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# A Cross-Country Analysis of Mobile Money Drivers and Inclusion Outcomes

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## Abstract

This study examines socioeconomic factors that shape financial inclusion through mobile money services across 102 low- and middle-income countries between 2017 and 2021. This research was motivated by persistent gaps in access to formal financial systems. The variables of research are education, employment, economic development, and digital connectivity influence the adoption and use of mobile money. Using World Development Indicators data, the analysis uses descriptive statistics, correlation patterns, and log-log OLS regression models to capture different phases of digital financial expansion. The results show that education and mobile access were the strongest drivers of inclusion in 2017. This in turn underscores the importance of basic literacy and connectivity in early adoption. By 2021, these effects weakened as digital penetration increased (all while broader structural factors became more influential). The findings suggest that financial inclusion significantly changes/evolves over time. This may be because when digital access becomes widespread, progress depends less on connectivity and more on economic conditions, institutional quality, and demographic structure. The study contributes to ongoing policy discussions by emphasizing that sustainable financial inclusion requires coordinated investments in education, digital infrastructure, and economic opportunity, particularly in low-income/rural settings.

**Keywords:** Mobile Money, Financial Inclusion, Education, Employment, Digital Access, Developing Economies.

**JEL Classifications:** O33, G20, D31, I32, O57

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## Introduction

Financial inclusion has become a linchpin of sustainable development. Over the last two decades, mobile money has emerged as one of the most effective tools for closing gaps to traditional financial access. These gaps are protuberant in low- and middle-income countries where traditional banking systems remain underdeveloped. With the global shift toward digital finance in the last century, an understanding of the key drivers of mobile money usage has become central to evaluating progress toward inclusive growth (to in turn ensure equality). Despite measurable progress, inclusion remains uneven. Low-income economies continue to lag, with persistent barriers linked to education, employment, and digital access.

It is imperative to define key terms. In this paper, mobile money refers to financial services delivered through mobile phones and used as the main measure of financial inclusion. Financial inclusion is the access to and use of formal or digital financial services across countries. Education reflects the level of schooling and literacy that shapes a population's ability to understand and adopt mobile money. Employment represents how participation in the labor market affects access to financial tools, whether through formal or informal work. Digital access describes the availability of mobile networks, internet use, and overall connectivity that enable individuals to use mobile-based financial services. Developing economies are the low- and middle-income countries in the dataset, where varying levels of education, employment, and digital infrastructure create different patterns of mobile money adoption.

Previous research and literature have often examined these patterns in isolation or within single regions. This in turn leaves a gap in the understanding of how key socioeconomic factors influence mobile money usage in conjunction across different income groups over time. Thus, to deepen this understanding, this study examines the determinants of mobile money usage as a measure of financial inclusion across low- and middle-income economies from 2017 to 2021.

This study utilizes a descriptive and econometric approach. Among others a correlation and ordinary least squares (OLS) regression analysis. Additionally, the study investigates the interrelationship between education, employment, economic growth, and digital access which in turn shapes financial inclusion trends in the years 2017 and 2021. By analyzing recent cross-country data, this study offers insights for policymakers aiming to leverage education, employment, and digital infrastructure to promote more equitable access to financial services.

This paper reviews the existing research, explains how the data was sourced, and motivates the question studied. It then outlines the model and methods, presents the main results, and closes with a discussion of their implications and a brief conclusion.

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## Literature Review

Research on mobile money in Sub-Saharan Africa consistently shows that digital finance has become one of the most effective channels for expanding financial inclusion, especially in regions where conventional banking services remain limited. The work by Ahmad, Green and Jiang (2020) underscore how mobile money lowers transaction costs, enhances security, and provides a viable substitute for formal banking. It also stressed that its success depends on regulatory openness, agent network reach, and broader market structure. Donovan (2012) underscores these points in tracing the rise of mobile money through models like Kenya's M-Pesa. This shows that large-scale adoption depends not only on technological availability but also on trust in agents, liquidity management, and strong network effects. Both works highlight a common thread: mobile money has clear potential to reduce financial exclusion, but usage patterns still mirror deeper institutional and infrastructural inequalities.

