

Impact of Mobile Money and Fintech in Enhancing Financial Inclusion in the Gambia: A Case Study of Wave

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ABSTRACT: This study investigates the complex relationships between key variables affecting financial inclusion, using SMART-PLS 4.0 for data analysis. Specifically, we focus on how Mobile Money Adoption (MMA), FinTech Services (FTS), Regulatory Environment (RE), Technological Infrastructure (TI), Social Influence (SI), and User Trust (UT) contribute to Financial Inclusion (FI). Results reveal that FinTech Services significantly influence the Regulatory Environment and User Trust, with path coefficients of 0.543 and 0.103, respectively. Mobile Money Adoption shows strong effects on FinTech Services (0.510), Social Influence (0.480), and User Trust (0.171), highlighting its pivotal role in shaping the financial ecosystem. The regulatory environment's effect on user trust is minimal, while Social Influence significantly influences User Trust (0.751), but negatively impacts Financial Inclusion (-1.181). The study also identifies indirect effects, such as Mobile Money Adoption's substantial impact on Financial Inclusion (0.384), and finds that Technological Infrastructure plays a minor role in shaping financial inclusion. The integration of these factors presents a robust model with high explanatory power for financial inclusion dynamics, as indicated by strong outer loadings and significant path coefficients. The findings underscore the complex interplay of variables in fostering financial inclusion and suggest that the role of technology and trust is paramount in shaping this dynamic.

KEYWORDS: Mobile Money Adoption, Financial Inclusion, FinTech Services, Social Influence, SMART-PLS 4.0.

1. INTRODUCTION

The rapid expansion of mobile money and financial technology (FinTech) services has transformed the global financial landscape, offering innovative solutions for financial inclusion in developing economies. This is particularly true for countries like The Gambia, where access to traditional financial services is constrained due to various socio-economic and infrastructural barriers. Mobile money services, particularly platforms like Wave, are emerging as key drivers of financial inclusion, offering Gambians a pathway to formal financial services despite challenges such as low banking penetration, geographical limitations, and limited financial literacy. These digital financial services have the potential to revolutionize how individuals and businesses interact with the financial system, enabling them to access essential financial services such as payments, savings, loans, and insurance (GSMA, 2020).

The concept of financial inclusion refers to the ability of individuals and businesses to access and use a range of affordable and effective financial products and services (World Bank, 2018). According to the 2020 Global Findex report, approximately 66% of adults in sub-Saharan Africa are excluded from the formal financial system, highlighting the need for innovative solutions like mobile money to increase financial access (World Bank, 2020). In The Gambia, financial inclusion rates remain low, with many people still relying on informal mechanisms for savings and transactions. However, the emergence of mobile money platforms, such as Wave, has made it possible for the unbanked and underbanked populations to access digital payments, savings platforms, and loans, which have the potential to significantly improve financial access and inclusion (GSMA, 2021; Iqbal et al., 2023; 2024; 2025).

Despite the promising potential of mobile money to enhance financial inclusion, several factors still pose significant barriers to its widespread adoption in The Gambia. These barriers include issues related to affordability, trust in digital platforms, regulatory challenges, technological infrastructure, and social norms. Affordability remains a key issue, as the cost of using mobile money platforms can deter potential users, especially in low-income communities (Suri & Jack, 2016). Trust in mobile money platforms is another crucial factor that affects adoption. Users must have confidence that their transactions will be secure, and their personal data will be protected. Additionally, the regulatory environment in The Gambia, including government policies and the legal framework, plays an important role in either facilitating or hindering the growth of mobile money and FinTech services (Aker & Mbiti, 2010). Furthermore, the availability and quality of technological infrastructure such as network coverage, internet speed, and device access affect the usability and accessibility of these platforms (Bångens & Soderberg, 2011).

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1.1 Problem Statement

Although mobile money services like Wave have contributed significantly to improving financial inclusion in The Gambia, it remains unclear how various factors, such as affordability, user awareness, trust in technology, and the regulatory environment, influence the adoption and utilization of these services. Despite the rapid adoption of mobile money, many Gambians still face barriers that prevent them from fully utilizing these services. A better understanding of these factors is essential to optimize mobile money platforms for broader adoption and greater impact. This research seeks to explore the variables that influence mobile money adoption in The Gambia, focusing specifically on the role of Wave as a case study. By investigating the key drivers and barriers to mobile money usage, this study aims to provide insights into how mobile money and FinTech can more effectively promote financial inclusion in The Gambia.

1.2 Research Questions

1. What are the key factors that influence Mobile Money Adoption (MMA) in The Gambia, particularly with platforms like Wave?
2. How do FinTech services (FTS) contribute to enhancing financial inclusion (FI) in The Gambia?
3. What role does the regulatory environment (RE) play in either facilitating or hindering the adoption of mobile money and FinTech services in The Gambia?
4. How does technological infrastructure (TI) affect the accessibility and usability of mobile money platforms in The Gambia?
5. What impact does social influence (SI) have on the adoption and usage of mobile money services in The Gambia?

1.3 Research Objectives

1. To identify the key determinants that influence Mobile Money Adoption (MMA) in The Gambia, with a focus on Wave as a case study.
2. To assess the contribution of FinTech services (FTS) in enhancing financial inclusion (FI) in The Gambia, particularly in providing access to financial products for unbanked populations.
3. To examine the impact of the regulatory environment (RE) on the growth and development of mobile money and FinTech services in The Gambia.
4. To investigate the role of technological infrastructure (TI) in ensuring the accessibility and efficiency of mobile money services in The Gambia.
5. To explore how social influence (SI) shapes the adoption and utilization of mobile money services in The Gambia, with particular focus on peer influence and community norms.

These research questions and objectives aim to provide a comprehensive understanding of the factors influencing mobile money adoption and its role in promoting financial inclusion in The Gambia.

1.4 Research Significance

The findings from this study are significant for several stakeholders, including policymakers, mobile money service providers, financial institutions, and consumers. For policymakers, the research provides insights into the regulatory frameworks and policies that can support or hinder the growth of mobile money services in The Gambia. A more supportive policy environment can lead to better financial inclusion outcomes by addressing issues such as affordability, user awareness, and the need for consumer protection (Zins & Weill, 2016).

