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Advancing Financial Inclusion through Fintech: A Regulatory Insight into Emerging Industry Practices

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Abstract
Although the global shift toward digitalization is accelerating, many individuals in the Middle East and North Africa (MENA) region still face restricted access to basic financial services. Nonetheless, the rise of financial technology (FinTech) is beginning to challenge traditional financial frameworks and expand reach. This study explores the impact of FinTech on promoting financial inclusion across the MENA region in the context of ongoing digital evolution. It examines how new technological advancements are reshaping the delivery of conventional banking and financial services. Furthermore, it assesses the contribution of key FinTech solutions—such as digital payment systems, online lending platforms, InsurTech, and digital wealth management—in enhancing financial inclusion within Gulf Cooperation Council (GCC) nations. A mixed-methods research design, incorporating an extensive review of existing literature and comparative case analyses from both developed and emerging economies, is employed. Results show that FinTech has made financial services more accessible to previously overlooked groups, including women, youth, and small and medium enterprises (SMEs). However, additional strategies are necessary to overcome persistent barriers faced by marginalized populations. The study concludes by advocating for a regulatory framework that balances innovation with consumer safeguards and highlights the importance of collaborative efforts to reinforce the role of technology in improving livelihoods.

Keywords: Financial Technology (FinTech), Financial Inclusion, MENA Region, Digital Transformation, Regulatory Framework, Underserved Populations

1. INTRODUCTION

The Fourth Industrial Revolution, marked by the integration of physical, digital, and biological technologies, has brought profound changes to the financial sector. Innovations in artificial intelligence (AI), big data analytics, blockchain, cloud computing, and the Internet of Things (IoT) have revolutionized financial platforms and services (Aljaloudi, 2020). These advancements have enabled greater automation and personalization within the industry. Yet, questions remain about how economies and societies will adapt to ongoing shifts in banking, investment, and financial interactions in the years ahead. Despite significant advancements in the financial sector since the 2008 global economic downturn, a considerable portion of the population continues to remain excluded from essential financial services. According to the World Bank (2017), more than 1.7 billion adults worldwide remain unbanked, lacking access to core services such as savings, credit, insurance, and payment systems. The extent of exclusion differs markedly from one region to another The Middle East and North Africa (MENA) region continues to experience major hurdles in promoting financial inclusion. In several MENA countries, adults struggle to obtain basic financial services, with traditional banking systems often failing to meet the demands of low-income and geographically isolated communities (Demir et al., 2022). However, the spread of digital infrastructure and the rise of FinTech innovations are beginning to challenge conventional financial approaches, improving access for historically underserved groups.

This research explores how financial technology (FinTech) contributes to improving financial inclusion across the MENA region in the context of the Fourth Industrial Revolution. The following are the main objectives of the research are as follows:

1. To explore how FinTech developments are reshaping conventional banking systems and service delivery in the digital age throughout the MENA region, focusing on tools such as blockchain, artificial intelligence, and mobile payment systems;
2. To assess the impact and efficiency of key FinTech solutions—such as digital payments, peer-to-peer lending, InsurTech, and digital wealth management platforms—in promoting financial inclusion across Gulf Cooperation Council (GCC) nations;
3. To pinpoint demographic groups within the GCC, including women, young adults, SMEs, migrant laborers, and those in rural areas, that have gained the most from increased access to financial services through FinTech innovation;
4. To analyze the progression of financial inclusion metrics and indices over time in selected GCC countries, in relation to FinTech adoption, regulatory initiatives, and technological infrastructure development;
5. To investigate the national FinTech frameworks, strategic policies, and experimental regulatory environments (such as sandboxes) implemented by leading GCC states to foster digital financial innovation, while ensuring robust consumer rights and data security.

By addressing the research questions outlined below, this study aims to shed light on the tangible impact of FinTech to date and explore future opportunities for expanding access to financial services through ongoing digital innovation. The outcomes are expected to inform decision-makers, regulatory bodies, FinTech startups, and conventional financial entities in leveraging technology to support broader financial inclusion worldwide. The core research questions are:

RQ1: In what ways have emerging technologies—such as blockchain, artificial intelligence, and mobile payments—reshaped traditional banking systems and the provision of financial services across the MENA region?

