

# Analyzing the Gender Gap in Digital Financial Services Access

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## ABSTRACT

**This study examines** the persistent gender disparity in digital financial inclusion, where Digital Financial Services (DFS) offer transformative opportunities but remain unevenly accessed by men and women. The background reveals that despite the rapid expansion of Fintech ecosystems and increased global adoption of digital financial tools, women continue to experience lower ownership and usage of digital accounts. **The object of this research is** to analyze the structural and social determinants contributing to the gender gap in DFS access and utilization. **The proposed method adopts** a mixed-methods approach, integrating quantitative analysis of global financial inclusion datasets with qualitative case studies of policies and programs explicitly designed to support women's financial participation. **The result** indicates that digital literacy limitations, entrenched socio-cultural expectations, and restricted access to essential resources such as mobile devices, financial assets, and formal identification continue to reinforce systemic barriers preventing women from fully benefiting from digital finance advancements. **The conclusion** highlights that addressing this inequality requires gender-intentional strategies, inclusive design principles, and evidence-based policy intervention to ensure that DFS evolves not only as a technological innovation but also as an equitable instrument for financial empowerment and social inclusion.

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## 1. INTRODUCTION

Digital financial services (DFS) have rapidly evolved over the past decade, transforming the global financial ecosystem and creating unprecedented opportunities for economic participation, particularly in emerging and developing economies [1]. The integration of mobile banking, digital payments, e-wallets, and platform-based financial products has accelerated financial inclusion by reducing traditional barriers such as geographical constraints, lack of formal banking infrastructure, and high transaction costs. In many regions, DFS has become a catalyst for socio-economic empowerment by enabling individuals to save securely, access credit, make transactions, and participate in digital marketplaces. However, despite these advancements, a persistent disparity remains between men and women in accessing and utilizing digital financial services. As a result, although DFS is promising, it has not yet achieved its full potential as an equalizing force for financial participation and gender equity. This gender gap is especially visible in low- and middle-income countries, where socio-cultural

norms, restricted access to digital devices, and uneven levels of digital literacy disproportionately disadvantage women. As a result, DFS although promising has not yet achieved its full potential as an equalizing force for financial participation and gender equity. Addressing this imbalance is essential not only for improving women's financial independence but also for advancing broader national development goals related to economic growth, social inclusion, and poverty reduction [2, 3].

The persistence of the gender gap in DFS has brought attention to the complexity of the issue, highlighting that it extends far beyond simple access to technology. The problem is deeply rooted in intersecting social, cultural, and economic constraints that limit women's agency and engagement with digital finance. Women are often excluded from formal identification systems, underserved by financial institutions, and less likely to own mobile devices, thereby creating a multilayered exclusion cycle. Furthermore, digital financial products are frequently designed without consideration for women's needs, roles, and behavioral patterns, reinforcing systemic barriers rather than dismantling them. This leads to a situation where even when women technically have access to digital tools, they may lack the confidence, knowledge, or supportive environment necessary to use them meaningfully [4]. Therefore, the gender gap in Digital Financial Services (DFS) should be understood as a structural challenge rather than merely a technological deficit. Based on this context, the research problem can be articulated as: although digital financial systems have expanded, women continue to face unique barriers preventing equitable participation in DFS ecosystems. These challenges necessitate a deeper examination of the interplay between demand-side factors such as social norms and digital literacy, and supply-side elements such as product design and service delivery, to fully understand the roots of exclusion and opportunities for reform [5].

To address this research problem, three guiding research questions are formulated. First, what are the primary factors contributing to the gender gap in DFS access and usage? This question seeks to unpack both direct and indirect drivers of inequality, ranging from affordability and technological access to household dynamics and perceived trust in digital financial systems [6]. Second, how do supply-side barriers, such as gender-blind product design or institutional biases, interact with demand-side limitations, including restrictive gender norms and limited financial literacy, to reinforce the existing gap? This question aims to understand how systemic and behavioral constraints intersect to produce uneven financial participation. Third, what strategies or frameworks have proven effective or show strong potential in closing the gender gap and promoting equitable access to DFS? This final question encourages exploration of policy solutions, gender-responsive design approaches, community-based capacity building, and public-private partnerships that prioritize women's inclusion [7]. Together, these research questions provide a structured pathway for analyzing the complexity of the issue and identifying opportunities for meaningful intervention [8].