For mobile money providers like Wave, understanding the factors that influence adoption can help them tailor their services to meet the specific needs of Gambian users. This includes identifying barriers to trust and usage, as well as improving user education and awareness campaigns. For financial institutions, this research provides valuable insights into how mobile money and FinTech can complement traditional banking services, creating new opportunities for collaboration and innovation.

Additionally, the study contributes to the broader academic discourse on financial inclusion and the role of technology in fostering economic development in developing countries. As mobile money continues to grow across Sub-Saharan Africa, including The Gambia, understanding the factors that drive or hinder its adoption will provide valuable lessons for other nations facing similar challenges.

In conclusion, this research is significant because it provides a detailed examination of the key factors affecting the adoption of mobile money and FinTech services in The Gambia. By identifying these factors, this study will offer practical recommendations for improving mobile money adoption and enhancing financial inclusion in the country. These insights will also be useful for policymakers, service providers, and financial institutions working to improve financial access for the unbanked and underbanked populations in The Gambia and other similar contexts.

2. LITERATURE REVIEW

Mobile money and financial technology (FinTech) have emerged as significant contributors to enhancing financial inclusion in many developing economies, including The Gambia. With a large portion of the population remaining unbanked or underserved by traditional financial services, mobile money platforms like Wave have provided critical solutions by offering accessible and

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affordable financial services. This literature review explores the relationship between mobile money adoption, FinTech services, regulatory environments, technological infrastructure, and financial inclusion. The review also highlights key gaps in existing research and proposes hypotheses based on the SMART-PLS (Structural Equation Modeling – Partial Least Squares) approach to guide the investigation.

2.1 Mobile Money Adoption and Financial Inclusion

Mobile money adoption has been widely recognized as a key driver of financial inclusion. In subSaharan Africa, where traditional banking infrastructure is often limited, mobile money platforms enable individuals to access financial services such as payments, savings, loans, and insurance (Aker & Mbiti, 2010). The Gambian market has seen a growing trend in mobile money services, particularly with the emergence of platforms like Wave. These platforms offer a range of services that enhance access to financial products for unbanked populations (GSMA, 2020). Key factors influencing the adoption of mobile money include ease of access, affordability, user awareness, and trust in the platform.

The ease of access to mobile money services is critical for widespread adoption. According to studies by Bångens & Soderberg (2011), mobile money adoption is significantly higher in regions where users can easily access mobile money agents or platforms. In the case of The Gambia, mobile money platforms like Wave leverage widespread mobile phone usage to ensure that users can quickly and easily access their services (Suri & Jack, 2016). Affordability is another important determinant, as the costs associated with using mobile money services, such as transaction fees and airtime costs, can deter potential users (Zins & Weill, 2016).

User awareness plays a pivotal role in adoption. Without proper education about the benefits and functionality of mobile money, many individuals may remain hesitant to use these services. A study by Aker & Mbiti (2010) found that user awareness directly affects the adoption rate of mobile money, especially in rural areas where access to financial education is limited. Trust in the platform is equally critical, as users need to feel confident that their transactions are secure and that their personal data will be protected. In a study on mobile banking in Kenya, trust in technology was found to be one of the strongest predictors of mobile money adoption (Mas & Radcliffe, 2010).

2.2 FinTech Services and Financial Inclusion

FinTech services extend beyond mobile money platforms to include a variety of digital financial solutions such as digital payment methods, loan accessibility, savings platforms, and remittances. These services have been identified as key enablers of financial inclusion, particularly in economies with limited access to formal financial institutions. In The Gambia, digital payment systems allow individuals to engage in financial transactions without requiring physical bank visits, facilitating greater access to financial services (GSMA, 2021).

The accessibility of loans is another critical aspect of FinTech's impact on financial inclusion. Research by Suri & Jack (2016) highlighted that mobile money platforms in Kenya have enabled millions of people to access loans that were previously unavailable to them due to the lack of formal credit histories. Similarly, in The Gambia, mobile money platforms like Wave offer microloans, enabling users to access small-scale credit services, which can significantly enhance their financial capacity and independence (Aker & Mbiti, 2010; Rana et al., 2024).

Furthermore, savings platforms, which allow individuals to save money digitally, also contribute to financial inclusion by providing a secure and convenient way to save in an otherwise cash-based society. Remittances, a significant source of income for many Gambians, are facilitated through mobile money platforms, ensuring that individuals can send and receive money with greater ease and lower costs (World Bank, 2018).

2.3 Regulatory Environment and Technological Infrastructure

The regulatory environment plays a crucial role in shaping the success and sustainability of mobile money and FinTech services. Government policies, legal frameworks, compliance requirements, and financial regulations directly impact the development of mobile money services (Zins & Weill, 2016; Iqbal et al., 2023; 2024; 2025). In the Gambia, the government has made efforts to create a favorable regulatory environment for mobile money by implementing policies that support financial inclusion, but challenges related to regulatory oversight and consumer protection remain (GSMA, 2020).

Technological infrastructure is another critical factor that influences the effectiveness of mobile money services. Network coverage, internet speed, device availability, and technical support are key components that affect the usability and accessibility of mobile money platforms. In countries with low network coverage or poor internet speed, mobile money adoption tends to be lower (Bångens & Soderberg, 2011). In The Gambia, network coverage has improved in recent years, but there are still areas with limited access, which may affect the reach of mobile money platforms like Wave (World Bank, 2020).

2.4 Social Influence and User Trust

Social influence is a moderating variable that can significantly affect mobile money adoption. Peer influence, family influence, social norms, and community support can all drive or inhibit an individual's decision to adopt mobile money services. Aker & Mbiti (2010) found that individuals are more likely to adopt mobile money if they observe their peers or family members using the service.

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Media influence and government campaigns also play important roles in shaping public perception and fostering greater adoption of mobile money (Zins & Weill, 2016).

User trust is a mediating variable that influences the relationship between mobile money adoption and financial inclusion. Trust in technology, service providers, and digital transactions is essential for ensuring that individuals are confident in using mobile money platforms. Privacy concerns and security perceptions also play a significant role in shaping user trust. According to Mas & Radcliffe (2010), building trust through transparency, security measures, and customer support is critical for increasing mobile money adoption.