Other studies across the region reinforce this picture. Tchouassi (2012) finds that countries with greater mobile phone penetration and stronger mobile money ecosystems experience higher levels of financial inclusion, especially in rural/low-income regions. Similar evidence appears in Myeni, Makate and Mahonye (2020), who show that mobile money offers outsized benefits for rural households in Eswatini, although the most marginalized populations remain difficult to reach. Akinyemi and Mushunje (2020) further emphasize the role of socioeconomic characteristics, showing that education, income, mobile phone ownership, and bank account status significantly shape both the decision to adopt mobile money and the volume of transactions. Mahmoud (2019) adds nuance by showing that literacy boosts active engagement even when it doesn't fully determine registration, and that lower-income economies depend more heavily on mobile money than higher-income countries, which tend to rely on established banking systems.

More recent research widens this notion. For example, Simione and Muehlschlegel (2023) demonstrate using micro-level data from Uganda that mobile money users are more likely to save, borrow, and engage with financial services than non-users, suggesting that digital finance can deepen inclusion beyond basic payments. A complementary cross-country perspective appears in newer global analyses such as the 2024 study on digital financial inclusion and remittances. The 2024 study shows that mobile penetration interacts with remittance inflows to reduce poverty in developing economies, underscoring how digital access amplifies income flows from migration. These broader results align with earlier work by Sarma and Pais as well as repeated Global Findex findings (e.g., Demirgüç-Kunt et al.), which document persistent income-based disparities in financial access and show that education, employment, and income stability remain central determinants of account ownership and digital finance use worldwide.

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The importance of digital infrastructure is also highlighted in studies focusing on mobile network coverage. Mothobi (2024) shows that fintech adoption rises sharply in areas with reliable mobile connectivity, pointing to infrastructure as a primary driver of whether households can use mobile money at all. Earlier work by Aker and Mbiti had reached similar conclusions, and more recent case studies (for example: Chiang et al. (2018) on user-interface design and perceptions) highlight how usability and digital literacy shape whether individuals trust and regularly engage with mobile money platforms.

Regional comparisons broaden the understanding of how context matters. Evidence from Vietnam, for instance, suggests that trust, simplicity, and social influence significantly affect mobile money uptake, reinforcing findings from Africa that user confidence and agent accessibility determine whether digital financial tools translate into actual usage. At the same time, cross-regional work underscores the persistence of gender gaps, with numerous studies (including Suri and Jack's work) showing that women often gain disproportionately from mobile money but remain constrained by phone ownership, digital skills, and social norms.

Evidence from India further supports the role of mobile-based digital finance in expanding financial inclusion in large developing economies. Haque, Azeez, and Akhtar (2023) find that India's Unified Payments Interface (UPI) has significantly increased financial participation in rural areas by lowering transaction costs and enabling digital transactions among previously unbanked households and informal workers. Their results indicate that while widespread mobile access facilitates adoption, effective usage depends on digital literacy and institutional trust. Similarly, Ozili (2024) shows that policy-driven digital infrastructure, particularly the Jan Dhan–Aadhaar–Mobile (JAM) framework, has expanded access to formal financial services, but persistent gaps remain across education levels, gender, and income groups. Together, these findings suggest that once digital access becomes widespread, education and institutional factors play a larger role in shaping financial inclusion outcomes than connectivity alone.

Taken together, this literature establishes several consistent patterns. Mobile money expands financial inclusion most effectively in settings where people lack traditional banking options, mobile networks are widespread, and households possess at least basic levels of education and digital literacy. Yet, even in high-performing ecosystems, access remains uneven across income levels, gender, age, and geographic regions. Low-income households and rural communities benefit from mobile money but continue to face barriers tied to affordability, device ownership, and digital access. Moreover, many studies show that mobile money complements rather than replaces formal banking, meaning that broader economic and institutional conditions continue to structure long-term financial inclusion.

The literature also indicates that the role of mobile money in financial inclusion differs by income level. In low-income economies, mobile money often substitutes for traditional banking,

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with connectivity and basic literacy as key constraints. In middle-income economies, mobile money increasingly complements formal financial systems, and education, employment structure, and institutions become more important. In high-income economies, digital finance is less about access and more about service quality and consumer protection. These differences motivate a comparative analysis across income groups and over time.

