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Gender Gap in Digital Banking Usage in Emerging Markets: Evidence from Kazakhstan's Digital Transformation

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Abstract

This study examines the gender gap in the adoption and use of digital banking services in Kazakhstan, an emerging market. While digital transformation has transformed banking services globally, differences in usage patterns between men and women remain understudied in emerging economies. This article explores how different gender groups access and use digital banking tools and the factors that contribute to uneven adoption. This study analyzes and assesses key usage trends, platform availability, and potential institutional or cultural barriers that may hinder female users' full engagement in digital financial products. The findings indicate that while overall digitalization has improved service coverage and operational efficiency, gender gaps persist due to differences in digital literacy, income levels, and trust in online systems. This study offers insights into how banks can develop strategies to bridge the digital gender gap, promoting financial inclusion and equitable access in the rapidly evolving banking ecosystem. The findings have important implications for both financial institutions and policymakers seeking to ensure that digital transformation benefits all user groups equally.

Keywords*:* Gender, Gender Gap, Finance, Financial Inclusion, Financial Institution, Bank, Banking Sector, Kazakhstan

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1. INTRODUCTION

In recent years, global financial technology has undergone rapid development, and digital banking has become an increasingly essential component of banking services. Through mobile banking, online trading platforms, self-service terminals, and other channels, banks have not only significantly improved operational efficiency but also considerably expanded their customer service offerings. However, while the benefits of digitalization are being widely released, the "digital divide" faced by various social groups in the process of using digital banking services has become increasingly prominent, especially at the gender level.

Globally, numerous studies have highlighted that women tend to have lower access rates, lower frequency of use, a lesser understanding of the functionality, and lower trust in digital banking services compared to men. This gender gap not only reflects the long-standing inequality in traditional financial services, but also restricts the comprehensive promotion of financial inclusion and digital transformation to a certain extent. Especially in emerging market countries, due to multiple factors such as digital infrastructure, financial education level, and gender cultural concepts, the gender gap problem is more complex and challenging.

Taking Kazakhstan as an example, although the country has made positive progress in financial digitalization in recent years, such as its vigorous promotion of the "Digital Kazakhstan" plan and the accelerated transformation of the banking industry's platforms, the gender dimension remains relatively weak in policy and academic research. Most of the existing literature focuses on how digital finance can promote bank performance, improve customer experience, or enhance risk control. Few studies specifically explore the role and status of female users in the development of digital banks. Therefore, it is necessary to analyze the inequality in the use of digital banks from a gender perspective, explore its causes, and put forward corresponding policy recommendations.

This study selects Halyk Bank, the National Bank of Kazakhstan, as a case study. Based on original research into digital transformation and bank performance, combined with existing regression analysis results and expert interviews, this study introduces the dimension of gender analysis to explore women's participation in digital banking, the main obstacles they face, and potential paths for improvement. This study aims to fill the gap in the current literature on "gender inequality in digital finance" in the research field of Central Asian countries, and provide theoretical support and practical paths for achieving gender-inclusive digital transformation.

2. LITERATURE REVIEW

Systematic classification of factors that affect access to quality jobs is essential for the successful analysis and development of effective strategies to expand women’s opportunities in the labor market. In Kazakhstan, gender equality and increasing women’s employment are important components of state policy. In his address to the people of Kazakhstan in 2024, President Kassym-Jomart Tokayev of the Republic of Kazakhstan emphasized the need to support entrepreneurship, promote economic activity, and reduce labor market inequalities (Demirgüç-Kunt et al., 2022). Close attention should be paid to supporting women’s entrepreneurship, especially in small and medium-sized enterprises, and creating conditions for improving women’s employment, which will help reduce gender inequality in the labor market and increase their contribution to the economy.