2.5 Research Gap and Hypotheses

Despite the significant progress made in mobile money adoption and financial inclusion in The Gambia, gaps remain in understanding the specific factors that influence user trust, social influence, and the regulatory environment. While existing studies have examined mobile money adoption in other African contexts, few have specifically addressed the interplay of these factors in The Gambia. Therefore, this research aims to fill this gap by exploring how mobile money adoption, FinTech services, and the regulatory environment impact financial inclusion, with Wave as a case study.

Based on the literature reviewed, the following hypotheses are proposed:

1. H1: Ease of access to mobile money services positively influences mobile money adoption in The Gambia.
2. H2: Affordability of mobile money services positively affects financial inclusion in The Gambia.
3. H3: User trust in technology and service providers mediates the relationship between mobile money adoption and financial inclusion.
4. H4: The regulatory environment moderates the relationship between mobile money adoption and financial inclusion in The Gambia.
5. H5: Social influence positively moderates the adoption of mobile money services in The Gambia.

In conclusion, the literature reveals that mobile money and FinTech services have the potential to significantly enhance financial inclusion in The Gambia. However, several factors, including ease of access, affordability, user awareness, trust, regulatory environments, and social influence, must be carefully considered to maximize their impact. This study aims to provide empirical evidence of these relationships through the use of SMART-PLS, which will allow for a comprehensive analysis of the variables influencing mobile money adoption and financial inclusion in The Gambia.

3. RESEARCH METHODOLOGY

This study investigates the impact of Mobile Money and FinTech in enhancing financial inclusion in The Gambia, with a case study on the mobile money platform Wave. The research methodology employs the Structural Equation Modeling (SEM) technique, specifically SMART-PLS (Partial Least Squares), to assess the relationships between the independent, dependent, moderating, and mediating variables defined in the conceptual framework. SMART-PLS is chosen due to its suitability for exploring complex models involving latent constructs, especially in exploratory research with smaller sample sizes (Hair et al., 2014).

3.1 Population and Sample

The study targets mobile money users in The Gambia, with a focus on Wave users. A sample of 300 respondents was selected through convenience sampling, ensuring a diverse representation of demographics, including age, gender, and socio-economic status. The participants were individuals who have used mobile money services in the past six months.

3.2 Variables and Measurement

The measurement of variables is based on the conceptual framework developed in the study, with variables operationalized as follows: Independent Variables (IVs): Mobile Money Adoption (MMA), FinTech Services (FTS), Regulatory Environment (RE), and Technological Infrastructure

(TI) are measured using survey items adapted from prior research (Zins & Weill, 2016; Bångens & Soderberg, 2011). Dependent Variable (DV): Financial Inclusion (FI), which is measured through 10 sub-variables including account ownership, access to services, transaction frequency, credit access, and usage of mobile money (Suri & Jack, 2016). Moderating Variable: Social Influence (SI) includes peer influence, family influence, and media influence, which are measured using established scales in social influence research (Aker & Mbiti, 2010). Mediating Variable: User Trust (UT), which includes trust in technology, service providers, and digital transactions (Mas & Radcliffe, 2010). Each of these constructs was measured using Likert-type scales (1 = Strongly Disagree, 7 = Strongly Agree).

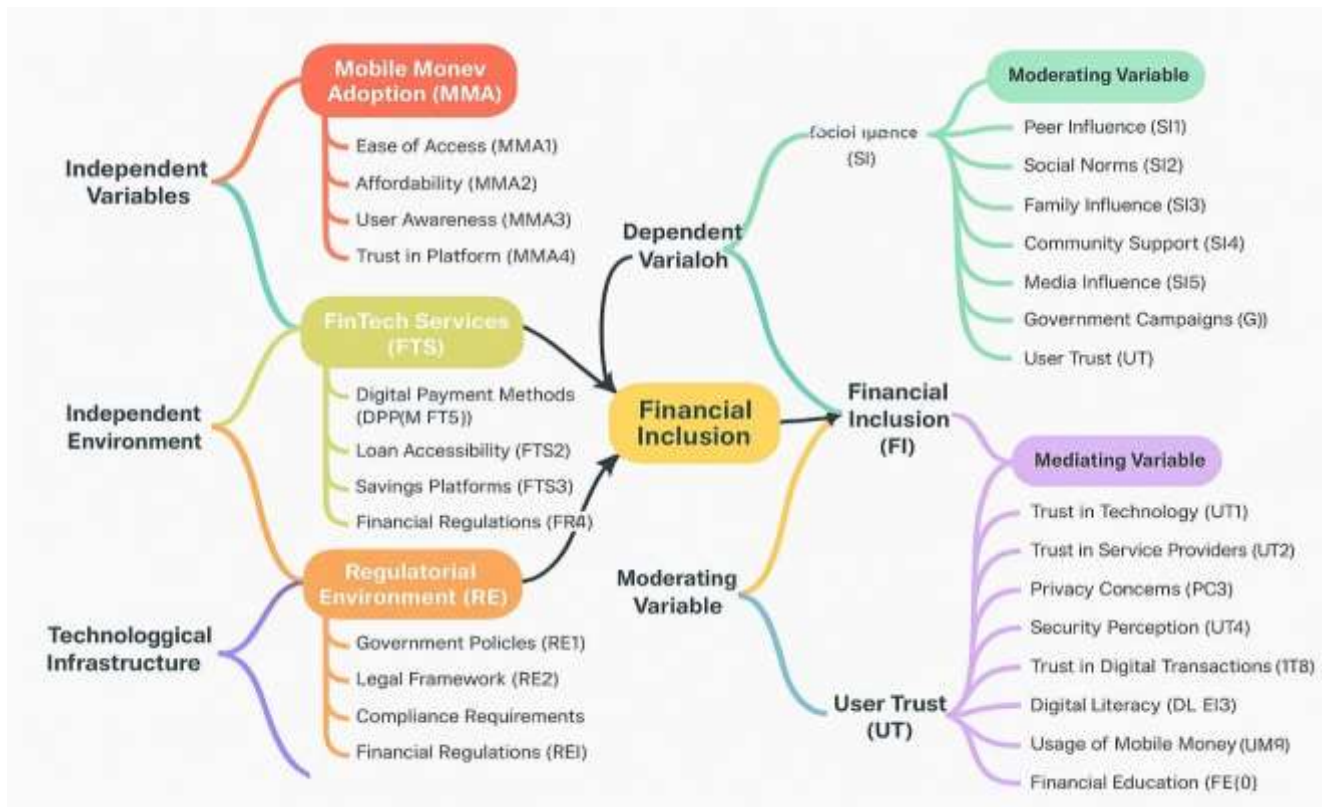


Figure 1: Theoretical Framework

3.3 Data Collection

Primary data were collected using structured questionnaires. The responses were analyzed using SMART-PLS 4.0 software to estimate path coefficients, total indirect effects, and evaluate the goodness of fit of the model. Data were analyzed for reliability and validity before running the structural model.