Despite extensive work, important gaps persist. Several authors note that evidence remains overly concentrated in a small set of high-profile cases like Kenya; cross-country data often lacks consistency; and there is limited causal analysis of long-run welfare effects, growth outcomes, or the interaction of multiple socioeconomic factors. Much of the literature isolates individual determinants such as education, income, or digital access, leaving less clarity on how these variables combine to shape financial inclusion across different income groups and over time. These limitations provide the motivation for the present study, which brings together several socioeconomic indicators to examine how education, employment, economic conditions, and digital access jointly influence mobile money usage between 2017 and 2021.

## Data and Data Sourcing

The study uses data from the World Development Indicators (provided by the World Bank) for 102 countries. The study focuses on primarily the years 2017 and 2021 due to data availability.

Variables include: account ownership at a financial institution or with a mobile-money-service provider (% of population ages 15+); account ownership (female, male, older adults, poorest 40%, primary education or less, richest 60%, secondary education or more, young adults); mobile cellular subscriptions (per 100 people); GDP per capita (constant 2015 US$); GDP (constant 2015 US$); educational attainment at least completed lower secondary (female, male, total); at least completed post-secondary (female, male, total); at least completed primary (female, male, total); at least Bachelor's or equivalent (female, male, total); employment-to-population ratio, 15+, total (%); individuals using the internet (% of population); access to electricity, rural (% of rural population); urban (% of urban population); and population, male and female (% of total population).

## Motivation

| | Low-Income Countries | | Middle-Income Countries | | High-Income Countries | |
|---|---|---|---|---|---|---|
| | 2017 | 2021 | 2017 | 2021 | 2017 | 2021 |
| poor | 44.48 | 51.239 | 57.82 | 63.94 | 93.17 | 95.96 |
| rich | 37.468 | 46.90 | 57.10 | 62.21 | 94.16 | 96.07 |

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| | | | | | | |
|---|---|---|---|---|---|---|
| female | 37.23 | 45.63 | 53.56 | 59.85 | 92.04 | 95.44 |
| male | 67.19 | 77.03 | 95.81 | 97.19 | 99.98 | 99.98 |
| primary education | 28.50 | 35.56 | 43.34 | 51.71 | 88.76 | 93.34 |
| secondary education | 29.04 | 37.12 | 42.13 | 48.38 | 83.11 | 88.38 |

***Table 1*** presents the average percentage of financial inclusion across different countries in 2017 and 2021. It is disaggregated by underlying factors such as educational level. Source: Author's calculations using data from the World Bank (World Development Indicators).

This data displays an amelioration in the financial inclusion between 2017 and 2021 in all income groups and countries, however low-income countries and middle-income countries exhibited a more substantial increase whereas high-income countries showed a relatively lower increase. In low-income countries, account ownership among the poorest increased from 44.48 to 51.23 percent. Showing a similar trend, in middle-income countries financial inclusion increased from 57.82 to 63.94 percent. High-income countries, which already had widespread, almost universal, access, saw only slight growth from 93.17 to 95.96 percent among the poorest. This indicates that progress becomes slower as countries become wealthier. Hence, these findings serve as motivation as they imply that income alone may not be the driving factor for these results. Looking at relative changes further highlights this pattern. For the poorest group in low-income countries, this increase represents a relative gain of approximately 15 percent. Similarly, women in low-income countries experienced an increase from 37.23 percent to 45.63 percent, a relative gain of about 23 percent, which is substantially larger than the proportional gains observed in high-income economies. This suggests that while absolute increases are smaller in richer countries, relative improvements are concentrated in poorer and more excluded populations.

Furthermore, while both men and women saw a general improvement in financial inclusion, the data still demonstrated a significant gap in progress between the two. In low-income countries, women's account ownership improved from 37.23 to 45.63 percent, but men's grew from 67.19 to 77.03 percent. This gap is narrower yet still evident in middle- and high- income economies. The evidence demonstrates a persistent and higher degree of financial inclusion for men. The sustained presence of this financial inclusion gap implies that institutional social and educational impediments persist in limiting the complete economic integration of women.

Beyond other considerations, educational level is an important facet that shapes a population's ability to engage with the financial services sector. Among low-income countries, ownership among those with only primary education rose from 28.50 to 35.56 percent. Contrary to those

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with primary education, financial inclusion for those with secondary education increased from 29.04 to 37.12 percent. This trend is also reflected in middle-income and high-income countries. Therefore, one can propose that education may escalate confidence and awareness in using formal financial systems. This can, however, be countered as the dissemination of the knowledge of mobile money services occurred regardless of education level in a nation. In turn, there may be confounding variables present beyond education alone. Thus, the trend of variation in financial inclusion visible through the lens of educational attainment contributed to the motivation of this study.