In addition, Kazakhstan is already implementing measures to support women, including national programs such as the “Enbek” employment promotion program, which aims to create conditions for increasing women’s employment, particularly in rural areas. Within the framework of the strategic document "Family and Gender Policy Concept of the Republic of Kazakhstan until 2030", the

goals are set to reduce gender gaps in the labor market, promote women's economic activity through social security reforms, and ensure women's equal rights and opportunities in their professional activities (GSMA, 2021). Within the framework of the United Nations 2030 Agenda for Sustainable Development, Kazakhstan is committed to promoting gender equality and expanding women's opportunities through the implementation of international standards and practices. A crucial aspect of these efforts is to enhance the legal framework, ensuring the protection of women's rights and their access to economic opportunities. The establishment of business incubators, start-up support centers, educational programs specifically designed for women entrepreneurs, and preferential credit lines will help strengthen women's entrepreneurial spirit, especially in the field of small and medium-sized enterprises, thereby promoting women's entrepreneurship and creating new job opportunities. In addition, an essential institutional condition is the introduction of a system for assessing the quality of employment, which is able to track gender differences in the labor market, analyze women's employment dynamics, and identify problem areas. The 2009 financial crisis resulted in a 1.7% decline in global GDP and triggered a global recession. Due to the failure to recover in time from the impact of the financial and economic crisis, the economy was affected by the epidemic. In 2020, global GDP growth slowed to 3.5%. Although inflation rose, economic development continued to stabilize. These shocks have led to significant changes in the labor market, resulting in a deepening recession, increased social uncertainty among the unemployed, and reduced working hours and wages. In addition, the unemployment rate has risen sharply, and jobs have been redistributed, which is a global trend. According to the forecast of the International Labor Organization, the global unemployment rate will reach 4.9% in the next few years (Suri & Jack, 2016). In turn, the rise in unemployment means that the economy is facing a process of job redistribution and needs to transfer labor to new industries. In the context of changes in the global labor market, not only quantitative indicators such as the unemployment rate, but also the quality of employment play an essential role. Special attention is paid to ensuring equal opportunities for all population groups, including women. In this regard, studying the factors that affect the quality of employment is crucial to understanding the institutional prerequisites that help expand women's access to stable and high-quality employment opportunities. Therefore, based on the labor market indicators proposed by the International Labor Organization (ILO), the leading indicators of a high-quality labor market can be formed (European Bank for Reconstruction and Development, 2020). Figure 1 shows the main economic and social factors that affect a country's employment and labor market and determine the quality of this market.

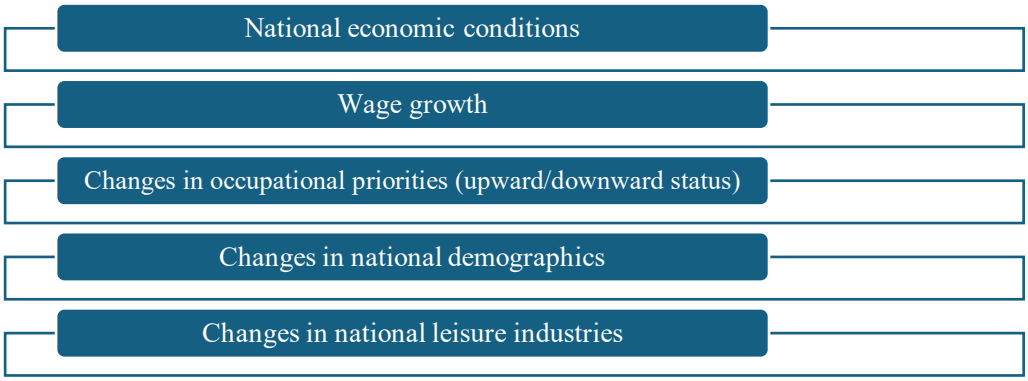

FIGURE 1. Factors influencing the functioning of the labor market

Note: compiled by authors Lekhtyanskaya & Rimskaya (2016)

First, the national economic situation is a key factor that reflects a country's level of economic development, which directly impacts the creation of jobs and the well-being of its citizens. In addition, wage growth determines the changes in wage levels, which are an essential indicator for motivating the economically active population and attracting new talent to the labor market.

With the rapid development of global financial technology, digital banking has become a crucial means to promote financial inclusion and enhance bank performance. A large number of overseas studies have focused on how digital banks can improve bank performance by improving customer experience, expanding service channels, and optimizing cost structure. However, these studies primarily focus on developed countries, and research in emerging markets, especially those in Central Asia, remains relatively scarce (Vasiljeva & Lukanova, 2016).

