193	6
Preventing data manipulation	5	-0.0574	0.0129	0.0135	9
Continuous information updates	3	-0.0385	0.0086	0.0091	11
IoT-based data verification	3	-0.0385	0.0086	0.0091	11
Access to online records	2	-0.0279	0.0062	0.0066	12
Ability to access customer feedback	3	-0.0385	0.0086	0.0091	11
Ability to track identity and record borrowers' history	2	-0.0279	0.0062	0.0066	12
Access to accounting processes	2	-0.0279	0.0062	0.0066	12

Eliminating human errors	1	-0.0158	0.0035	0.0037	13
Predicting possible errors	5	-0.0574	0.0129	0.0135	9
Eliminating transaction duplication	8	-0.0819	0.0183	0.0193	6
Improving data recording quality	7	-0.0742	0.0166	0.0175	7
Increasing order in banking processes	9	-0.0893	0.0200	0.0211	5
Improving project management	10	-0.0965	0.0216	0.0227	4
Reducing fraud	6	-0.0660	0.0148	0.0156	8
Increasing service quality	3	-0.0385	0.0086	0.0091	11

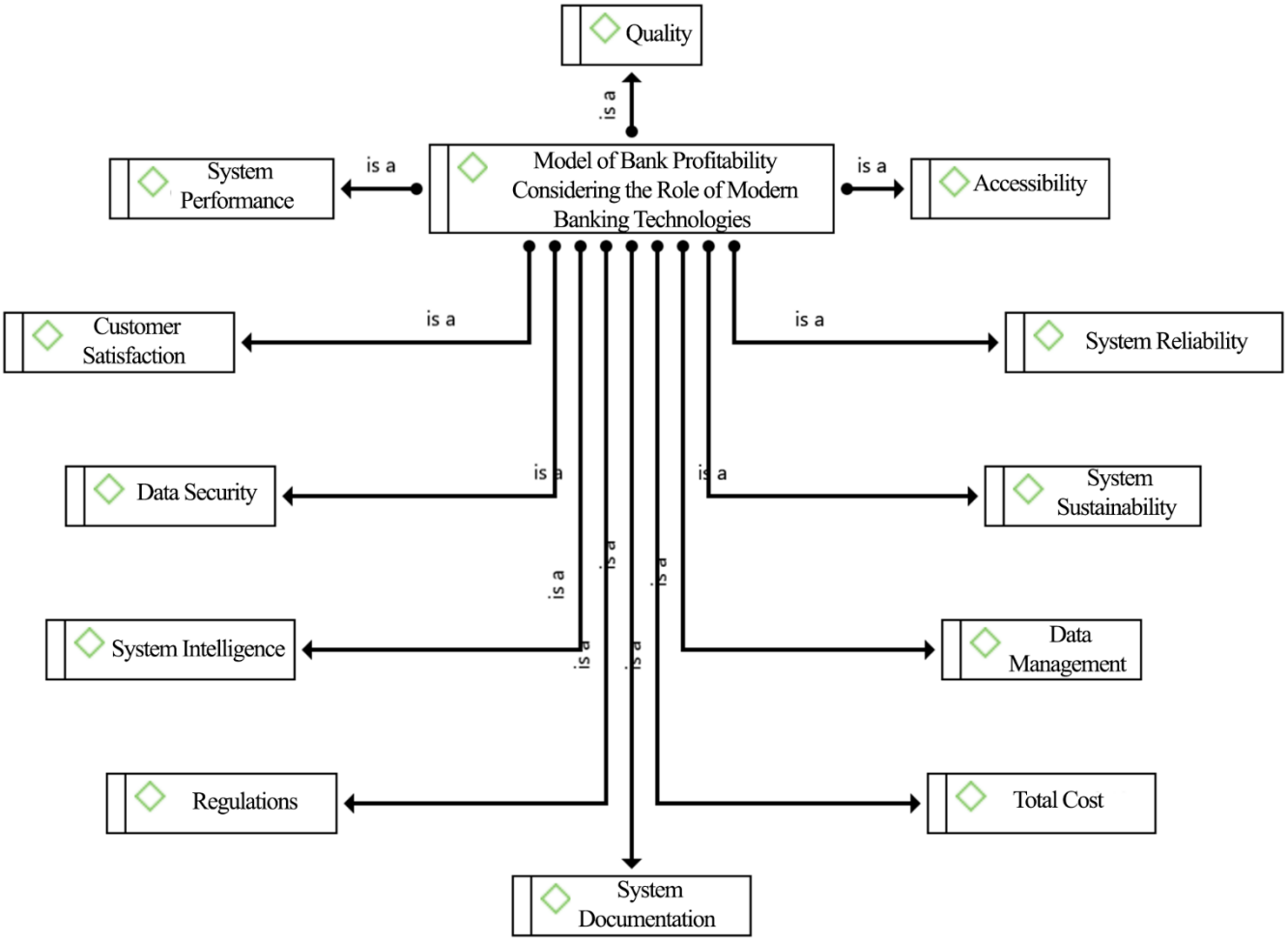

Figure 1. Factors Influencing the Bank Profitability Model Considering the Role of Modern Banking Technologies

4. Discussion and Conclusion

Based on the meta-synthesis analysis concerning the bank profitability model considering the role of modern banking technologies, 12 categories and 52 subcategories were identified. The 12 categories are system sustainability, total cost, system performance, data security, accessibility, regulations, system intelligence, customer satisfaction, system reliability, system documentation, data management, and quality.