Other factors for this trend may include the rapid growth in the usage of digital technology and mobile money. Between 2017 and 2021 there was a substantial increase in mobile cellular subscriptions and internet usage. This possibly may have contributed to this growth. Digital tools are what may have contributed to this augment. Additionally, the years of data chosen correspond with COVID-19 which likely may have accelerated digital adoption worldwide. Social distancing and lockdowns severely restricted movement and closed physical bank branches and businesses. This, in turn, forced consumers and businesses alike to seek and adopt remote, digital transaction methods to continue financial activities. This may help explain the steady rise in account ownership, particularly in low- and middle-income countries, as people and institutions shifted to remote and digital transactions.

An amalgamation of these findings motivated this study.

## Methodology and Model

The research employed a descriptive design, and it was supplemented by correlational and regression analyses. Firstly, the data underwent a log-log transformation to ensure linearity and meet the assumptions of the analytical techniques. This is because the variables are measured in different units (percentages, counts, currency) and the log-log transformation standardizes the scale. Subsequently, initial exploratory data analysis was conducted via a scatterplot matrix and two-way scatter plots to identify emergent patterns and associations among the variables. Ordinary Least Squares (OLS) regression was then applied to investigate the relationship between financial inclusion and selected socioeconomic factors. The synthesis of descriptive statistics, visual analysis, and regression modeling yielded a more strong understanding of the factors influencing financial account ownership and mobile money service usage across different countries.

## Results and Inferences

For the purposes of this study income code 0 refers to low-income countries whereas income code 1 refers to middle-income countries. As above stated, the data went through a log-log

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transformation to enforce linearity. 'Lg_Edu' refers to the education level of a nation; the data has undergone a log transformation. 'Lg_Emplo' refers to employment and is log-transformed. 'Lg_GDP' is the log-log transformed Gross Domestic Product (GDP) of a country. 'Lg_GDP_PC' refers to the Gross Domestic Product per capita of a nation; the data has undergone a log transformation. 'Lg_Mobile' is the log-transformed data of mobile subscriptions in a country. Finally, 'Lg_Population_(year)' refers to the log transformed population in a particular year.

| | Income Code 0 (MMSP) | Income Code 1 (MMSP) |
|---|---|---|
| Lg_Edu | 0.5624 | 0.5624 |
| Lg_Emplo | -0.4024 | -0.4024 |
| Lg_GDP | 0.23 | 0.23 |
| Lg_GDP_PC | 0.2322 | 0.2322 |
| Lg_Mobile | 0.3491 | 0.3491 |
| Lg_Pop_2017 | 0.1555 | 0.1555 |

***Table 2***: Correlation Coefficients Between Mobile Money Service Provider (MMSP) Usage and Key Socioeconomic Variables (2017). Source: Author's calculations on STATA using World Development Indicators (World Bank, 2017)

Table 2 is the correlation analysis for 2017 between a plethora of socioeconomic factors and the dependent variable (mobile money service providers). The correlation analysis expounds that education (Lg_Edu = 0.5624) has the strongest positive correlation with mobile money usage across both income groups (income code 0 and income code 1). This is a finding that is consistent with existing literature (Akinyemi, 2020; Simione and Muehlschlegel, 2023). This positive correlation indicates that, due to better financial literacy and familiarity with technology, people with higher education levels are more likely to use mobile money services. The strong relationship also implies that digital and financial awareness enable inclusion as it allows individuals to understand, trust and adopt mobile-based financial platforms (more readily than those who are not).

Table 2 also demonstrates that employment (Lg_Emplo = -0.4024) is negatively correlated with mobile money usage. This inverse relationship suggests that unemployed individuals rely more on mobile money for daily transactions. This can possibly be attributed to the fact that formal employees have better access to traditional banking services (and are not reliant on mobile money for day-to-day transactions). The negative sign in the correlation analysis propounds that mobile money can serve as an alternate financial channel for unemployed/underemployed individuals (who are typically unbanked as well). Thus, mobile money services may compensate for limited access to financial institutions.