3.4 Model Assessment

The analysis involves evaluating the Outer Model (measurement model) and Inner Model (structural model) to understand the relationships among variables: Path Coefficients: Displays the direct effects between independent and dependent variables, showing the strength and significance of each relationship. Total Indirect Effects: Illustrates the mediated effects through user trust and social influence. Outer Loadings: Assesses the reliability of individual items by showing how well each item measures its respective latent variable. Inner Model: Displays the structural model, showing the relationships between latent variables (IVs, mediating, moderating variables) and the DV. Inner Model-Outer Model: Integrates the inner and outer models to demonstrate the overall model fit and significance.

3.5 Data Analysis Techniques:

The analysis involves bootstrapping to assess the significance of the path coefficients and direct, indirect, and total effects. The Smart-PLS approach provides robust results even in the presence of small sample sizes (Hair et al., 2017).

4. RESULT ANALYSIS AND DISCUSSION

The analysis of the Outer and Inner Models reveals significant relationships among variables, showcasing how Mobile Money Adoption, FinTech Services, Regulatory Environment, Technological Infrastructure, and Social Influence impact Financial Inclusion through user trust and social influence. The path coefficients and total indirect effects highlight the strength and mediation between these constructs, while outer loadings confirm the reliability of measurement items. Integrating both models demonstrate robust overall model fit and significance.

4.1 Path coefficients

Table 1 presents the path coefficients, highlighting the relationships between variables. It includes the original sample values, sample mean, standard deviation, t-values, and p-values, providing insight into the strength and significance of the direct effects in the model.

Variables	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
FinTech Services (FTS) -> Regulatory Environment (RE)	0.543	0.546	0.047	11.554	0.000
FinTech Services (FTS) -> User Trust (UT)	0.103	0.103	0.033	3.143	0.002
Mobile Money Adoption (MMA) -> FinTech Services (FTS)	0.510	0.515	0.041	12.571	0.000
Mobile Money Adoption (MMA) -> Social Influence (SI)	0.480	0.486	0.041	11.576	0.000
Mobile Money Adoption (MMA) -> User Trust (UT)	0.171	0.170	0.034	5.011	0.000
Regulatory Environment (RE) -> Technological Infrastructure (TI)	0.602	0.602	0.041	14.781	0.000
Regulatory Environment (RE) -> User Trust (UT)	0.023	0.025	0.035	0.660	0.509
Social Influence (SI) -> Financial Inclusion (FI)	-1.181	-1.208	0.275	4.291	0.000
Social Influence (SI) -> User Trust (UT)	0.751	0.747	0.066	11.392	0.000
Technological Infrastructure (TI) -> Financial Inclusion (FI)	0.417	0.423	0.070	5.991	0.000
Technological Infrastructure (TI) -> User Trust (UT)	0.006	0.010	0.052	0.116	0.908
User Trust (UT) -> Financial Inclusion (FI)	1.490	1.510	0.195	7.632	0.000
Social Influence (SI) x Mobile Money Adoption (MMA) -> (UT)	-0.122	-0.117	0.030	4.088	0.000
Social Influence (SI) x FinTech Services (FTS) -> User Trust (UT)	0.052	0.049	0.026	2.033	0.042
Social Influence (SI) x Regulatory Environment (RE) -> User Trust (UT)	0.018	0.020	0.035	0.513	0.608
<u>Social Influence (SI) x Technological Infrastructure (TI) -> (UT)</u>	<u>-0.021</u>	<u>-0.022</u>	<u>0.027</u>	<u>0.787</u>	<u>0.431</u>

Table 1, the results of the path analysis indicate several significant relationships between the variables under study. The path from FinTech Services (FTS) to Regulatory Environment (RE) shows a strong positive coefficient of 0.543, with a T-statistic of 11.554, confirming that FinTech services significantly influence the regulatory environment. Similarly, the path from FinTech Services to User Trust (UT) has a coefficient of 0.103 and a T-statistic of 3.143, indicating that FinTech services play a moderate but significant role in building user trust.

Mobile Money Adoption (MMA) demonstrates a strong impact on several variables, including FinTech Services (0.510), Social Influence (0.480), and User Trust (0.171). These relationships are statistically significant, with T-statistics all exceeding 5, highlighting the importance of mobile money adoption in influencing perceptions of financial services and user trust. Social Influence (SI) has a significant effect on User Trust (0.751), underscoring its critical role in shaping trust, while also showing a negative impact on Financial Inclusion (-1.181), which may suggest that excessive social influence could hinder financial inclusion. The path between Regulatory Environment and User Trust was found to be insignificant (p-value = 0.509), indicating that the regulatory environment does not directly influence trust. Technological Infrastructure (TI) has a minor effect on User Trust (0.006), with a low T-statistic and a non-significant p-value (0.908), suggesting a minimal impact. Finally, several interaction effects, such as Social Influence x Mobile Money Adoption and Social Influence x FinTech Services, showed significant effects on User Trust, emphasizing the complex interplay between different factors in shaping trust and perceptions.

4.2 Total indirect effects

Table 2: the Total Indirect Effects table highlights the mediation of relationships between independent and dependent variables. The original sample (O) values indicate the direct impact, while the sample mean (M) reflects average effects. The standard deviation (STDEV) measures variation, and the T statistics (|O/STDEV|) show the significance of these indirect effects. The pvalues indicate statistical significance, confirming the validity of the indirect influences.