In recent years, some studies have begun to focus on the impact of the digital divide on financial inclusion, particularly in terms of gender differences (see Table 1). For example, the World Bank noted that female users encounter structural barriers, including low technology adoption, limited educational attainment, and incomplete legal identification, when accessing digital banking services. In emerging markets, this gender gap may be more significant, limiting the inclusive development of digital finance. Given the relatively limited research literature on Kazakhstan, it primarily focuses on the impact of digital banks on performance or technical specifications, with relatively few systematic analyses from a gender perspective.

TABLE 1. Summary of key literature on digital banking

Author(s) / Year	Region of study	Research method	Key findings / Focus
Zalan & Lewis (2020)	Developed Economies	Quantitative (regression analysis)	Digital banks enhance efficiency, lower costs, and improve satisfaction.
Koont (2024)	United States	Quantitative (empirical analysis of 100+ banks)	Digitalization reshapes market competition and service delivery structures.
Acosta-Prado et al. (2024)	Emerging Economies	Bibliometric & Literature Review	Rapid rise of digital adoption in emerging markets; Central Asia under-researched.
World Bank (2023)	Global (focus on developing regions)	Policy evaluation & institutional analysis	Open banking, digital ID, and regulatory frameworks shape success of ecosystems.
Deloitte (2021)	Global (practice-oriented)	Industry survey & case study comparison	Traditional banks must digitally transform or face market irrelevance.

Note: compiled by authors based on Koont (2024)

A small number of studies in Kazakhstan have mentioned women's participation in digital payments and remote account opening; however, there is still a lack of data support based on quantitative analysis. Therefore, based on previous empirical research findings on the digitalization of banks in Kazakhstan, this article attempts to introduce a new perspective of “gender differences” to fill the gap in the existing literature on the intersection of gender and digital finance, as well as provide an analytical framework and policy recommendations with a localized perspective for emerging economies (Chen et al., 2019).

2. METHODOLOGY

This study employs a qualitative research method to investigate the differences in the use of digital banking services among users of different genders and their potential impact on

bank performance and ecological sustainability from a gender perspective.

The expert evaluation part utilizes the AHP questionnaire method to reevaluate the existing five core indicators in conjunction with the gender dimension: technical foundation, policy supervision, customer experience, ecological synergy, and risk control compliance.

Based on the scoring results of the questionnaires completed by seven experts, the different challenges faced in constructing the banking ecosystem under varying gender financial preferences and behaviors are analyzed. AHP Online Calculator provided by bpmsg.com.

This study employs a qualitative, expert-led approach to examine the key factors influencing gender differences in digital banking adoption in Kazakhstan, utilizing the Analytical Hierarchy Process (AHP). Professor Saaty proposed the AHP method, which is primarily used in strategic decision-making, policy analysis, and prioritizing complex systems. This method constructs a multi-level structural model, performs pairwise comparison scoring, and passes consistency tests to derive the weight coefficient of each indicator. It possesses the characteristics of clear logic, strong operability, and considers both subjective judgment and quantitative analysis. It is particularly suitable for qualitative variables, such as the policy environment, customer experience, and cross-platform cooperation, which are involved in this study (OECD, 2022).

The AHP research method is particularly suitable for this study, mainly for the following reasons:

Some intangible factors, which are difficult to quantify, can be systematically studied, such as policy implementation, platform interoperability, and customer experience.

It enables multiple experts to express their preferences in pairs, thus improving judgment clarity and reducing cognitive bias.

It supports consistency checks, ensuring data reliability and minimizing inconsistencies in expert ratings.

The Analytical Hierarchy Process (AHP) is a method for decomposing a problem into its constituent factors and their interrelationships. The selected factors are then grouped to form a hierarchical framework. On a per-level basis, each factor is compared two-way with the other factors, thereby building a judgment matrix. The weights of these factors can then be determined by calculating the maximum eigenvalue of the matrix and obtaining the corresponding positive eigenvectors. The Analytical Hierarchy Process (AHP) is defined as a powerful and highly manipulable evaluation tool, as it allows the evaluation of results based on pairs of relative criteria and options. The relative importance of two criteria is evaluated using a numerical scale from 1 to 9. A score of 1 indicates the highest importance, while a score of 9 indicates that the first criterion is significantly higher than the second.

To determine the value of the factors (A1, A2, ..., An) obtained from the mathematical matrix, each factor is assigned a corresponding positive number. The goal is to find the value of each factor Ak, where k = 1, 2, ..., n.