System sustainability in the bank profitability model, considering the role of modern banking technologies, refers to the bank's ability to maintain and enhance its financial performance over the long term. Modern technologies such as artificial intelligence, blockchain, and advanced security systems assist banks in effectively managing risks and preventing cyber threats and financial fraud. These technologies enhance customer confidence and trust in the banking system and, by reducing costs associated with risks and potential losses, ensure sustainable profitability for the bank.

Total cost in the bank profitability model, considering the role of modern banking technologies, refers to the overall expenses incurred by banks in providing their services and products. Modern technologies such as automation, digital banking, and artificial intelligence significantly reduce operational costs by decreasing the need for human resources, optimizing processes, and increasing the speed of operations. This cost reduction allows banks to offer their services at more competitive prices, thereby increasing profitability and strengthening the bank's competitive position in the market.

System performance in the bank profitability model, considering the role of modern banking technologies, refers to the efficiency and effectiveness of banking processes and operations. Modern technologies such as digital banking systems, data analytics, and artificial intelligence help banks automate, accurately, and quickly execute their operations. These technologies improve customer access to services, reduce waiting times, and increase accuracy in transaction processing. Optimal system performance leads to increased customer satisfaction, reduced operational costs, and ultimately, higher profitability and competitiveness for the bank.

Data security in the bank profitability model, considering the role of modern banking technologies, refers to the protection of sensitive customer information and financial transactions from unauthorized access and cyber threats. The use of modern technologies such as advanced encryption, blockchain, and multi-factor authentication significantly enhances data security. These measures reduce the risks associated with information theft and financial fraud. Strong data security reinforces customer trust, protects the bank from costs arising from security breaches, and ultimately contributes to sustainable profitability.

Accessibility in the bank profitability model, considering the role of modern banking technologies, refers to the ability of customers to easily and quickly access banking services from any location and at any time. Modern technologies such as mobile banking, internet banking, and digital wallets enable customers to access banking services without the need for physical presence at branches. This increased accessibility leads to greater customer acquisition, more transactions, and improved user experience. Consequently, by expanding access to services, banks increase their revenues and strengthen their profitability.

Regulations in the bank profitability model, considering the role of modern banking technologies, refer to the set of legal and regulatory requirements that banks must adhere to when using modern technologies. Modern technologies such as blockchain, artificial intelligence, and data analytics require compliance with regulations related to privacy, data security, and anti-money laundering. Compliance with these regulations is of utmost importance, as non-compliance can result in heavy fines and damage to the bank's reputation. Effective compliance with regulations allows banks to use technologies safely and legally, ensuring sustainable profitability.

System intelligence in the bank profitability model, considering the role of modern banking technologies, refers to the ability of banking systems to analyze data, predict customer behavior, and make optimal decisions automatically. Technologies such as artificial intelligence and machine learning enable banks to identify complex patterns and offer personalized services. This intelligence improves customer experience, increases operational efficiency, and reduces credit risks. Intelligent systems also help banks identify profitable opportunities and respond more quickly to market changes, ultimately leading to increased profitability.

Customer satisfaction in the bank profitability model, considering the role of modern banking technologies, refers to the level of contentment and trust customers have in banking services. Modern technologies such as mobile banking, digital payments, and personalized services enhance the user experience and allow customers to access desired services easily and quickly. This increased convenience and speed lead to higher customer satisfaction and reduced complaints. High customer satisfaction results in greater loyalty, an increase in the number of transactions, and the acquisition of new customers, all of which contribute to increased revenue and profitability for the bank.

System reliability and system documentation in the bank profitability model, considering the role of modern banking technologies, are two key elements in maintaining the health and efficiency of banking operations. System reliability refers to the confidence customers and stakeholders have in the banking system's ability to provide stable and uninterrupted services. Modern technologies such as blockchain and advanced encryption systems help banks ensure that transactions and information are processed securely and without errors. This reliability not only attracts and retains customers but also reduces operational and financial risks, contributing to sustainable profitability for banks.

System documentation refers to the set of records and documents used to track processes, changes, and the

performance of banking systems. Modern technologies enable banks to digitally store and manage documentation using advanced tools. These documents include transaction records, system changes, and security reports, which are essential for regulatory compliance, risk management, and performance evaluation of systems. Accurate and comprehensive documentation helps banks maintain greater transparency, quickly identify problems, and continually improve processes, ultimately leading to increased profitability and maintaining system reliability.

Data management and quality in the bank profitability model, considering the role of modern banking technologies, are critical aspects in enhancing performance and increasing profitability for banks. Data management refers to the collection, storage, processing, and analysis of financial and customer data, which has been improved through the use of modern technologies such as big data analytics and artificial intelligence. These technologies provide more effective data management with high accuracy and speed, leading to smarter decision-making and more accurate predictions of customer behavior.

Data quality refers to the accuracy, completeness, and reliability of the information used by banks for analysis and decision-making. Modern technologies such as data management systems and automated correction tools help banks ensure the accuracy and quality of their data. High-quality data allows banks to offer services and products more accurately and effectively to customers, better manage credit risks, and identify new opportunities. As a result, effective data management and maintaining high quality contribute to improving customer experience, reducing operational costs, and increasing sustainable profitability.

Authors' Contributions

Authors equally contributed to this article.

Acknowledgments

Authors thank all participants who participate in this study.

Declaration of Interest

The authors report no conflict of interest.

Funding

According to the authors, this article has no financial support.

Ethical Considerations

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

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