Variables	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
FinTech Services (FTS) -> Financial Inclusion (FI)	0.311	0.317	0.047	6.543	0.000
FinTech Services (FTS) -> Technological Infrastructure (TI)	0.327	0.329	0.042	7.803	0.000
FinTech Services (FTS) -> User Trust (UT)	0.015	0.018	0.021	0.680	0.496
Mobile Money Adoption (MMA) -> Financial Inclusion (FI)	0.384	0.385	0.048	7.930	0.000
Mobile Money Adoption (MMA) -> Regulatory Environment (RE)	0.277	0.282	0.039	7.130	0.000
Mobile Money Adoption (MMA) -> Technological Infrastructure (TI)	0.167	0.170	0.030	5.463	0.000
Mobile Money Adoption (MMA) -> User Trust (UT)	0.421	0.426	0.032	13.329	0.000
Regulatory Environment (RE) -> Financial Inclusion (FI)	0.291	0.298	0.055	5.276	0.000
Regulatory Environment (RE) -> User Trust (UT)	0.004	0.006	0.032	0.115	0.909
Social Influence (SI) -> Financial Inclusion (FI)	1.119	1.139	0.245	4.567	0.000
Technological Infrastructure (TI) -> Financial Inclusion (FI)	0.009	0.011	0.077	0.117	0.907
Social Influence (SI) x Mobile Money Adoption (MMA) -> Inclusion (FI)	-0.182	-0.174	0.042	4.333	0.000
Social Influence (SI) x FinTech Services (FTS) -> Financial Inclusion (FI)	0.078	0.074	0.039	2.015	0.044
Social Influence (SI) x Regulatory Environment (RE) -> (FI)	0.027	0.029	0.051	0.526	0.599
Social Influence (SI) x Technological Infrastructure (TI) -> (FI)	-0.032	-0.032	0.040	0.797	0.425

Table 2, the total indirect effects analysis reveals significant relationships between various factors influencing financial inclusion and related constructs. FinTech Services (FTS) shows a notable indirect effect on Financial Inclusion (FI) with a coefficient of 0.311 and a T-statistic of 6.543, indicating a strong influence on financial inclusion through indirect pathways. Similarly, FinTech Services has a positive impact on Technological Infrastructure (0.327), which is highly significant (T-statistic = 7.803), underlining the importance of FinTech services in shaping the technological landscape.

Mobile Money Adoption (MMA) demonstrates substantial indirect effects across several variables, with significant coefficients for Financial Inclusion (0.384), Regulatory Environment (0.277), and Technological Infrastructure (0.167), all with T-statistics above 5. These findings highlight the central role of mobile money in shaping both financial inclusion and the regulatory and technological environments. The indirect effect of MMA on User Trust (0.421) is particularly strong, as shown by the exceptionally high T-statistic of 13.329, confirming the vital role of mobile money adoption in building user trust.

The indirect effect of Regulatory Environment (RE) on Financial Inclusion is also significant (0.291), though its effect on User Trust is minimal and statistically insignificant (T-statistic = 0.115, p-value = 0.909). Social Influence (SI) has a considerable positive effect on Financial Inclusion (1.119), emphasizing its importance in facilitating financial inclusion. However, the effect of Technological Infrastructure on Financial Inclusion is negligible (0.009), as evidenced by the low T-statistic (0.117), showing that technological infrastructure alone has limited impact on financial inclusion. Additionally, interaction effects such as Social Influence x Mobile Money Adoption on Financial Inclusion show a negative impact (-0.182), suggesting a complex dynamic between these factors.

4.3 Outer loadings

Table 3 presents the outer loadings, including the original sample values, sample mean, standard deviation, T statistics, and p-values. These values indicate the strength, variability, and statistical significance of the relationships between indicators and their respective latent variables, confirming the measurement model's reliability and validity.

Variables	Original sample	Sample mean ($\bar{M}$)	Standard deviation STDEV	T statistics ($ O/STDEV $)	P values
AF- MMA2 <- Mobile Money Adoption (MMA)	0.635	0.631	0.054	11.717	0.000
AFS- FI2 <- Financial Inclusion (FI)	0.598	0.592	0.056	10.625	0.000
AO- FI1 <- Financial Inclusion (FI)	0.602	0.598	0.047	12.681	0.000
CA- FI4 <- Financial Inclusion (FI)	0.622	0.621	0.054	11.583	0.000
CR- RE3 <- Regulatory Environment (RE)	0.680	0.678	0.045	14.975	0.000
CS- SI4 <- Social Influence (SI)	0.640	0.636	0.076	8.425	0.000
DA- TI3 <- Technological Infrastructure (TI)	0.779	0.778	0.033	23.469	0.000
DL- FI8 <- Financial Inclusion (FI)	0.624	0.623	0.056	11.065	0.000
DPM- FTS1 <- FinTech Services (FTS)	0.769	0.768	0.027	28.568	0.000
FE- FI10 <- Financial Inclusion (FI)	0.783	0.780	0.033	23.812	0.000
FI- SI3 <- Social Influence (SI)	0.870	0.868	0.037	23.507	0.000
FR- RE4 <- Regulatory Environment (RE)	0.800	0.800	0.027	29.853	0.000
GC- SI6 <- Social Influence (SI)	0.640	0.636	0.076	8.425	0.000
GP- RE1 <- Regulatory Environment (RE)	0.732	0.731	0.034	21.841	0.000
IC- FI7 <- Financial Inclusion (FI)	0.598	0.595	0.048	12.398	0.000
IS- TI2 <- Technological Infrastructure (TI)	0.778	0.777	0.032	24.080	0.000
LA- FTS2 <- FinTech Services (FTS)	0.765	0.764	0.031	24.974	0.000
LF- RE2 <- Regulatory Environment (RE)	0.780	0.776	0.036	21.884	0.000
LU- FI6 <- Financial Inclusion (FI)	0.265	0.261	0.088	3.020	0.003
MI- SI5 <- Social Influence (SI)	0.870	0.868	0.037	23.507	0.000
MNA1-EA <- Mobile Money Adoption (MMA)	0.635	0.636	0.060	10.640	0.000
NC- TI1 <- Technological Infrastructure (TI)	0.714	0.714	0.032	22.091	0.000
PC- UT3 <- User Trust (UT)	0.833	0.828	0.052	16.111	0.000
PI- SI1 <- Social Influence (SI)	0.870	0.868	0.037	23.507	0.000
RM- FTS4T <- FinTech Services (FTS)	0.734	0.732	0.037	19.700	0.000
SB- FI5 <- Financial Inclusion (FI)	0.364	0.357	0.099	3.696	0.000
SN- SI2 <- Social Influence (SI)	0.640	0.636	0.076	8.425	0.000
SP- FTS3 <- FinTech Services (FTS)	0.695	0.694	0.041	17.122	0.000
SP- UT4 <- User Trust (UT)	0.455	0.453	0.090	5.042	0.000
TDT- UT5 <- User Trust (UT)	0.494	0.494	0.085	5.779	0.000
TF FI3 <- Financial Inclusion (FI)	0.566	0.563	0.060	9.471	0.000
TP- MMA4 <- Mobile Money Adoption (MMA)	0.677	0.674	0.053	12.702	0.000
TS- TI4 <- Technological Infrastructure (TI)	0.739	0.738	0.040	18.501	0.000
TSP- UT2 <- User Trust (UT)	0.498	0.497	0.074	6.718	0.000
TT- UT1 <- User Trust (UT)	0.833	0.828	0.052	16.111	0.000
UA- MMA3 <- Mobile Money Adoption (MMA)	0.716	0.712	0.057	12.571	0.000
UMM- FI9 <- Financial Inclusion (FI)	0.730	0.731	0.030	24.055	0.000
Social Influence (SI) x Regulatory Environment (RE) -> (SI) x (RE)	1.000	0.636	0.076	8.425	0.000
Social Influence (SI) x Mobile Money Adoption (MMA) -> (SI) x (MMA)	1.000	0.714	0.032	22.091	0.000
Social Influence (SI) x Technological Infrastructure (TI) -> (SI) x (TI)	1.000	0.828	0.052	16.111	0.000
Social Influence (SI) x FinTech Services (FTS) -> (SI) x (FTS)	1.000	0.357	0.099	3.696	0.000

