

Leveraging Financial Technology (FinTech) to Enhance Financial Inclusion: Evidence from Saudi Arabia

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Year:

2026

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1. Introduction

In the last ten or so years there has been a kind of silent revolution in the financial services sector across the globe, not by the traditional or established banks and institutions, but by a movement of digital innovation often referred to as Financial Technology, also known as FinTech. Mobile banking apps, digital wallets, peer-to-peer lending sites, crowdfunding platforms, robo-advisory applications, and blockchain-based payment systems have contributed to the transformation of how individuals save, borrow, invest, and transfer money. What started as an intrusion in the developed economies has slowly extended to the emerging markets where the possibility of accessing the hitherto unserved is arguably even greater.

Financial inclusion - in its broadest sense, it can be described as meaningful access to and use of formal financial services - is one of the more intractable development challenges of our era. According to the 2022 Global Findex report by the World Bank, there are some 1.4 billion unbanked adults in the world, the vast majority of whom reside in developing and middle-income nations. To such people, being locked out of formal finance is not just a nuisance, but it constrains their capacity to smooth consumption, to absorb economic shocks, to invest in education or health and to engage in formal economic life. The spillover effects to poverty reduction, inequality, and sustainable growth are well-reported.

Saudi Arabia is at a curious cross-section of these world trends. The Kingdom is a highly-income, fast-digitizing economy that is experiencing an ambitious national transformation with Vision 2030. Since 2018, the Saudi Central Bank, SAMA, and the Capital Market Authority have launched regulatory sandboxes, FinTech licensing schemes, and a national financial inclusion policy. The volume of mobile payments has increased significantly, and applications such as STC Pay and Apple Pay have gained a significant user base within a comparatively short time. The Kingdom leads regional counterparts in terms of FinTech infrastructure by most metrics.

But there is little empirical evidence of whether such infrastructural development has in fact yielded better financial inclusion results, especially to women, youth, lower-income households, and smaller cities. Majority of the current studies on Saudi FinTech are more supply-side oriented: regulatory development, startup ecosystems, and investment flows. There is a dearth of demand-side research on who actually uses these services, who is being left behind, and what are the factors that explain the disparity.

This research proposal will fill that gap. It will be the purpose of the study to quantitatively investigate how the adoption of FinTech, which is measured in various

dimensions, affects the outcome of financial inclusion among individuals and small businesses in Saudi Arabia and what the moderating effects of digital literacy and institutional trust are on this relationship. The proposal is organized according to the requirements of Mid Ocean University and includes all the parts of Chapter One, including the problem statement and up to the methodology and references.

1.1. Problem Statement

By all measures, Saudi Arabia has seen its financial sector take significant steps towards digital modernization. The volume of cashless transactions has increased significantly, smartphone access is over 95 percent of adult users and regulatory assistance of FinTech has been steady and increasing. The requirements of broad-based financial inclusion sound good on paper.

In reality, though, a more complex scenario is involved. A number of structural and behavioral loopholes still exist that do not allow the technology-inclusion connection to be as direct as policymakers would like:

Patterns of FinTech adoption are not even. The use of digital financial applications is also strongly skewed towards urban and educated and comparatively higher-income groups - the very groups that were already financially included. The gains have been relatively low among the peripheral and rural populations.

The gender differences in the use of financial services though decreasing have not disappeared. Although women have greatly increased their economic involvement under Vision 2030, women have not adopted FinTech services, particularly credit and investment platforms, as much as men have and the reasons behind the disparity are not clearly comprehended.

Small and micro enterprises still claim to have restricted access to formal credit as a binding growth constraint, despite the proliferation of digital lending platforms. It is not clear how much of these platforms are targeting underserved businesses and not the already-banked clients.

Trust is still a major challenge. The most common obstacles are cybersecurity issues, data protection fears, and overall mistrust of non-bank financial operators, especially among older adults and those with less prior experience of formal banking.