Mathematical matrix AHP is represented in formula (1):

$$A = (a_{ij}) \begin{pmatrix} a_{1i} & \cdots & a_{ni} \\ \vdots & \ddots & \vdots \\ a_{1n} & \cdots & a_{nn} \end{pmatrix} \quad (1)$$

where:

$a_{ij}\ and\ a_{ji}$ – A matrix's elements;

i – matrix row;

j – matrix column.

The following task involves gathering the evaluations of the experts regarding the weightage of each criterion. The expert evaluates each criterion individually using a special scale called the Relative Importance Scale, which assigns a specific assessment value to each criterion. These values range from 1 to 9, with intermediate values such as 3, 5, and 7 in between is represented in formula (2):

$$(A)_{nxm}X_n = \begin{pmatrix} a_{11}\,x_1 & \cdots & a_{1n}x_n \\ \vdots & \ddots & \vdots \\ a_{m1} & \cdots & a_{mn}x_n \end{pmatrix} \quad (2)$$

where:

X = (x1, ..., xn) – selected indicator vector;

n – selected in shaping the digital ecosystem in the banking industry.

The study builds on an existing assessment model originally developed to examine the construction of a digital banking ecosystem. Rather than collecting new data, this study reframes the findings from a gender perspective, applying the same hierarchy and weights but focusing on the impact on male and female users separately. The original AHP model contains five key criteria: (1) technology infrastructure; (2) policies and regulations; (3) customer experience; (4) ecosystem synergies; and (5) risks and compliance. Seven experts provided expert opinion, including bank employees, university professors, and fintech users. The expert survey was conducted via Google Forms and employed the paired comparison method, structured according to the Saaty scale (1-9). The expert feedback data was then collected and analyzed using the BPMSG AHP-OS online calculator. The calculator automatically performs consistency checks (CR values) and derives priority vectors using the eigenvalue method. The final consistency level was 9.7%, which is within the AHP acceptance threshold (CR < 10%), indicating that the feedback is internally consistent and reliable.

This study retains the same weights and expert opinions. Still, the interpretation highlights the different impact that each factor may have on female and male users' access to and benefits from digital banking services. For example, the discussions of "Customer Experience" and "Policy and Regulation" focus on how regulatory frameworks and platform design can either bridge or exacerbate gender gaps in digital inclusion. This reinterpretation does not alter the structural hierarchy, but rather reframes the findings in light of gender-sensitive insights. By adopting this approach, this study offers a practical and resource-efficient method for integrating a gender lens into the assessment of a digital banking ecosystem, leveraging existing data while minimizing the need for new empirical data collection.

Gender analysis framework: combined with theoretical perspectives on the gender gap in financial technology in the literature (such as the gender digital divide, financial literacy differences, etc.).

The gender composition is not distinguished explicitly in the AHP expert sample, which has a limited impact on the gender sensitivity of the results.

3. RESULTS AND DISCUSSION

The Analytic Hierarchy Process (AHP), developed by T. Saaty (1977, 1980, 1988, 1995), is one of the best-known and most widely used multi-criteria analysis (MCA) methods. It allows users to intuitively estimate the relative weight of multiple criteria or options related to a given criterion. Even if quantitative estimates are not available, policymakers or evaluators can still make decisions about whether one criterion is more important than another. Pairwise comparisons are, therefore, attractive to users. Saaty developed a consistent method for converting this pairwise comparison (X is more important than Y) into a set of numbers that represent the relative priority of each criterion (Fernandes et al., 2014).

Compared with the semi-structured interview research method, although the latter has a high advantage in obtaining in-depth cognition and experience, it has the following limitations: (1) The content of the interview is difficult to standardize, which is not conducive to cross-object comparison; (2) The conclusion is not representative enough when the sample size is small; (3) There is subjective bias in the qualitative analysis process. On the other hand, the AHP research method provides a structured, logical deduction process that maintains subjective input, allowing for the extraction of consistent "quantitative

priorities" from the "professional experience given by experts" and serving as a reference for subsequent decision-making (Allen et al., 2016).