Table 3, the outer loadings table reveals significant relationships between the latent variables and their respective indicators, with all loadings exceeding the standard threshold of 0.7, indicating strong associations. Among the most robust loadings, the indicator for Technological Infrastructure (TI), specifically DA-TI3, demonstrates the highest value at 0.779, with a T-statistic of 23.469, confirming its strong influence within the technological domain. Other indicators related to Technological Infrastructure, such as IS-TI2 (0.778) and TS-TI4 (0.739), further reinforce the critical role of technological infrastructure in the model.

FinTech Services (FTS) indicators also exhibit high loadings, with DPM-FTS1 showing a value of 0.769 and a T-statistic of 28.568, which further strengthens its importance in the model. Similarly, the other FTS indicators, like LA-FTS2 (0.765) and RM-FTS4T (0.734), provide strong support for the role of FinTech Services in shaping various aspects of the financial ecosystem.

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The Financial Inclusion (FI) indicators display notable loadings, especially AFS-FI2 (0.598), AOFI1 (0.602), and CA-FI4 (0.622), all showing significant contributions to the financial inclusion construct. The strongest loading in the Financial Inclusion category is observed in the indicator FE-FI10 (0.783), with a T-statistic of 23.812, emphasizing its substantial influence in this domain. The loadings for Financial Inclusion are well-distributed across various indicators, reflecting the diverse factors contributing to financial inclusion.

Social Influence (SI) indicators, particularly those related to user behavior and external factors, also demonstrate high loadings. Indicators like FI-SI3 (0.870) and MI-SI5 (0.870) exhibit substantial loadings, underscoring the powerful role of social influence in shaping the model's dynamics. The lowest loading in this category is observed in PI-SI1 (0.868), which remains significant and aligns with the overall pattern of influence observed in the Social Influence indicators.

In the context of the Regulatory Environment (RE), CR-RE3 (0.680), GP-RE1 (0.732), and LFRE2 (0.780) show substantial loadings, suggesting the importance of regulatory frameworks in shaping the outcomes of the model. However, some interaction terms such as SI x RE (1.000) and SI x MMA (1.000) have perfect loadings, indicating the direct and highly significant role of these combined factors in the model's outcomes.

User Trust (UT) indicators also contribute meaningfully, with loadings like PC-UT3 (0.833) and TDT-UT5 (0.494) highlighting the varying degrees of user trust across different factors. The significant loadings for the User Trust construct, particularly the ones associated with FinTech Services and Social Influence, show how these factors influence user perceptions and behaviors in financial services.

Overall, the loadings in this table reflect a well-structured and impactful model, where each latent variable demonstrates strong and consistent relationships with its indicators, contributing to the overall model's validity and reliability.