These developments have not been followed up in the academic literature. The literature on the FinTech-financial inclusion nexus in the GCC setting remains relatively immature, with most of the literature either qualitative-oriented or limited in the scope of its coverage to adoption intentions instead of inclusion outcomes. The modulating factors that define whether adoption of FinTech will lead to real financial inclusion, especially digital literacy, trust, have received virtually no quantitative consideration in the Saudi context.

1.2. Significance of Research

Scientific (Theoretical) Importance

The contribution of this study to the academic community is based on a number of contributions that are interrelated. Firstly, it provides empirical data on a context, a high-income, fast-digitizing, largely-Islamic, Gulf state, which is truly different than the developing-country contexts that predominate the existing FinTech-inclusion literature. Saudi Arabia is neither a low-income nation where FinTech can be used as a first-access solution nor a fully developed financial market, it is an analytically interesting mid-ground that has been systematically under-explored.

In addition to context, the research contributes theory by creating and testing a unified model to synthesize the components of the Technology Acceptance Model (Davis, 1989) and the Unified Theory of Acceptance and Use of Technology 2 (Venkatesh et al., 2012) in a financial inclusion context based on the multidimensional conceptualization of the Alliance for Financial Inclusion. The integration of these frameworks has been promoted in the methodological literature but seldom realized in a single empirical study.

The study also has a methodological contribution in that it developed and validated a purpose-specific measurement tool of the Saudi FinTech-inclusion context, which can be used as a template that can be replicated in further GCC-based research. Finally, by disaggregating both FinTech adoption and financial inclusion by demographic subgroup, the study generates granular empirical evidence that is currently absent from the literature.

Practical (Applied) Importance

As a practitioner, the study has a number of direct applications. In the case of SAMA and the CMA, it will give them an evidence base to refine the national financial inclusion strategy -

what FinTech services are producing inclusion benefits, who is being left out, and what policy levers are most likely to work. In the case of FinTech companies, the results provide insights into product design, distribution approach, and the importance of trust-building communication in stimulating adoption in the currently underserved groups. In the case of university and corporate training providers, the digital literacy gap data indicates the existence of educational intervention opportunities. And to researchers and postgraduate students in the Gulf region, the validated instrument and the tested conceptual model provides a convenient starting point to subsequent work.

1.3. Research Objectives

General Objective: To explore how the adoption of Financial Technology (FinTech) influences financial inclusion among individuals and small businesses in the Kingdom of Saudi Arabia and to determine which factors mediate or mediate this relationship.

Specific Objectives

- To estimate the existing degree and trends of FinTech usage among the target population, considering demographic and geographic differences.
- To quantify the current degree of financial inclusion, on the access, usage, and quality scales, among Saudi people and small businesses.
- To explore how certain dimensions of FinTech, such as mobile payments, digital credit, e-wallets, InsurTech, and digital investment platforms, affect the results of financial inclusion.
- To determine the most important moderating variables - especially digital literacy and institutional trust - that determine the strength of the relationship between FinTech and financial inclusion.
- To offer a conceptual model and policy recommendations that can be applied to utilize FinTech in the financial inclusion agenda in Saudi Arabia.

Research Questions

Principal Research Question

How does the adoption of Financial Technology (FinTech) affect the financial inclusion of people and small businesses in Saudi Arabia?

Subsidiary Research Questions

- What is the current FinTech adoption rate of the study population, and how it differs between demographic subgroups such as gender, age, income, and geographic location?
- What is the current degree of financial inclusion - access, use, and quality - and what groups are still most out of the reach of formal financial services?
- How much does the uptake of mobile payment technologies influence the outcomes of financial inclusion?
- What does the presence of digital lending platforms have on access to finance by small enterprises and underserved people?
- Research Question: Which is the moderating effect of digital literacy on the relationship between FinTech adoption and financial inclusion outcomes?
- What institutional and trust-based obstacles do not allow full implementation of the potential of FinTech in Saudi Arabia?