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Furthermore, GDP (Lg_GDP = 0.23) and GDP per capita (Lg_GDP_PC = 0.23) both show moderate positive correlations. This implies that higher national incomes (and thus higher GDPs) show moderate positive correlations. This imbues that higher national income levels are linked with higher mobile financial services (which means higher financial inclusion). In spite of this, the moderate/highly weak relationship indicates that economic prowess and development is not the sole driver that facilitates financial inclusion.

Additionally, mobile subscriptions (Lg_Mobile = 0.35) expound a positive correlation. This, in turn, reinforces the role of digital connectivity in sanctioning financial participation (Abdulkareem, 2019; Mothobi, 2023). The data suggests that a greater access to mobile devices directly supports the spread of mobile services (and thus financial inclusion).

Lastly, population (Lg_Pop_2017 = 0.16) shows a weak positive relationship with mobile services. This means that demographics alone do not strongly influence mobile services. It can be understood that large populations may expand the user base for these mobile services but they do not mandate equal access.

Overall, Table 2 highlights that education and mobile access are the most deciding and influential factors correlated with mobile money usage.

| | Income Code 0 (MMSP) | Income Code 1 (MMSP) |
|---|---|---|
| Lg_Edu | 0.79 | 0.57 |
| Lg_Emplo | -0.60 | -0.39 |
| Lg_GDP | 0.57 | 0.21 |
| Lg_GDP_PC | 0.95 | 0.54 |
| Lg_Mobile | 0.42 | 0.12 |
| Lg_Pop_2021 | 0.25 | -0.01 |

***Table 3:*** Correlation Coefficients Between Mobile Money Service Provider Usage and Key Socioeconomic Variables (2021). Source: Author's calculations on STATA using World Development Indicators (World Bank, 2021)

Table 3 is the correlation analysis for 2021 between a plethora of socioeconomic factors and the dependent variable (mobile money service providers). In 2021, the correlation between education (Lg_Edu) and mobile money usage (MMSP) strengthened further for low-income economies (0.79) and remained moderately high for middle-income ones (0.57). This trend delineates the idea that when education level increases, adoption of mobile money expands. Thus, this result reinforces the finding that education is one of the most influential factors while discussing

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mobile money service and therefore financial inclusion. Furthermore, the relatively stronger coefficient (0.79) for income code 0 (low-income countries) perhaps means that education plays a larger role in environments in which traditional banking infrastructure and financial literacy are still developing.

Furthermore, the results in Table 3 propound that employment (Lg_Emplo) continues to show an anticorrelation with the variable MMSP in both income groups: for income group 0 it is -0.60 and for income group 1 it is -0.36. This indicates the theory that unemployed or informally employed individuals are more dependent on mobile money systems for financial access. This trend also aligns with the idea that mobile money provides an alternative financial platform for those excluded from formal labor markets (i.e. people who are unemployed).

Additionally, Table 3 shows that GDP (Lg_GDP) and GDP per capita (Lg_GDP_PC) show stronger positive correlations in 2021 compared to 2017. GDP's correlation increased to 0.57 for low-income economies (income code 0) and GDP per capita increased to 0.97 (it is the highest coefficient in the data set). This suggests that rising national income and individual prosperity both promote mobile money adoption. This trend may possibly be reflecting broader economic digitization and consumer purchasing power. Into the bargain, the higher GDP per capita implies that correlation may point to the idea that individuals in better-performing economies have greater resources and perhaps incentives to engage in formal/digital financial systems.

Mobile subscriptions (Lg_Mobile) continue to remain positively correlated (0.42 for low-income, 0.12 for middle-income) in 2021 (this reflects the trend shown in 2017). Subsequently, it confirms that mobile connectivity continues to underpin access to mobile money platforms. However, the lower value in middle-income economies suggests that once digital access becomes widespread, other structural factors begin to matter, conceivably more than just connectivity.