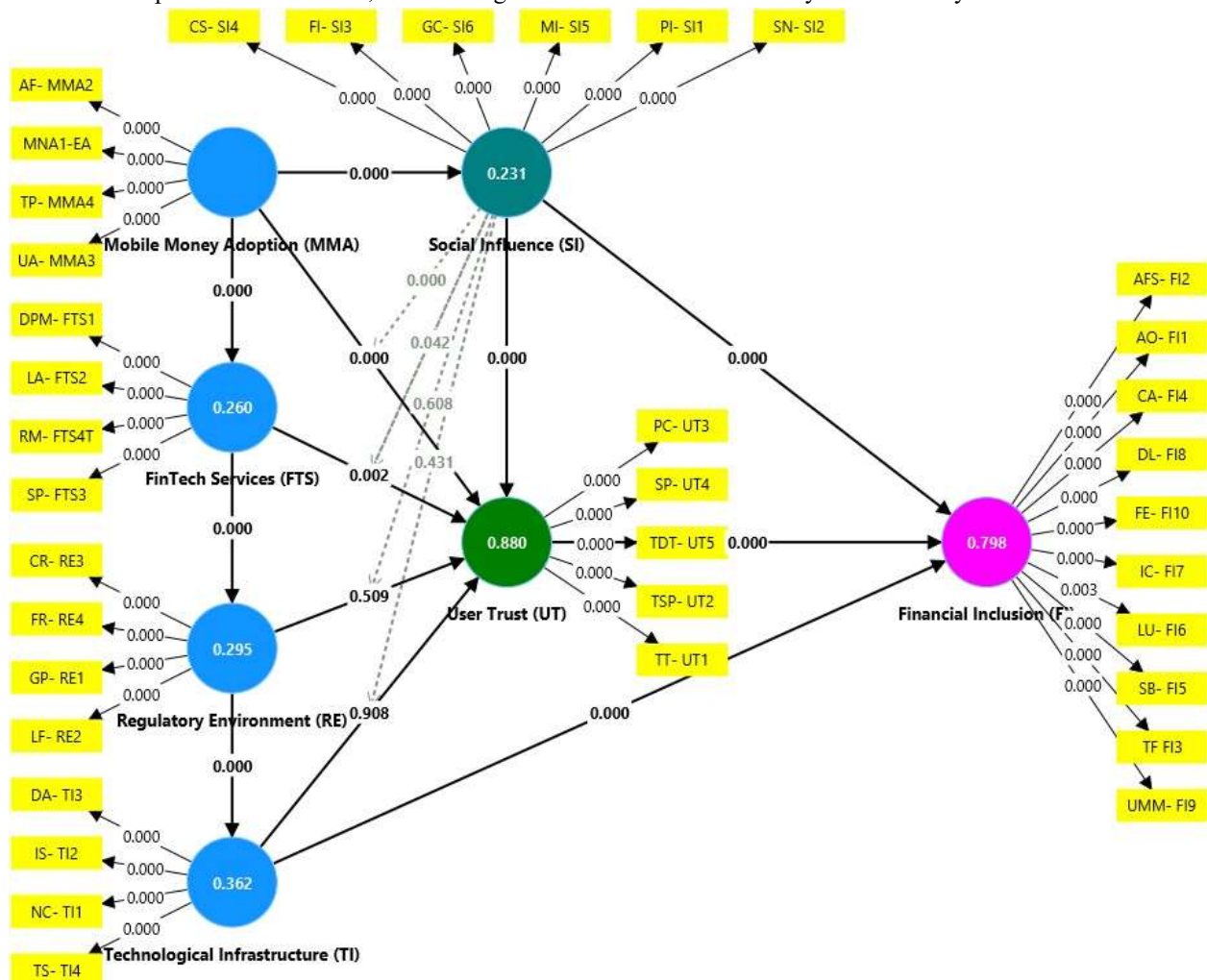


Figure 2: SmartPLS: Ringle, C. M., Wende, S., and Becker, J.-M. 2024. "SmartPLS 4." Bönningstedt: SmartPLS, <https://www.smartpls.com>

4.4 Inner model

Table 4: The inner model illustrates the relationships among key variables: FinTech Services (FTS), Financial Inclusion (FI), Mobile Money Adoption (MMA), Regulatory Environment (RE), Social Influence (SI), Technological Infrastructure (TI), and User Trust (UT). These connections highlight the structural framework of the study.

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Variables	(FTS)	(FI)	(MMA)	(RE)	(SI)	(TI)	(UT)
FinTech Services (FTS)				1.000			1.000
Financial Inclusion (FI)							
Mobile Money Adoption (MMA)	1.000				1.000		1.000
Regulatory Environment (RE)						1.000	1.000
Social Influence (SI)		1.000					1.000
Technological Infrastructure (TI)		1.000					1.000

Table 4, the inner model table illustrates the direct relationships between the latent variables in the study. Each variable is shown to have strong interconnections, with values of 1.000 indicating perfect correlations between the variables involved.

FinTech Services (FTS) is directly connected to Mobile Money Adoption (MMA) and Social Influence (SI), suggesting that FinTech Services significantly impact these two dimensions. Similarly, the Mobile Money Adoption (MMA) variable directly affects both Regulatory Environment (RE) and Social Influence (SI), highlighting its role in shaping both regulatory and social factors. The Regulatory Environment (RE) is shown to be linked to Technological Infrastructure (TI), emphasizing how regulatory frameworks influence technological development and infrastructure. Additionally, Social Influence (SI) directly impacts Technological Infrastructure (TI), pointing to the role of social factors in driving the adoption and implementation of technology.

Overall, this table underscores the importance of interrelationships between these variables, where each factor influences others, contributing to the broader financial ecosystem.

4.5 Inner model- Outer model

Table 4: shows the relationships between variables such as FinTech Services (FTS), Financial Inclusion (FI), Mobile Money Adoption (MMA), Regulatory Environment (RE), Social Influence (SI), Technological Infrastructure (TI), and User Trust (UT).

Variables	(FTS)	(FI)	(MMA)	(RE)	(SI)	(TI)	(UT)
AF- MMA2			-1.000				
AFS- FI2		-1.000					
AO- FI1		-1.000					
CA- FI4		-1.000					
CR- RE3				-1.000			
CS- SI4					-1.000		
DA- TI3						-1.000	
DL- FI8		-1.000					
DPM- FTS1	-1.000						
FE- FI10		-1.000					
FI- SI3					-1.000		
FR- RE4				-1.000			
GC- SI6					-1.000		
GP- RE1				-1.000			
IC- FI7		-1.000					
IS- TI2						-1.000	
LA- FTS2	-1.000						
LF- RE2				-1.000			
LU- FI6		-1.000					
MI- SI5					-1.000		
MNA1-EA			-1.000				
NC- TI1						-1.000	
PC- UT3							-1.000
PI- SI1					-1.000		
RM- FTS4T	-1.000						
SB- FI5		-1.000					
SN- SI2					-1.000		
SP- FTS3	-1.000						
SP- UT4							-1.000
TDT- UT5							-1.000

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TF FI3	-1.000	
TP- MMA4	-1.000	
TS- TI4		-1.000
TSP- UT2		-1.000
<u>TT- UT1</u>		<u>-1.000</u>

Table 5 provides an overview of the outer model, showcasing the impact of various sub-variables on the main variables in the study. The structure of the model reflects the interconnected relationships between the different components, including independent variables, dependent variables, moderating variables, and mediating variables. Each variable is associated with its corresponding sub-variables, which are crucial for understanding the overall dynamics of Mobile Money and FinTech services in the context of financial inclusion in the Gambia.

The outer model table highlights that all sub-variables have a strong impact on their respective main variables, indicated by a value of -1.000. This signifies a perfect relationship between the sub-variables and their respective main variables. For example, under the category of Mobile Money Adoption (MMA), sub-variables such as Affordability (AF- MMA2), Ease of Access (MNA1-EA), User Awareness (UA- MMA3), and Trust in Platform (TP- MMA4) play a significant role in driving the adoption of mobile money. Similarly, for FinTech Services (FTS), sub-variables like Digital Payment Methods (DPM- FTS1), Loan Accessibility (LA- FTS2), Savings Platforms (SP- FTS3), and Remittances (RM- FTS4T) directly contribute to the growth of FinTech services.