Research Hypotheses

The hypotheses below were derived from the research questions and the theoretical and empirical literature reviewed in the following section. The null hypothesis is given in relation to each alternative hypothesis.

Main Hypothesis

- H1 (Main): There is a statistically significant positive effect of FinTech adoption on financial inclusion of individuals and small enterprises in Saudi Arabia.
- H0 (Main): There is no statistically significant difference in the use of FinTech on the financial inclusion of individuals and small enterprises in Saudi Arabia.

Sub-Hypotheses

- H1a / H0a: The use of mobile payment technologies positively affects financial inclusion statistically significantly / does not affect financial inclusion statistically significantly.
- H1b / H0b: The utilization of digital credit and lending platforms is positively linked with enhanced access to finance by small enterprises / is not linked to enhanced access to finance.
- H1c / H0c: Digital literacy has a positive moderating effect on the relationship between FinTech adoption and financial inclusion / does not have a positive moderating effect on the relationship.
- H1d / H0d: There is a positive correlation between institutional trust and FinTech adoption rates / no significant relationship between institutional trust and FinTech adoption rates.
- H1e / H0e: There are statistically significant differences in the level of financial inclusion depending on demographic factors (gender, age, income, location) / there are no statistically significant demographic differences in the level of financial inclusion.

2. Previous Studies / Literature Review

The following review is structured thematically in three groups: global and cross-national research on FinTech and financial inclusion; research that specifically addresses the GCC and Saudi context; and research that examines the moderating effects of digital literacy and institutional trust. At the end of this section there is a summary comparison table.

2.1. FinTech and Financial Inclusion: Scope and Evidence.

In a broad-based review of the financial inclusion literature, published by the Forum of Social Economics, Ozili (2021) drew upon evidence gathered in the developing world as a whole to demonstrate that mobile money adoption is the most reliably reported source of inclusion benefits. The review has reviewed dozens of country-level studies published within the last decade and identified a common theme: digital finance is most likely to reach the unbanked at scale when it is combined with a robust mobile infrastructure and a regulatory environment that favors non-bank providers. Its extensive scope has made it one of the most-referenced syntheses in the discipline, but its intentionally aggregated character implies that country-specific processes, including those that have produced the unique context of Saudi Arabia, are not discussed separately.

The 2022 Global Findex report by Demirguc-Kunt, Klapper, Singer, and Ansar is, in most aspects, the main empirical point of reference in the field. Based on nationally representative surveys in 148 countries, report reported that 76 percent of adults around the world now have a formal account - an increase of only 51 percent in 2011 - yet observed that the rate of increase has been disproportionate. Digital payment adoption was found to be the only proximal driver of growth in account ownership since 2017. Notably to the current research, the report identified that even in countries with well-established FinTech industries, there were still gender and income disparities in financial service utilization, indicating that infrastructure does not necessarily lead to inclusion.

Published in Journal of Management Information Systems, Gomber, Kauffman, Parker, and Weber (2018) created what has since become a canonical taxonomy of FinTech activity. Their model categorized FinTech innovations by four areas of service, including payments and currencies, financing and lending, investment management, and insurance, and visualized the

competitive and customer-experience aspects of each. The present study directly applied this taxonomy to the operationalization of FinTech dimensions in the questionnaire design.

2.2. Mobile Payments and Access to Finance.

In their publication by the African Governance and Development Institute, Asongu and Nwachukwu (2018) employed dynamic panel GMM estimation on 49 African countries to show a strong positive correlation between mobile banking penetration and financial inclusion depth. Their threshold analysis was especially educational: the marginal value of mobile finance was significantly higher in economies that had lower initial financial sector development - a result that implies that FinTech may be able to replace, not complement, existing banking infrastructure. Although the African case is quite different in contrast to Saudi Arabia, both methodological approach and theoretical mechanism can be directly applied to the empirical strategy of this study.