The scope of this research focuses on women in low- and middle-income economies, where the gender gap in DFS remains most pronounced and where digital finance has been positioned as a key enabler of inclusive development. The analysis draws on global data sources, comparative regional insights, and case studies of targeted interventions to generate findings that are applicable across diverse socio economic contexts [9]. The significance of this study lies in its contribution to a growing body of knowledge seeking to understand how DFS systems can evolve in ways that promote gender equity rather than replicate existing inequalities. The findings will be relevant for policymakers designing national financial inclusion strategies, financial service providers building and scaling digital products, and development organizations prioritizing women's empowerment initiatives [10]. By offering evidence-based insights and actionable recommendations, this research aims to support a more gender-intentional approach to digital finance one that ensures women are not only counted as potential users but empowered as active participants in the digital economy [11].

## 2. LITERATURE REVIEW

### 2.1. The Global State of the Gender Gap in Financial Inclusion

Recent global assessments highlight persistent disparities in women's access to financial systems, despite rapid growth in digital financial services. According to [12], the global gender gap in formal account ownership remains at approximately 6 percentage points, with wider disparities in regions such as Sub-Saharan Africa, South Asia, and parts of the Middle East. Although digital financial tools, especially mobile money platforms, have expanded financial access, the benefits have not been uniformly distributed. Men consistently demonstrate higher levels of Digital Financial Service (DFS) usage across metrics such as mobile banking,

digital payments, and savings [13]. A study by [14] emphasizes that DFS expansion does not automatically eliminate gender inequalities because social and structural inequalities often migrate into digital systems. More recent analysis from [15] reinforces this pattern, noting that even when women adopt digital financial accounts, they are less likely to engage actively or use multiple financial products. Recent studies further confirm this trend, highlighting that structural gender disparities in digital financial access persist despite technological advancement [16]. Collectively, these studies suggest that the digitalization of financial systems has reduced, but not eliminated, gender disparities, demonstrating the need for intentional design, policy support, and targeted interventions.

## 2.2. Socio-Cultural and Economic Barriers

Research continues to demonstrate that gender norms, educational disparities, and structural inequalities disproportionately restrict women's financial participation. Evidence from recent studies indicates that lower education levels, especially digital literacy, significantly affect women's confidence and capability to use formal financial services [17]. Cultural restrictions further exacerbate these challenges, as women in some societies require permission from male relatives to own mobile phones or open bank accounts [18]. Economic barriers also remain significant, with women less likely to control income, assets, or collateral for loans, which limits participation in both traditional and digital financial ecosystems [19]. In addition, lack of legal identification remains a major barrier, especially in low- and middle-income countries, where millions of women remain undocumented [20]. These findings suggest that barriers to DFS participation are not merely logistical but are deeply embedded in structural inequalities and household power dynamics. Thus, addressing the gender gap requires approaches that consider social context, cultural norms, and systemic discrimination not solely technological provision.

## 2.3. The Digital Divide

The gendered digital divide remains one of the most critical challenges to equitable access to DFS. [21] reports that women are 16% less likely than men to own a mobile phone and 28% less likely to own a smartphone both essential tools for DFS access. Internet and technology access gaps further widen the divide, particularly in rural and low-income communities [22]. Digital literacy also emerges as a strong predictor of DFS adoption, with women demonstrating lower confidence in managing online transactions due to fears of fraud, privacy breaches, and financial mismanagement [23]. Furthermore, infrastructural limitations such as unreliable mobile networks, high data costs, and lack of gender-inclusive support services reinforce women's exclusion from digital finance ecosystems [24]. Recent work from [25] highlights that without addressing underlying digital inequalities, DFS risks reinforcing rather than reducing the gender gap. Therefore, the digital divide remains a critical area of concern and requires multi-level intervention across infrastructure, education, and technology access.