In addition, the AHP research method also has the advantage of strong operability. First, the questionnaire design is simple, allowing experts to complete the scoring directly through online forms (such as Google Forms), thereby avoiding the time and energy required from respondents. Next, researchers can use Excel or open-source tools to easily complete weight calculation and consistency verification. The overall research process is transparent, replicable, and easily subject to peer review. This method offers practicality and benefits for researchers with limited resources.

Research design and selection of criteria

Based on an extensive literature review and previous case studies, we identified the following five criteria as key factors in shaping the digital ecosystem in the banking industry (see Table 2).

TABLE 2. Criteria as key factors in shaping the digital ecosystem in the banking industry

Code	Criterion	Explanation
C1	Technology Infrastructure	API readiness, mobile platforms, cloud infrastructure
C2	Policy and Regulation	Regulatory sandbox, open banking policies, digital ID rules
C3	Customer Experience	Usability, responsiveness, personalization, user-centric design
C4	Ecosystem Collaboration	Integration with eGov, e-commerce, and fintech partners
C5	Risk Management & Compliance	KYC, AML, data protection, fraud detection systems

Note: compiled by the authors on the bases of the AHP criterion

The above design is closely centered on the actual operating status and transformation goals of Halyk Bank. Also, it reflects the typical path of international banks in building a digital ecosystem. Each dimension has observable characteristics that are suitable for experts to make comparative judgments based on their experience (Glinkina, 2004).

(2) Expert scoring logic and scale setting

The questionnaire was designed using the standard 1-9 nine-level scale method, requiring experts to compare the importance of each pair of indicators in pairs (see Table 3).

TABLE 3. The standard 1-9 nine-level scale method

Score	Significance
1	Equally important
2	Slightly important
3	Clearly important
4	Strongly important
5	Extremely important
2,4,6,8	Somewhere in between

Note: compiled by the authors based on AHP score

For example, if the expert believes that "customer experience (C3)" is "obviously important" than "risk management (C5)", then fill in "C3 vs C5 = 5" on the questionnaire.

(3) Questionnaire design and distribution method

To reduce the cost of data collection and improve efficiency, this paper utilizes the Google Forms platform to design and distribute a questionnaire written in English. The target experts mainly include the following three categories:

- teachers in relevant fields of colleges and universities (financial technology, information systems, strategic management, etc.);
- banking practitioners (middle-level managers, product managers, IT team members); consumers (rural and urban).

It is expected that no less than six valid questionnaires will be collected to meet the robustness requirements of the AHP method under small samples. The questionnaire will be completed anonymously, and the researchers will maintain the confidentiality of the data.

Considering the key factors for scientifically evaluating the construction of Kazakhstan's banks' digital ecosystem, this paper employs the analytic hierarchy process (AHP), which is used to quantify the importance of five core indicators through expert scoring. A total of 7 valid questionnaires were collected for this survey topic. To ensure that the scoring source is widely representative and based on practical experience, the experts comprise professors from universities (3 individuals), bank practitioners (2 individuals), and digital financial users and consumers (2 individuals).

Considering the consistency of overall judgment and mathematical feasibility, the following steps are used for data integration:

1. Matrix summary method

The geometric mean method is used to calculate the geometric mean of each group of corresponding elements in the seven pairwise comparison matrices, forming a summary matrix. This method is suitable for processing multiple expert opinions in AHP and can effectively avoid the influence of individual extreme values.

2. Weight calculation

Import the summary matrix into the AHP online calculator (AHP Calculator - AHP-OS) provided by bpmsg.com, use the eigenvector method to calculate the final weight of each indicator, and automatically perform a consistency check (CR value calculation). First, we need to determine the consistency ratio (CR). Generally, it is less than the 10% standard recognized by AHP, indicating that the questionnaire score has good internal consistency and the results are credible. In this study, the consistency ratio (CR) is 9.7%, which fully demonstrates that the study has good consistency in scoring and that the results can be used in research analysis.

Table 4 presents the visual ranking diagram and deviation range of the above weight results, which vividly illustrates the relative importance of the three core indicators in constructing the digital ecosystem.