Finally, population (Lg_Pop_2021) shows a weak positive relationship for low-income economies (0.25) and a negligible or slightly negative one for middle-income (-0.01). This also reflects the findings of 2017. Therefore, effectively implying that demographic scale alone has limited/very low influence on financial inclusion outcomes.

| **Base Model** | OLS Regression | |
|---|---|---|
| **Dependent Variable** | Lg_Mobile_Money_Service_Provider_2017 | |
| **Explanatory Variables** | **Coefficients** | |
| Economies | Low-Income Economies | Middle-Income Economies |

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| | | |
|---|---|---|
| Lg_Edu | 0.54** | 0.18** |
| Lg_Emplo | 11** | -0.58* |
| Lg_GDP | -12.2** | 0.04 |
| Lg_GDP_PC | 0 | 0.16 |
| Lg_Mobile | 16.51** | 0.17 |
| Lg_Pop_2017 | -55.89** | 0 |
| p-value: p* < 0.1 , p** < 0.05 , p*** ≤ 0.01 | | |

Table 4: OLS Regression Results for Mobile Money Service Provider Usage in Low- and Middle-Income Economies (2017). Note: ***, *, * indicate significance at the 1%, 5%, and 10% levels respectively. Author's calculations on STATA using World Development Indicators (World Bank, 2017).

Table 4 is the OLS regression results for mobile money service provider usage in income code 0 and 1 in the year 2017. This regression model ascertains education (Lg_Edu) as a significant positive determinant of mobile money usage across both low- and middle-income economies. For income group 0, the coefficient 0.54 (which has a significance at 5%) designates mobile money usage to rise substantially as education increases (which is in alignment with the results of the correlation analysis). This reflects the importance of literacy and financial awareness in promoting digital financial inclusion. Furthermore, the effect, while smaller, remains significant in middle-income economies (0.18**). This shows that education continues to support inclusion even in more developed countries/contexts/environments.

Furthermore, employment which is denoted by Lg_Emplo shows a positive and significant relationship (11**) in low-income economies. Perhaps due to their greater disposable income and need for secure payment methods, this finding alludes to the idea that individuals with stable employment are more likely to adopt mobile money services. In contrast, in middle-income economies, the coefficient becomes negative (-0.58*). This implies that formal employment provides better access to traditional financial services thus would reduce the relative dependence on mobile money platforms.

Additionally, Table 4 demonstrates that GDP (Lg_GDP) has a negative and statistically significant effect (-12.2**) in low-income economies. This indicates that, despite economic growth, the benefits of this aforementioned growth may not be evenly distributed. Thus, wealth concentration may be limiting financial inclusion through mobile money. It suggests that GDP growth alone does not necessarily translate directly into wider access to digital financial services. In middle-income economies, GDP has a small positive but insignificant coefficient (0.04). This means that there is a limited, almost negligible effect.

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Moreover, GDP per capita (Lg_GDP_PC) is statistically insignificant in both income group 0 and income group 1. This could imply that average income levels do not strongly determine mobile money usage once other factors (all other confounding variables present) are controlled for. This highlights that individual or household-level characteristics (including but not limited to: education and employment) may play a stronger role than macroeconomic averages.

Next, mobile subscriptions which is denoted by Lg_Mobile have a large and highly significant positive coefficient which is 16.51** in low-income economies. This further emphasizes the notion that technological access and connectivity are among the most powerful enablers of financial inclusion through mobile money (this finding is harmonious with the results of the correlation analysis of 2017). On the contrary, this same effect is smaller and insignificant (0.17) in middle-income countries, likely because mobile access is already near universal (hence its explanatory power is significantly reduced).

Finally, population (Lg_Pop_2017) has a large negative and significant coefficient (-55.89**) in low-income economies. This indicates the suggestion that higher population levels might strain infrastructure and limit inclusive access to digital finance. More analytically, these results could reflect challenges in rural outreach and uneven network coverage across densely populated or geographically dispersed areas.

| Base Model | OLS Regression | |
|---|---|---|
| Dependent Variable | Lg_Mobile_Money_Service_Provider_2021 | |
| Explanatory Variables | Coefficients | |
| Economies | Low-Income Economies | Middle-Income Economies |
| Lg_Edu | 0.54 | 0.25** |
| Lg_Emplo | 0 | -0.59 |
| Lg_GDP | 1.34 | 0 |
| Lg_GDP_PC | 0 | -0.24 |
| Lg_Mobile | 0 | -0.15 |
| Lg_Pop_2021 | -1.25 | 4.04 |
| p-value: p* < 0.1 , p** < 0.05 , p*** ≤ 0.01 | | |

Table 5: OLS Regression Results for Mobile Money Service Provider Usage in Low- and Middle-Income Economies (2021)

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Note: ***, *, * indicate significance at the 1%, 5%, and 10% levels respectively. Source: Author's calculations on STATA using World Development Indicators (World Bank, 2021).