## 2.4. Gender-Inclusive Policies and Design

A growing body of literature emphasizes that gender-responsive DFS ecosystems require intentional and evidence-based approaches to product design, policy regulation, and implementation. Studies from [26] indicate that when providers incorporate gender-disaggregated data and user-centered design frameworks, women's adoption rates increase significantly. Successful examples include tailored savings products, simplified account onboarding, flexible verification procedures, and interfaces designed to accommodate low literacy users [27]. Public policy has also played an essential role: countries such as India, Kenya, and Bangladesh have made progress by implementing national financial inclusion strategies that prioritize gender equity and require gender-specific reporting metrics. Capacity-building interventions, particularly digital and financial literacy programs, have demonstrated measurable improvements in women's confidence and usage patterns of digital financial services tools. The literature suggests that holistic approaches combining policy mandates, gender-inclusive design principles, and community-based engagement are among the most effective strategies for reducing gender-based disparities in digital financial systems [28].

## 2.5. Conceptual Framework

This study develops a conceptual framework that integrates demand-side and supply-side factors to explain gender disparities in Digital Financial Services (DFS). On the demand side, socio-cultural and eco-

nomic barriers such as gender norms, limited financial autonomy, and low digital literacy constrain women's ability to access and use DFS. These challenges are further compounded by digital barriers, including limited access to mobile devices, internet connectivity, and technological skills, which collectively reduce women's participation in digital financial ecosystems.

From the supply side, barriers such as gender-blind product design, complex onboarding procedures, and institutional biases limit the accessibility and usability of DFS for women. These demand and supply side constraints interact to shape key outcomes, including access, usage, and meaningful engagement with digital financial services. Therefore, improving gender equity in DFS requires integrated strategies that address both structural and technological barriers through inclusive design, targeted policies, and capacity-building initiatives.

Table 1. Synthesis of Barriers and Their Impact on DFS Outcomes

Barrier Type	Key Factors	Description	Impact on DFS
Socio-Cultural	Gender norms, financial autonomy	Restrictions on women's decision-making and mobility	Low usage, limited engagement
Economic	Income, asset ownership	Limited control over financial resources	Reduced access to financial products
Digital	Device ownership, internet access, literacy	Limited access to technology and digital skills	Barriers to DFS adoption
Supply-Side	Product design, onboarding, institutional bias	Non-inclusive services and rigid requirements	Low accessibility and usability

As shown in Table 1, the identified barriers collectively influence women's access, usage, and overall engagement with digital financial services. These findings highlight the interconnected nature of socio-cultural, digital, and supply-side constraints in shaping financial inclusion outcomes.

### 3. RESEARCH METHODOLOGY

The methodology adopted for this research is designed to provide a comprehensive and multi-dimensional understanding of the gender gap in digital financial inclusion. Since the issue is influenced by both measurable socioeconomic indicators and subjective sociocultural experiences, a mixed-method approach was selected. The following sections describe the research flow, methodological logic, data sources, and analytical techniques implemented in this study [29].

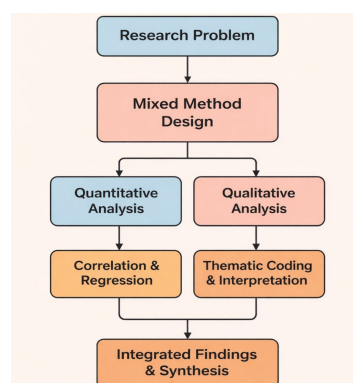


Figure 1. Research Methodological Framework

This framework is positioned at the beginning of the methodology section to guide the reader in understanding the logical sequence of the research. It illustrates the integration of quantitative analysis (correlation and regression) and qualitative thematic analysis, highlighting how both approaches contribute to identifying the key determinants of the gender gap in digital financial services [30]. It demonstrates how quantitative and qualitative streams operate independently but later converge to generate a holistic synthesis. The design ensures

that measurable trends from global data are supported and contextualized by real-world experiences gathered through qualitative inquiry [31].