Shen, Lan, Xiong, Lv, and Pei (2020) investigated the use of mobile payments in rural China through a structural equation model with 612 participants. They also found their results congruent with TAM: the main attitudinal motivators of adoption were perceived usefulness and ease of use. They however, made a more subtle discovery, that trust and security issues were moderators and not necessarily barriers, i.e. high-trust users were disproportionately advantaged by the presence of mobile payment options. This subtlety is the basis of the consideration of institutional trust as a moderating variable in the theoretical framework of the current study.

2.3. GCC and Saudi Arabian Environment.

The adoption of FinTech in Saudi Arabia is as follows:

The body of FinTech adoption research in Saudi Arabia has significantly expanded since the mid-2010s, with much of it being qualitative or intention to use-specific. The initial investigation of mobile banking adoption by Alotaibi and Roussinov (2016) revealed that social influence and facilitating conditions such as norms and support structures under which technology is used were more influential in the Saudi setting than in similar Western research. Such cultural particularity is noteworthy: it implies that peer effects and institutional support can be especially valuable leverages of inclusion-oriented FinTech policy in the Kingdom.

In a more recent study, published in the *International Journal of Information Management*, Al-Qaysi, Mohamad-Nordin, and Al-Emran (2020) used UTAUT2 in various Gulf settings and established that hedonic motivation and habit were especially robust predictors of mobile technology use in younger Gulf residents, whereas performance expectancy dominated among working-age adults. These generational trends have a direct implication on the way interventions to promote financial inclusion should be designed according to generational cohort.

A study by Alshubiri, Jamil, and Elheddad (2019) on the connection between ICT development and financial depth in GCC countries established that e-payment infrastructure had the greatest ICT forecast of financial sector breadth - not just internet access. This supports the particular significance of payment-oriented FinTech as opposed to digital infrastructure in general.

2.4. Financial Inclusion in Saudi Arabia.

In the panel-based analysis of financial inclusion determinants in GCC states, Al-Jaifi, Al-Rassas, and Al-Qadasi (2017) discovered that Saudi Arabia had lower levels of inclusion, especially in account ownership among women and non-metropolitan regions, in comparison to Bahrain and the UAE. The fact that the quality of regulation was among the better predictors of inclusion results in the sample is consistent with the rationale of the FinTech licensing reforms proposed by SAMA and serves as a solid argument as to why the present study focuses on the regulatory trust dimension.

Saeed, Almutairi, and Al-Nashmi (2022) surveyed 350 Saudi young people in three universities to study the adoption of digital financial services in a UTAUT2 framework. They discovered that hedonic motivation, habit and performance expectancy were all important predictors of the intensity of adoption and that adoption was related to increased self-reported usage of savings and investment products. One of the main limitations the study has is its limited sample, which consists of university students in big cities, which the current research aims to address by providing a more diverse sampling strategy based on geography and demographics.

2.5. Digital Literacy, Trust, and Moderating Factors.

The initial review of the literature in the *Journal of Economic Literature* by Lusardi and Mitchell (2014) laid down the theoretical argument that financial literacy should be viewed as

human capital investment with significant returns. The more financially educated individuals will save, less likely to enter into expensive debt and will be in a better position to make good investment decisions. Although the research is older than the present FinTech age, the main thesis of the article, which states that the lack of knowledge limits engagement in formal financial markets, directly translates into the digital literacy aspect of the proposed study.

In a working paper published by the Bank of International Settlements, Feyen, Frost, Gambacorta, Natarajan, and Saal (2021) examined data on 72 countries to determine the circumstances in which digital finance produces real inclusion benefits. Their multilevel regression model revealed that institutional trust, in the form of trust in the security of digital payment systems and the effectiveness of financial regulators, was a precondition, but not a sufficient condition to inclusion benefits. This was particularly strong among older and less educated users, which are the most vulnerable to marginalization in the Saudi environment.