TABLE 4. Expert Pairwise Comparison Matrix and Geometric Mean for AHP Analysis

Expert	C1vsC2	C1vsC3	C1vsC4	C1vsC5	C2vsC3	C2vsC4	C2vsC5	C3vsC4	C3vsC5	C4vsC5
1	8	3	2	5	7	3	1	2	4	4
2	1	3	3	5	1	3	5	7	7	5
3	3	3	3	5	3	3	3	1	5	3
4	5	1	1	1	1	3	2	6	4	1
5	4	4	4	4	3	4	3	4	3	4
6	4	3	2	4	4	3	2	4	1	3
7	2	1	2	3	2	5	5	4	5	6
mean	3	2	2	3	2	3	3	3	4	3

Note: compiled by authors based on the result of AHP

It can be seen that, in the process of promoting the platform transformation of banks and deepening ecological cooperation, it is necessary to prioritize the synergistic strengthening of technical capabilities and institutional guarantees, and to combine user experience orientation for comprehensive optimization.

It presents the priority ranking of five key factors influencing the development of a banking ecosystem, based on AHP analysis. Technology Infrastructure ranks first with a priority weight of 35.9%, highlighting its foundational role. Policy and Regulation (24.6%) and Customer Experience (20.9%) follow closely, reflecting their strategic importance. Ecosystem Collaboration and Risk Management & Compliance rank fourth and fifth, with relatively lower weights of 11.9% and 6.6%, respectively.

These results suggest that technical and regulatory readiness are the most critical enablers of ecosystem formation.

TABLE 5. Calculation results and visualization

Cat		Priority	Rank	(+)	(-)
1	Technology infrastructure	35.9%	1	19.7%	19.7%
2	Policy and regulation	24.6%	2	11.0%	11.0%
3	Customer experience	20.9%	3	8.2%	8.2%
4	Ecosystem collaboration	11.9%	4	5.3%	5.3%
5	Risk management & compliance	6.6%	5	2.9%	2.9%

Note: compiled by the authors based on the results of AHP questionnaire analysis

The technology infrastructure stands out with the highest weight, reinforcing its dominant role across all expert evaluations. Policy, Regulation, and Customer Experience also show relatively high and consistent weights, suggesting their importance in ecosystem success. Ecosystem Collaboration, Risk Management, and Compliance received lower priority, with smaller ranges of expert consensus. Figure 2 illustrates the consolidated results of the AHP analysis, showing the minimum, actual, and maximum priority weights for each factor influencing the development of the banking ecosystem.

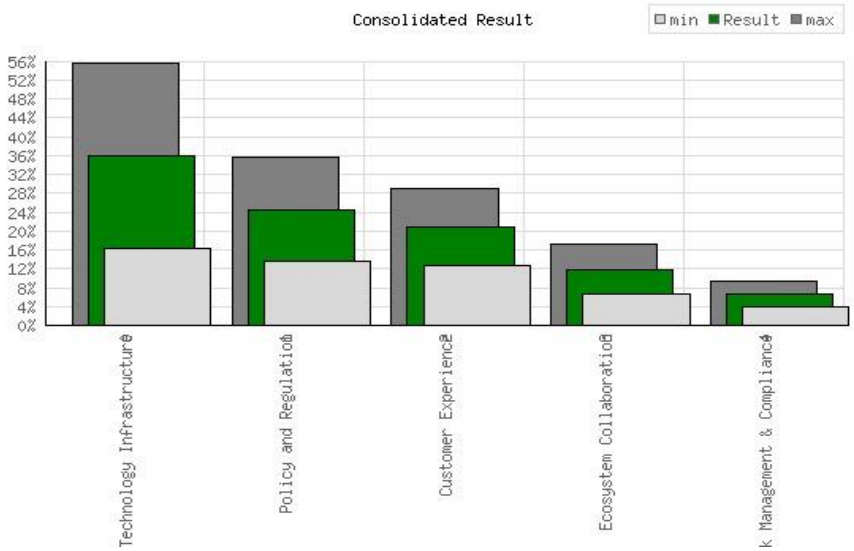

FIGURE 2. Weight diagram of digital banking ecosystem indicators based on AHP

Note: generated from AHP-OS software (bpmsg.com) based on expert survey results

According to the analysis results, technical infrastructure (C1) has the highest proportion, indicating that both experts and consumers believe a stable and open technical environment is a prerequisite for building a digital banking ecosystem. This covers aspects such as API interfaces, mobile development capabilities, and cloud service architecture.