Table 5 is the OLS regression results for mobile money service provider usage in income code 0 and 1 in the year 2021. The data reflects the trend visible in 2017: the relationship between education (Lg_Edu) and mobile money usage remains positive for both income groups. The coefficient for low-income economies which is 0.54 is similar to 2017, but it loses statistical significance. This loss in statistical significance suggests that while education still matters, its influence may have plateaued (possibly because basic/rudimentary digital literacy became more widespread). In contrast, middle-income economies show a smaller but statistically significant effect of 0.25**. This indicates that higher education continues to enhance financial inclusion in moderately developed settings/countries/environments where usage is becoming more sophisticated.

Furthermore, Table 5 shows that employment (Lg_Emplo) has a coefficient of 0.00 for low-income economies and -0.59 for middle-income ones. This finding implies that employment status had little predictive power for mobile money usage by 2021. Possibly, this may be a reflection of how digital financial services have become accessible across both formal and informal employment segments. This accessibility may have reduced the employment-based disparities observed in earlier years (particularly through the data analysis of 2017).

Moreover, GDP which is typified by Lg_GDP currently has a coefficient that turned positive (1.34) for low-income economies but remains statistically insignificant. This insignificance and positive correlation creates counsels that while economic activity contributes to expanding mobile money systems, the effect is not strong enough to be decisive/potent facet. For middle-income economies, GDP's impact is negligible with a coefficient of exactly 0.00. This underprops the conviction that macroeconomic growth alone does not guarantee deeper financial inclusion.

Furthermore, GDP per capita (Lg_GDP_PC) continues to be insignificant in both income groups (0 and 1). Additionally, it turns slightly negative (-0.24) for middle-income economies. This alludes to the fact that average income levels are no longer a consistent driver of mobile money adoption once technological and educational factors are considered (this notion is further reinforced by the aforementioned correlation analysis). This supports the view that inclusion is now more determined by digital infrastructure and behavioral factors/facets than by income growth alone.

Next, the coefficient for mobile subscriptions (Lg_Mobile) declines sharply to 0.00 for low-income nations in 2021. It is -0.15 for middle-income economies. This thus indicates that by

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2021, connectivity had largely reached saturation. It can be understood that mobile access is now (in 2021) a baseline condition rather than a differentiating factor for mobile money participation.

Finally, population (Lg_Pop_2021) shows contrasting effects: a mild negative coefficient (-1.25) in low-income economies and a strong positive (4.04) in middle-income economies. This shift possibly may suggest that in more developed regions, higher populations now correlate with larger, denser mobile money ecosystems. Contrarily, in poorer countries, large populations still pose logistical and infrastructural barriers to this very financial inclusion.

## Discussion

The principal purpose of this study was to identify key determinants of financial inclusion in low-income and medium-income nations. Inclusion remains unequal in these regions. Hence the analysis of which socioeconomic and technological factors most influence adoption is pivotal. Mobile money service provider usage was used as a proxy for financial inclusion, and this captures the share of individuals using formal or digital financial systems. Independent variables such as education, employment, GDP, mobile connectivity, and population were selected to represent the human, economic, and structural conditions that shape financial access (especially in these regions). Predominantly, the results reveal that while financial inclusion increased across income groups, the drivers of inclusion evolved over time. Education and mobile connectivity were dominant enablers in 2017, but by 2021, economic development and population dynamics played a larger role. This discussion interprets these results in light of existing literature and global evidence.

In 2017, inclusion was largely access-driven, it was an early stage of digital finance growth. Education and mobile connectivity were the strongest predictors of mobile money usage. This suggests that literacy and digital familiarity were important enablers during the early adoption phase. GDP and income levels played secondary roles, implying that inclusion at this stage was less about wealth and more about technological reach and awareness. By 2021, in contrast, inclusion became more structure-based, it reflected a more mature stage of digital finance growth. Education and mobile access remained positive but less influential, reflecting a stage of digital saturation. Instead, economic indicators such as GDP and GDP per capita gained importance as mobile money became more embedded within formal financial systems. Population effects also shifted, suggesting that demographic and structural conditions increasingly determine how financial inclusion scales. These changes instantiate a broader transition: financial inclusion has moved from being primarily driven by access and literacy to being sustained by economic and institutional factors. Thus, it can be concluded that when countries reach higher levels of digital penetration, inclusion becomes less about connecting people and more about ensuring equitable participation within these established financial ecosystems.