### 3.1. Research Approach

This study employs a mixed methods approach, integrating quantitative statistical analysis with qualitative thematic interpretation. The rationale for using mixed methods is grounded in the recognition that the gender gap in digital financial inclusion is not merely a technical access problem but also a sociocultural phenomenon influenced by social norms, digital literacy, trust, and personal experiences [32].

A mixed-methods approach provides several advantages, including:

- It enhances the validity of findings through triangulation.
- It enables the exploration of both macro-level patterns (e.g., digital access disparities) and micro-level lived realities (e.g., fear of technology or cultural constraints).
- It bridges the gap between numerical evidence and social meaning, which is critical for policy-oriented research on gender inclusion [33].

This approach aligns with contemporary digital inclusion research frameworks and is widely endorsed in post-2021 studies focusing on financial development and gender equity [34].

### 3.2. Quantitative Analysis

The quantitative component involves collecting and analyzing gender-disaggregated financial access data from globally recognized sources such as the World Bank Global Findex, GSMA Mobile Gender Gap Report, and UNESCO educational datasets. The quantitative analysis focuses on identifying correlations between key variables such as education level, access to mobile devices, geographic location, and gender differences in formal financial account ownership. This study applies Pearson correlation and multiple regression analysis to identify significant predictors of digital financial service usage, with statistical significance set at  $p < 0.05$  [35].

Table 2. Quantitative Variables and Data Sources

Variable	Description	Type	Source
Gender	Respondent's gender (male/female)	Binary	Global Findex 2021
Account Ownership	Ownership of a formal financial account	Binary	Global Findex 2021
Mobile Phone Access	Ownership of a mobile phone	Binary	Global Findex 2021
Internet Access	Access to internet services	Binary	Global Findex 2021
Education Level	Highest level of education attained	Ordinal	Global Findex 2021
Location	Urban or rural residence	Binary	Global Findex 2021

Table 2 summarizes the key quantitative variables used in the analysis, including education level, mobile device access, and geographic location, which served as independent variables, while Digital Financial Service (DFS) usage was treated as the dependent variable. These variables were analyzed using Pearson correlation and multiple regression techniques to examine the strength and significance of relationships between gender and financial inclusion outcomes. The variables were selected based on their established relevance in prior studies on digital financial participation. Statistical analysis was conducted using SPSS and STATA, including data cleaning, descriptive statistics, Pearson correlation, and multiple regression modeling. Diagnostic tests were also performed to ensure the validity and reliability of the model [36, 37, 38].

### 3.3. Qualitative Analysis

To complement the numerical findings, qualitative data will be gathered using semi-structured interviews and focus group discussions with women across different socioeconomic backgrounds [39]. These

women include digital banking users, non-users, and individuals who attempted but failed to register for financial services. Additional perspectives from fintech providers and policymakers may also be incorporated to enhance contextual interpretation as seen as Table 3 below.

Table 3. Sample Qualitative Question Framework

Theme	Sample Question	Purpose
Trust & Perception	Do you feel digital finance is safe? Why or why not?	To explore risk perception and psychological barriers
Access Challenges	What obstacles did you face when attempting to register or use digital financial services?	To identify structural and sociocultural challenges
Usage Experience	How do you currently use digital financial tools in your daily life?	To document patterns and usability gaps

The interview framework is designed to uncover the social realities behind numerical patterns. By capturing individual narratives, this section highlights how gender norms, education, cultural expectations, and technology perception influence financial behavior. The analysis will employ NVivo software to code themes and identify recurring linguistic and emotional patterns. The analysis follows thematic coding procedures including open, axial, and selective coding to identify key patterns and themes [40].

### 3.4. Data Analysis

The final analytical stage integrates quantitative and qualitative findings. The quantitative results will establish statistical associations and measurable patterns, while the qualitative findings will add context and interpretation [41]. The integration process compares quantitative results with qualitative themes to identify consistent patterns and strengthen the validity of the findings. This triangulation strengthens the reliability and applicability of the conclusions, making them valuable for policymakers, financial institutions, and digital inclusion initiatives [42].