Previously, Ng (2012) developed a conceptual framework of digital literacy in the article published in Computers and Education that suggested a multi-layered definition of digital literacy, which includes technical (use of devices and applications) and cognitive (critical analysis of digital information and situations) skills. The development of the digital literacy scale to be used in the questionnaire of this study adopted this broader definition instead of a skills-based measure.

2.6. Summary Table of Previous Studies

Table 1 below provides a structured overview of the key studies reviewed, highlighting their methodological approaches and direct relevance to the present research.

Author(s) & Year	Study Focus	Method	Key Finding	Relevance to This Study
Ozili (2021)	FinTech and financial inclusion – global review	Systematic Review	Mobile money is the strongest predictor of inclusion gains in developing economies	Provides foundational framework; limited GCC coverage creates a gap this study addresses
Demirguc-Kunt et al. (2022)	Global Findex: financial inclusion 148 countries	Survey / Panel Data	Digital payments strongly linked to account ownership; gender &	Benchmarking data used to operationalize

Author(s) & Year	Study Focus	Method	Key Finding	Relevance to This Study
			income gaps persist	financial inclusion indicators
Gomber et al. (2018)	FinTech taxonomy and innovation mapping	Conceptual / Review	FinTech spans payments, credit, insurance, investment, and digital banking	Informs the operationalization of FinTech dimensions used in questionnaire
Venkatesh et al. (2012)	UTAUT2 – consumer technology acceptance	Quantitative SEM (n=1,512)	Hedonic motivation, habit, and price value significantly predict adoption	Theoretical backbone of FinTech adoption constructs in this study
Davis (1989)	TAM – perceived usefulness & ease of use	Quantitative (n=152)	PU and PEOU are fundamental determinants of user acceptance	Foundational theory; combined with UTAUT2 for the integrated model
Lusardi & Mitchell (2014)	Financial literacy and economic decision-making	Literature Review	Financially literate individuals show higher savings and lower debt costs	Grounds the digital literacy moderator variable in established theory
Feyen et al. (2021)	Digital finance trust and FinTech-inclusion linkages (72 countries)	Multilevel Analysis	Institutional trust is necessary for FinTech to drive inclusion, esp. for elderly/less-educated	Directly informs trust as a moderating variable in the conceptual model
Asongu & Nwachukwu (2018)	Mobile banking and financial inclusion (49 African countries)	Dynamic Panel (GMM)	Positive effect of mobile penetration on inclusion; larger in low-development countries	Provides methodological and empirical precedent for mobile payments hypothesis

Table 1: Summary of Key Previous Studies on FinTech and Financial Inclusion

2.7. Research Gap

Collectively, the literature reviewed demonstrates four substantive gaps that are located to be filled by this study. To start with, there is limited quantitative demand-side research specifically looking at the effect of FinTech adoption on financial inclusion outcomes in Saudi Arabia; much of the current Saudi research is qualitative or adoption-based, but not inclusion-outcome-based. Second, the moderating effects of digital literacy and institutional trust, which are both theoretically significant and come out of the literature, have not been tested together in the Saudi context. Third, the available literature nearly always uses convenience samples of urban university students or bank clients, which restricts their applicability. Fourth, the reviewed studies do not concomitantly disaggregate FinTech adoption and financial inclusion

by gender, age, income, and geography, which is needed to formulate specific inclusion policy.
This research fills all the four gaps by a national-level quantitative design.

3. Theoretical Framework of the Study.

This study is based on three theoretical perspectives that complement each other. They add a unique explanatory layer to the FinTech-financial inclusion relationship and combined, they constitute the integrated conceptual model that informs the research design.

3.1. Technology Acceptance Model (TAM) -Davis (1989)

The Technology Acceptance Model proposed by Davis (1989) to the information systems literature in the late 1980s has demonstrated an astonishing resilience over the next 50 years of technological transformation. Its main hypothesis that the choice of an individual to adopt a technology is influenced (most importantly) by two perceptions: the perceived usefulness (Perceived Usefulness) and the perceived ease of use (Perceived Ease of Use) has been confirmed in both enterprise resource planning systems and social media platforms. TAM offers the attitudinal base to understand why individuals who find digital financial services useful and accessible tend to adopt them more, and why those who do not have such perceptions are left behind, in the FinTech context.