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The results indicate that while financial inclusion has expanded between 2017 and 2021, the factors influencing it have evolved. Early growth was driven by improvements in education and digital connectivity, but as access became widespread, structural and economic variables began to dominate. This shift reflects the transition from early-stage adoption to deeper integration of mobile money into national financial ecosystems. Education remains the most consistent driver of inclusion. While its marginal effect may have declined, literacy and awareness determine how effectively individuals use digital finance tools. Thus, the results of this paper suggests that governments and financial institutions should expand financial education programs, especially for women and rural populations. It is imperative to ensure digital literacy accompanies technological expansion. Expanding mobile access alone no longer guarantees inclusion (as proven by the data). As mobile penetration approaches saturation, policy should focus on improving service quality and affordability. Encouraging innovation in credit, savings, and insurance products can deepen financial inclusion. Reliable networks and well-supported agent systems remain critical, particularly in rural and remote regions. Furthermore, economic development has become a key determinant of inclusion. As digital finance becomes mainstream, sustained inclusion depends on employment opportunities and income equality. Expanding mobile-based credit for small enterprises, linking mobile money to wage payments, and supporting micro-entrepreneurship can buttress both financial and economic inclusion. Population growth and demographic differences influence inclusion unevenly. Low-income economies with large, dispersed populations face infrastructure constraints that limit financial access. Expanding rural electrification, internet connectivity, and mobile agent networks should accompany financial inclusion strategies to ensure equitable access.

To summarize, the paper through an analysis of the data suggests the following policies:

1. Strengthen financial and digital literacy programs: The development of national financial education strategies that integrate digital skills and financial management into school curricula and adult learning. This would target women, rural populations and informal workers and these groups of people are most affected by financial exclusion. This can be done through public-private partnerships.
2. Enhance digital infrastructure and mobile service quality: Governments should focus from expanding coverage to improving reliability, affordability, and speed of mobile and internet services. This in turn would promote interoperability between banks and mobile money platforms to reduce costs and expand reach of mobile services.
3. Integrate financial inclusion with employment and entrepreneurship policy:
    a. Link mobile money platforms to wage payment systems for informal workers and small businesses.
    b. Expand access to microcredit and savings products through mobile channels, especially for youth and women entrepreneurs.
4. Expand rural agent networks and infrastructure

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5. Promote inclusive regulation and gender-sensitive policy: A method of achieving this goal can be mandating financial access through simplified KYC (Know Your Customer) processes and women-targeted financial products
6. Align mobile money systems with national development goals

Overall, the results of this study align with existing evidence that mobile money continues to drive financial inclusion. However, this study reveals that the determinants of the expansion of this very financial inclusion are evolving. Sustaining inclusion in the coming years will depend less on access and more on addressing other variables including educational, economic, and institutional inequalities that shape how individuals engage/interact with digital finance.

## Conclusion

This study set out to examine the factors influencing financial inclusion through mobile money services across 102 countries, using data from the World Development Indicators for 2017 and 2021. A comprehension of these facets is critical for policymakers that aim to promote inclusive growth and digital access. The results show that education and digital access were the strongest drivers of mobile money usage in 2017. This, in turn, highlights the importance of human capital in early financial inclusion. By 2021, the influence of GDP, employment, and demographic structure became more prominent, hence indicating that as access expands, deeper economic and institutional factors start shaping participation in digital finance. The findings suggest that promoting financial inclusion now requires a more overarching policy focus. Thus, it can be deduced that merely expanding mobile access is not enough; policies must enhance the quality and diversity of financial services all while addressing employment and income inequality. Future research should build on this analysis by exploring causal relationships and incorporating gender and behavioral dimensions of inclusion. More granular data could also help assess how policy interventions translate into sustained digital engagement/inclusion. Overall, the path to full financial inclusion will depend on how effectively countries combine education, technology, and economic policy.

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