## 4. DISCUSSION

This section presents findings grounded in the empirical results of the study. The quantitative analysis shows that gender remains a statistically significant predictor of Digital Financial Service (DFS) usage ( $p < 0.05$ ), with women consistently less likely to own and actively use digital financial accounts compared to men. Among the independent variables, mobile phone access and education level demonstrate the strongest positive effects on DFS adoption, indicating that both technological access and human capital are critical enabling factors. These findings are consistent with prior studies on financial inclusion disparities [43, 38].

The qualitative findings further contextualize these results by revealing that women face persistent barriers related to socio-cultural norms, limited financial autonomy, and lack of confidence in using digital platforms. Participants frequently reported concerns about security, limited control over financial decisions, and restricted access to digital devices. These insights support the statistical findings by explaining why structural constraints continue to limit women's engagement with DFS despite increased availability of digital financial tools [37]. Overall, the integration of quantitative and qualitative findings highlights that the gender gap in DFS is not solely driven by access limitations, but by the interaction of structural, digital, and institutional barriers, reinforcing the need for integrated and gender-responsive interventions [44].

### 4.1. Beyond Access: The Challenge of Meaningful Use

The results indicate that increasing the number of women with digital financial accounts has not automatically translated into active and independent usage. Quantitative evidence shows that while ownership gaps are shrinking in many regions, the gap in active usage remains substantial. For example, in several emerging economies women report account ownership levels close to those of men, yet their frequency of digital transactions remains markedly lower. This finding demonstrates that access does not equal empowerment [45, 46, 47].

Qualitative data further reveal that autonomy remains limited due to household power structures and social norms. Many women reported that account passwords, SIM cards, or identity-linked devices were controlled or monitored by male family members. Some respondents expressed fear of making mistakes, being

judged, or violating perceived cultural expectations. These lived experiences illustrate that digital financial inclusion cannot be understood solely as a technological phenomenon, but also as a social one [48].

The evidence emphasizes the need for gender-intelligent digital financial product design. Women expressed preference for privacy-respecting features such as biometric authentication, discreet balance alerts, and simplified user interfaces available in local languages. These preferences reflect a broader reality in which safety, dignity, and usability are critical factors in determining whether a woman can meaningfully participate in digital financial ecosystems [49, 50].

#### 4.2. The Interplay of Barriers

The second key finding reveals that the barriers limiting women's participation in digital financial services are interconnected. Quantitative regression results indicate a strong relationship between education level, digital literacy, and likelihood of independent DFS usage. Women with higher formal education demonstrated significantly higher confidence, more frequent use, and a greater willingness to explore additional financial features such as savings, insurance, and digital credit.

The qualitative analysis provides deeper insight into this relationship. Many participants reported hesitation, confusion, or anxiety when navigating mobile applications and digital banking platforms. Limited exposure to technology, combined with fear of error or fraud, discouraged experimentation and learning. Furthermore, economic constraints restrict women's ability to access reliable internet connections, modern devices, or user support services.

Supply-side conditions also contribute to the persistence of the gap. Providers often design services based on assumptions about formal income structures that align more closely with male users. Women, however, tend to have irregular earnings, informal employment, and shared household financial responsibilities. Without tailored products that recognize these realities, the gender gap persists not because women lack demand, but because the market does not adequately acknowledge their financial patterns and needs. These findings highlight the interaction between demand-side and supply-side constraints. Limited digital literacy and socio-cultural norms reduce women's engagement, while gender-blind product design and institutional barriers further restrict access. This interaction creates a reinforcing cycle that sustains the gender gap in digital financial services.

#### 4.3. The Path to Gender Equity

The findings confirm that meaningful progress toward equity requires integrated strategies. Countries that demonstrate the greatest reduction in the gender gap are those that combine policy reforms, digital and financial literacy education, and targeted product innovation. These strategies work best when they challenge not only economic or technological barriers but also outdated cultural norms that restrict women's financial agency.