3.2. Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) -Venkatesh et al. (2012)

Venkatesh, Thong, and Xu (2012) created UTAUT2, which is an extension of the original UTAUT model to consumer adoption settings - a particularly apt modification when examining FinTech, which is more of a consumer-focused than an organizational phenomenon. The three other constructs added to UTAUT2 Hedonic Motivation (the intrinsic enjoyment or fun of using the technology), Price Value (the trade-off between monetary cost and perceived benefit), and Habit (the extent to which usage has become automatic due to prior experience) are all obviously relevant to mobile payment and digital banking adoption. UTAUT2 also incorporates moderating variables of age, gender, and experience and is thus well-adapted to the demographic disaggregation of the analytical agenda of this study.

3.3. Financial Inclusion Framework -AFI/World Bank.

The measurement framework of the Alliance of Financial Inclusion operationalizes financial inclusion as a three-dimensional concept. Access is the possibility of reaching and accessing formal financial service points and products. Usage represents the real degree of actual utilization of the services available - frequency, value, and diversity of usage. Quality involves the suitability, relevancy and consumer experience of the products accessed. The structure is a three dimensional structure that has been extensively used in the empirical literature such as the Global Findex and on which the dependent variable measure in this study is based. The framework offers a more comprehensive view of whether FinTech adoption is creating meaningful inclusion or just formal enrollment, by capturing all three dimensions instead of just account ownership.

3.4. Integrated Conceptual Model

FinTech adoption, gauged in five dimensions (mobile payments, digital credit, e-wallets, InsurTech, and digital investment platforms) is the most important independent variable in the integrated model. The dependent variable is financial inclusion, which is measured in the AFI framework on the access, usage, and quality dimensions. Digital literacy and institutional trust are considered as moderating variables and demographic characteristics are considered as control variables. The research flowchart and the overall process of the analytical study are presented in figure 1 below.

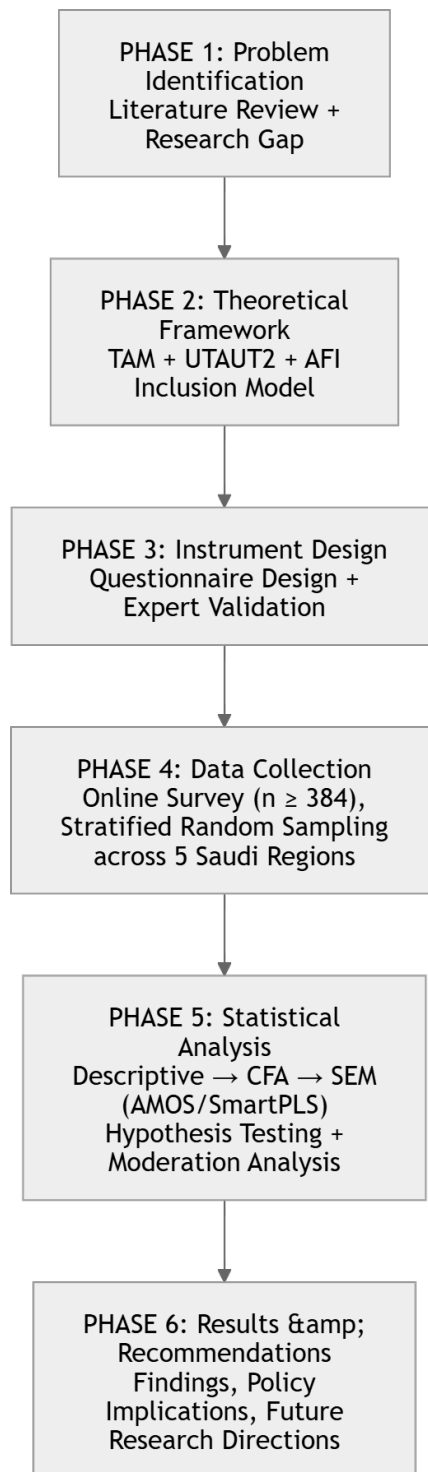


Figure 1: Research Process Flowchart (Phases 1–6)