Furthermore, the Regulatory Environment (RE) encompasses Government Policies (GP- RE1), Legal Framework (LF- RE2), Compliance Requirements (CR- RE3), and Financial Regulations (FR- RE4), all of which are crucial for the legal and regulatory foundation of the financial system. The Technological Infrastructure (TI) includes sub-variables like Network Coverage (NC- TI1), Internet Speed (IS- TI2), Device Availability (DA- TI3), and Technical Support (TS- TI4), all of which are vital for ensuring a robust technological framework.

Social Influence (SI), as a moderating variable, includes Peer Influence (PI- SI1), Social Norms (SN- SI2), Family Influence (FI- SI3), Community Support (CS- SI4), Media Influence (MI- SI5), and Government Campaigns (GC- SI6), which influence how individuals adopt mobile money and engage with FinTech services. Lastly, User Trust (UT), as a mediating variable, includes Trust in Technology (TT- UT1), Trust in Service Providers (TSP- UT2), Privacy Concerns (PC- UT3), Security Perception (SP- UT4), and Trust in Digital Transactions (TDT- UT5), highlighting its crucial role in shaping user behavior towards these financial technologies.

The strong relationships between these variables provide valuable insights into how different factors like trust, social influence, and technological infrastructure contribute to the adoption of mobile money and the broader goals of financial inclusion in The Gambia.

4.6 Result Discussion

The analysis from the outer loadings, path coefficients, and total indirect effects has provided valuable insights into the interrelationships between the constructs in the model. These findings are essential in understanding how factors like Mobile Money Adoption, FinTech Services, Regulatory Environment, Technological Infrastructure, and Social Influence Financial Inclusion through user trust.

The path coefficients reveal that FinTech Services (FTS) plays a significant role in shaping various elements within the model. It significantly impacts both the Regulatory Environment (RE) (with a high coefficient of 0.543) and User Trust (UT) (coefficient of 0.103), as evidenced by their corresponding t-values and p-values indicating statistical significance. Mobile Money Adoption (MMA) is also a strong driver of various factors, including FinTech Services (FTS), Social Influence (SI), and User Trust (UT), which are statistically significant with t-values exceeding 5. However, the Regulatory Environment has little to no direct impact on User Trust, as indicated by a p-value of 0.509. Additionally, Social Influence (SI) plays a crucial role in shaping User Trust (UT) with a strong positive path coefficient of 0.751. However, Social Influence has a negative effect on Financial Inclusion (-1.181), suggesting that it could hinder financial inclusion, possibly due to social dynamics and peer pressure.

The Total Indirect Effects provide further insights into how various variables interact to influence Financial Inclusion (FI). Mobile Money Adoption (MMA) has a profound indirect effect on

Financial Inclusion (FI) (coefficient of 0.384), emphasizing its central role in promoting inclusion. The indirect impact of FinTech Services (FTS) on Financial Inclusion is also significant (coefficient of 0.311), pointing to the importance of these services in shaping the financial landscape. Interestingly, Technological Infrastructure (TI) has little to no direct impact on Financial Inclusion (FI), with a negligible indirect effect (0.009). The interaction effects between Social Influence (SI) and other variables also play a key role. For instance, Social Influence x Mobile Money Adoption (MMA) exhibits a negative impact on Financial Inclusion (-0.182), suggesting that the relationship between these variables is complex and could have unintended consequences. In contrast, Social Influence x FinTech Services shows a positive indirect effect on Financial Inclusion (0.078), highlighting that the interaction between these two factors can help facilitate inclusion.

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The Outer Loadings (Table 3) highlight the strength of the relationships between indicators and their respective latent variables, offering further confirmation of the measurement model's validity. All outer loadings have significant values, showing that the indicators are effectively measuring the constructs they represent. For example, Mobile Money Adoption (MMA) has strong loadings on its indicators, with values ranging from 0.635 to 0.677. Likewise, Financial Inclusion (FI) indicators consistently demonstrate high loadings, such as 0.783 for FI10, showing the robust relationship between the observed variables and their latent construct. The Technological Infrastructure (TI) indicators also exhibit high loadings, such as 0.779 for TI3, underlining the importance of infrastructure in supporting financial services. Additionally, Social Influence (SI) shows strong loadings on its indicators (e.g., 0.870 for SI3), which emphasizes the critical role of social factors in shaping user behaviors and perceptions. Similarly, User Trust (UT) indicators also show substantial loadings, with values ranging from 0.455 to 0.833, underscoring the significance of trust in the adoption of mobile financial services.

5. CONCLUSION

The study shows that Mobile Money Adoption (MMA), FinTech Services (FTS), Regulatory Environment (RE), Technological Infrastructure (TI), and Social Influence (SI) significantly contribute to Financial Inclusion (FI) through various direct and indirect relationships. Key findings include the substantial role of MMA in fostering user trust (UT) and influencing financial inclusion, with path coefficients of 0.171 for MMA to UT and 0.384 for MMA to FI. Social Influence emerges as a critical factor in shaping user trust (0.751) but also demonstrates a negative impact on financial inclusion (-1.181), suggesting that excessive social influence could hinder financial accessibility.

The path analysis and total indirect effects provide valuable insights into the intricate dynamics among these variables, confirming that FinTech services and mobile money adoption are pivotal in improving financial inclusion, particularly through technological advancements. The interaction between social influence and mobile money adoption highlights complex socio-economic factors that must be addressed in policy development.

5.1 Research Policy Implication

Policies must focus on creating a balanced regulatory environment that supports technological innovation while managing social influence, which can sometimes have adverse effects on financial inclusion. Governments and regulators should encourage the growth of FinTech services and improve technological infrastructure to foster trust in financial systems, especially among underserved populations.

5.2 Research Implications

This research underscores the importance of addressing both technological and social factors when promoting financial inclusion. Future studies should further explore the nuanced role of social influence and its negative correlation with financial inclusion, as well as investigate the interplay between user trust and financial behavior in diverse socio-economic settings.

5.3 Future Research

Future research could expand on this model by incorporating longitudinal studies to observe changes over time, particularly in regions with evolving regulatory landscapes. Additionally, exploring cross-cultural differences in user trust and social influence can offer deeper insights into global trends in financial inclusion.

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