Participants who received structured learning support expressed greater confidence and independence in managing digital transactions. Training programs that combine financial literacy with digital skills were reported as significantly impactful because they addressed fear, misunderstanding, and skill limitations simultaneously. These findings suggest that governments should strengthen gender-targeted digital literacy programs and expand access to digital identification systems, while financial service providers should implement inclusive product designs such as simplified interfaces and privacy-enhancing features to better support women's participation in digital financial services. This recommendation is consistent with national policy priorities, as the Coordinating Ministry for Economic Affairs of the Republic of Indonesia emphasizes the acceleration of financial inclusion implementation to ensure broader and more equitable access to financial services [44]. This suggests that education is an essential mechanism for empowerment rather than merely a complementary measure.

The analysis also highlights the critical role of sex-disaggregated data. Institutions that actively collect and analyze gender-specific financial behavior data demonstrate more effective product development and regulatory alignment. Such data enables financial service providers and policymakers to identify underserved segments, track inclusion patterns, and measure the effectiveness of gender-responsive initiatives.

### 5. MANAGERIAL IMPLICATIONS

The results of this study provide important managerial implications for regulators, fintech providers, digital banks, non-governmental organizations (NGOs), and policymakers involved in financial inclusion. The

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findings highlight the need for regulators to design gender-responsive policies that address structural barriers such as limited access to identification, digital infrastructure, and financial literacy. Strengthening regulatory frameworks that mandate gender-disaggregated data and inclusive financial reporting can enhance monitoring and accountability in reducing the gender gap in Digital Financial Services (DFS).

For fintech providers and digital banks, the results emphasize the importance of adopting user-centered and gender-inclusive design approaches, including simplified interfaces, low-literacy features, and flexible onboarding processes. NGOs and development organizations play a critical role in delivering targeted capacity-building programs, particularly in digital and financial literacy, to empower women's participation in DFS. Overall, these findings suggest that reducing gender disparities in digital finance requires coordinated efforts across institutional, technological, and social dimensions to ensure that DFS systems are not only accessible but also equitable and inclusive.

## 6. CONCLUSION


The findings of this study demonstrate that the gender gap in Digital Financial Services (DFS) is supported by empirical evidence from both quantitative and qualitative analysis. The quantitative results confirm that gender is a statistically significant predictor of DFS usage ( $p < 0.05$ ), with women consistently less likely to own and actively use digital financial accounts compared to men. Among the independent variables, mobile phone access and education level exhibit the strongest positive effects on DFS adoption, indicating that access to technology and human capital are critical determinants of financial inclusion. These findings suggest that disparities in DFS usage are not solely driven by access availability but are strongly influenced by differences in capability and resource distribution.


The qualitative findings further reinforce these results by identifying key themes such as limited financial autonomy, restrictive socio-cultural norms, and low confidence in using digital platforms. Participants also reported concerns related to security risks and limited control over financial decision-making, which reduce their engagement with DFS. These insights provide contextual explanations for the statistical patterns observed and highlight that the gender gap is shaped by the interaction of demand-side and supply-side barriers, including digital access limitations and non-inclusive financial system design.

While this study provides robust insights through a mixed-methods approach, it is subject to several limitations, including reliance on secondary datasets for quantitative analysis and a limited number of qualitative participants. Future research should expand sample diversity, incorporate longitudinal designs, and explore behavioral and psychological dimensions influencing DFS adoption. Strengthening collaboration among policymakers, financial institutions, and technology providers will be essential to develop gender-responsive strategies that ensure digital financial services are not only accessible but also equitable and inclusive.

## 7. DECLARATIONS

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### 7.2. Author Contributions

Conceptualization: DA, MM, and BN; Methodology: DA; Software: MM; Validation: MM; Formal Analysis: DA and BN; Investigation: MM and BN; Resources: DA; Data Curation: DA and BN; Writing Original Draft Preparation: DA and BN; Writing Review and Editing: MM; Visualization: MM; All authors, DA, MM and BN, have read and agreed to the published version of the manuscript.

### 7.3. Data Availability Statement

The data presented in this study are available on request from the corresponding author.

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### 7.5. Declaration of Conflicting Interest

The authors declare that they have no conflicts of interest, known competing financial interests, or personal relationships that could have influenced the work reported in this paper.

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