The second is the policy and regulatory system (C2), which reflects the importance of reasonable supervision, government support, and open banking standards. Meanwhile, customer experience (C3) accounts for nearly 20%, indicating that user satisfaction has become a key factor in determining the ecosystem's success.

In contrast, ecological synergy capabilities (C4) and risk control (C5) have lower weights, indicating that Kazakhstan is still in the initial stage of cross-platform integration and open ecological construction, especially in terms of systematic risk control and compliance

automation. A complete mechanism has not yet been formed.

After conducting the AHP analysis framework, "customer experience" was defined as one of the critical dimensions that promote the construction of the banking ecosystem. This dimension was further explored by introducing a gender perspective. The results show that gender differences are significant in digital banking services in many aspects:

First, from the perspective of user experience, female users pay more attention to the convenience of operation, security tips, and the integration of life services when using bank apps. In contrast, male users tend to pay more attention to the efficiency of account management and the depth of investment functions. If banks fail to consider the needs of female users in product design fully, they may inadvertently create a “gender usage gap” in digital services.

Second, from the perspective of service accessibility, some women, especially those in rural areas, find it more difficult to use online financial services conveniently due to their limited digital literacy levels and traditional family roles. This structural barrier also poses a challenge to the inclusiveness and sustainable development of the digital financial ecosystem.

Therefore, this study recommends that the "gender adaptability" indicator be incorporated into customer experience optimization to encourage banks to consider gender differences in user research, interface design, and service development, thereby enhancing the fairness and breadth of overall services.

In promoting the development of the banking ecosystem in Kazakhstan, this study emphasizes "gender inclusiveness" as one of the key directions for institutional development. Based on the existing policy recommendations, the following additional recommendations are further proposed:

Promote the data disclosure system of the gender dimension. Encourage banks to disclose digital service usage data (such as APP activity, loan application ratio, etc.) divided by gender in annual reports and regulatory statements to facilitate the systematic evaluation of service coverage and fairness.

Strengthen women's participation in digital financial education. The national level should introduce supporting policies to promote women's digital financial literacy training, especially in rural and remote areas, to enhance their understanding and use of digital financial tools (United Nations ESCAP, 2020).

Improve the gender adaptability of financial technology product design. Banks and financial technology companies should conduct user testing and implement feedback mechanisms for female users during the product development stage to ensure the service experience is friendly and accessible.

Establish a gender equality incentive mechanism. Provide policy or financial incentives to banks that have made progress in gender inclusion to promote the evolution of the entire industry towards a diverse, fair, and inclusive digital financial ecosystem (Hasanov, 2021).

5. CONCLUSIONS

In summary, the introduction of gender dimensions not only helps deepen the understanding of differences in customer experience but also provides a more realistic reference path for ecosystem construction. By institutionally promoting the transformation of "gender-inclusive" banks, Kazakhstan can further enhance the inclusiveness of financial services, the diversity of the ecosystem, and its future sustainability.

This study incorporates a gender perspective into the existing analytical framework for digital transformation in the banking sector, exploring the gender gap in digital banking usage in Kazakhstan. The paper emphasizes the significance of gender inclusion strategies in emerging market contexts.

The results indicate that digital transformation, particularly in terms of IT investment and mobile banking adoption, has a significant positive impact on bank

performance. However, the gender dimension reveals that the benefits of digitalization are not evenly distributed. Factors such as digital literacy, access to technology, and cultural barriers contribute to the low digital banking participation of women in Kazakhstan. These disparities may result in half of the population not fully utilizing digital financial services, ultimately hindering the inclusion and sustainability of the digital ecosystem.

To bridge this gap, it is recommended that financial institutions and policymakers prioritize gender-sensitive strategies, such as conducting targeted digital education campaigns, designing inclusive platforms, and collecting sex-disaggregated data. In addition, banks should consider incorporating gender equality indicators into their digital performance assessments and ecosystem development strategies.

In summary, closing the gender gap in digital banking is not only a matter of fairness but also a strategic imperative to maximize the social and economic benefits of digital finance. This case study examines Kazakhstan's experience and offers valuable lessons for other emerging economies seeking to establish an inclusive and efficient digital banking ecosystem.

AUTHOR CONTRIBUTION

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Visualization: Madina Sikakebieke, Laura Kuanova.
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