4. Methodology and Research Methods

4.1. Research Design

This paper takes quantitative, cross-sectional and explanatory research design. The quantitative nature of the selected method is based on the fundamental purpose of the study: to test hypothesized causal relationships between FinTech adoption and financial inclusion, and to estimate the statistical significance of the relationships between the two variables in a nationally representative sample. Cross-sectional data will be suitable due to the time frame of the research and the need to map the current trends instead of change over time. The explanatory orientation sets this work apart as compared to descriptive research on FinTech adoption: the objective is not to record who uses what services, but to comprehend what happens to financial inclusion when they do so - and why.

4.2. Research Philosophy

The epistemological approach to this work is positivism. The research presupposes that the phenomena of interest, namely FinTech adoption, financial inclusion, digital literacy, institutional trust, can be meaningfully measured with the help of validated instruments and that the relationships between the phenomena can be statistically determined and interpreted. This position is aligned to a deductive research logic: theory and existing literature produce hypotheses that are subsequently tested on empirical data. The findings either confirm or refute the hypotheses, creating knowledge that can both refine theory and practice.

4.3. Data Collection Method

The primary data will be gathered with the help of a structured, self-administered online questionnaire, which will be provided in Arabic and English to make it as accessible as possible. The Arabic version will be prepared using forward-backward translation process to make sure that the concepts are equivalent in all languages. The distribution channels will involve the Qualtrics survey tool, outreach through social media (Twitter/X and LinkedIn), and collaborating with five regional chambers of commerce to access small business owners. A pilot

study of 30 respondents will be done before complete implementation to optimize the wording of items, determine understanding, and estimate internal consistency.

4.4. Population and Sample

The target population is the adult Saudi resident aged 18 years and older, and owners and managers of small enterprises (firms with 1-49 employees) in the Kingdom. The minimum sample size is determined at 384 valid responses using Cochran formula of an unknown population with a 95 percent confidence interval, 5 percent margin of error, and $p = 0.5$. In order to take into consideration a projected non-response and incomplete rate of questionnaires, 550 questionnaires will be issued. The stratified random sampling will provide proportional representation in terms of gender, age cohort, geographic region (Central, Western, Eastern, Northern, and Southern), income level, and education.

4.5. Study Instrument

The questionnaire will be structured into five parts:

- Section 1: Demographic profile - 9 questions that address gender, age, education, income, employment and region.
- Section 2: FinTech Adoption Scale 24 items on five scales mobile payments (6), digital credit/lending (5), e-wallets (5), InsurTech (4), and digital investment platform (4). The items are rated using a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree). Adapted from Venkatesh et al. (2012) and Shen et al. (2020).
- Section 3: Financial Inclusion Scale - 16 items in three dimensions: access (5), usage (6), and quality (5). Based on the Demircuc-Kunt et al. (2022) and AFI measurement guidelines.
- Section 4: Digital Literacy Scale - 8 items modified after Ng (2012).
- Section 5: Institutional Trust Scale - 6 items modified by Feyen et al. (2021).

4.6. Validity and Reliability

The expert panel review will be used to determine the content validity with the help of five academic experts and two industry practitioners, where the Content Validity Index will be

0.80. Confirmatory Factor Analysis will be used to determine construct validity. Cronbachs Alpha will be used to measure internal consistency reliability with 0.70 being the minimum acceptable level of internal consistency reliability.

4.7. Statistical Analysis Methods

- Descriptive Statistics: Frequencies, means, standard deviations to characterize the sample and variable distributions.
- Confirmatory Factor Analysis (CFA): To test the dimensionality of scales and construct validity.
- Pearson Correlation Analysis: To test the bivariate relationships between constructs.
- Multiple Regression Analysis: To determine the independent value of each FinTech dimension and demographics.
- Independent Samples t-test and One-Way ANOVA: To test hypothesis H1e - demographic differences in the level of financial inclusion.

All the analysis will be carried out in the IBM SPSS 27 or AMOS 27 / SmartPLS 4.0. Throughout, statistical significance will be determined at $p < 0.05$.

4.8. Study Limitations

Human Scope

The research is aimed at adult Saudi residents (aged 18 and over) and owners or managers of small businesses (1-49 employees) in the Kingdom of Saudi Arabia. Stratified random sampling will be used to sample five geographic regions. The target is 384 valid responses. Big firms, government agencies, and non Saudi nationals are not included.

Spatial Scope

The research is limited to the Kingdom of Saudi Arabia. Although the results can be applicable to similar GCC economies, direct extrapolation to low-income developing nations or to high-income western markets must be approached with caution, as the Kingdom has unique regulatory, cultural and economic features.

Temporal Scope

The data will be collected in Q1-Q2 2026. The study period covers 2024–2026. The study is a cross-sectional design, which means that it captures a snapshot and not a longitudinal path, which restricts the ability to make causal inferences with absolute confidence and to observe how the FinTech-inclusion relationship changes over time.

Methodological Limitations

Self-report data collected by survey is prone to common method bias and social desirability. Procedural remedies will be applied to these limitations - e.g. by separating predictor and outcome items into different sections - and by statistical tests involving the single-factor test of Harman. The data is cross-sectional, so the causal inferences provided will be probabilistic, but not absolute, and longitudinal or experimental studies would enhance the trustworthiness of the results.

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6. Appendix: Draft Questionnaire Structure

The following represents the preliminary structure of the study questionnaire. Wording will be refined following expert panel review and the pilot study.

6.1. Section 1: Demographic Information

- Gender: Male / Female
- Age: 18–30 / 31–45 / 46–60 / Over 60
- Education: Secondary or below / Diploma / Bachelor's / Master's / PhD
- Monthly income (SAR): Below 5,000 / 5,000–10,000 / 10,001–20,000 / Above 20,000
- Employment: Employed (private) / Employed (government) / Self-employed / Student / Unemployed
- Region: Central / Western / Eastern / Northern / Southern

6.2. Section 2: FinTech Adoption – Sample Items (1–5 Likert Scale)

- I regularly use mobile payment apps (e.g., STC Pay, Apple Pay, Mada) for everyday purchases.
- In the past 12 months, I have used a digital lending or buy-now-pay-later platform.
- I store and transfer money regularly using a digital wallet.
- I have obtained insurance coverage through a digital platform rather than a traditional insurer.
- I manage savings or investments through a digital investment or robo-advisory platform.

6.3. Section 3: Financial Inclusion – Sample Items (1–5 Likert Scale)

- I hold an active account with a licensed financial institution or a regulated FinTech provider.
- I save money on a regular basis through a formal institution or digital platform.
- I have access to credit when I need it from a formal, regulated provider.
- The financial products available to me suit my personal needs and circumstances.
- The digital financial services I use are reliable and function as expected.

6.4. Section 4: Digital Literacy – Sample Items

- I am able to critically evaluate whether a FinTech platform is safe and legitimate before using it.
- I understand what personal data I am sharing when I use a digital financial application.
- I feel confident navigating new financial apps on my smartphone without external help.

6.5. Section 5: Institutional Trust – Sample Items

- I trust that digital financial service providers in Saudi Arabia handle my data responsibly.
- I am confident that SAMA's regulations adequately protect consumers of FinTech services.
- I believe that FinTech companies operating in Saudi Arabia are honest and transparent.