RQ2: Which FinTech models—namely digital payment platforms, peer-to-peer lending, digital wealth management, and insurance technology (InsurTech)—have proven most successful in enhancing financial inclusion within GCC nations?

RQ3: Which demographic groups in the GCC, including women, young people, small and medium enterprises (SMEs), migrant laborers, and residents of rural areas, have most significantly benefited from FinTech-driven access to financial resources?

RQ4: What strategic policies, national initiatives, and regulatory mechanisms have leading GCC countries implemented to foster inclusive FinTech growth while maintaining robust standards for consumer protection and data security?

The structure of this paper is organized as follows:

Section 2 provides a review of the existing literature;

Section 3 outlines the research design and methodology employed to evaluate FinTech's influence on financial inclusion in developing and emerging markets, particularly within the GCC context; **Section 4** presents the study's key findings and analytical outcomes based on the stated objectives; **Section 5** engages in a comprehensive discussion of the results;
Section 6 concludes with final reflections and actionable recommendations.

2. LITERATURE REVIEW

2.1. Overview of Core Technologies Driving FinTech Innovation

Artificial Intelligence (AI) leverages complex algorithms and computational models to analyze and interpret large volumes of data efficiently. Distributed Ledger Technology (DLT) involves decentralized databases that are continuously updated and synchronized across a network. Among DLTs, **blockchain** stands out as the most prominent, utilizing cryptographic methods to securely log transactions within a transparent, unchangeable, and decentralized ledger system (Tapscott & Tapscott, 2017). **Cloud computing** enables scalable, on-demand access to shared digital resources—including storage, servers, and applications—delivered over the Internet with a pay-as-you-go model (Mell & Grance, 2011). Meanwhile, the **Internet of Things (IoT)** encompasses networks of interconnected physical devices equipped with sensors and software, allowing seamless data collection and exchange across digital platforms (Atzori et al., 2011). These foundational technologies form the backbone of FinTech solutions and will be central to this study's analysis of their role in advancing financial inclusion.

2.2 FinTech and financial inclusion

2.2.1. Understanding and Evaluating Financial Inclusion

Financial inclusion generally implies that individuals and businesses have access to affordable and formal financial products and services essential for full economic participation (Khalaf & Wadi, 2023; Yakubi et al., 2019). In recent years, the assessment of financial inclusion has evolved beyond merely identifying whether individuals are included or excluded. It now also encompasses how deeply they engage with financial services—such as the frequency of transactions and the variety of services used (Khmous & Besim, 2020; Niankara, 2023). National-level surveys have been instrumental in identifying financially excluded groups, thereby aiding in the formulation of targeted policies to improve access—especially in areas lacking both digital and physical financial infrastructure Regional disparities in financial exclusion remain substantial, as highlighted by recent studies (Emara & El Said, 2021; Khalaf & Wadi, 2023) To capture the full picture, multi-dimensional indices are now used to assess demand, access, and service quality across different population segments based on gender, geography, and income level, while also recognizing digital literacy and other non-technological constraints (Al-Smadi, 2023; Cicchiello et al., 2021). Additionally, global benchmarking tools help track each country's progress toward achieving their financial inclusion targets, especially those aligned with the 2030 sustainable development objectives (Emara & Mohieldin, 2021; Demir et al., 2022).

2.2.2. Barriers to Financial Inclusion and Historically Excluded Groups

A range of persistent barriers continues to limit equitable access to financial services, effectively excluding several population groups from active participation in economic progress. **Geographical constraints** are a major concern, as conventional banking institutions struggle to extend services to rural or remote regions due to their physical inaccessibility. Many marginalized individuals reside in isolated areas with minimal transportation and infrastructure, making traditional financial outreach challenging (Porteous, 2005).

Economic limitations also contribute significantly to exclusion. Individuals with lower incomes often find it difficult to maintain minimum balance requirements, effectively barring them from using many conventional financial products (Beck et al., 2007). Moreover, **digital divides** represent another major obstacle. Lack of financial and digital literacy, coupled with inadequate technological infrastructure, has hindered segments of the population from adopting or accessing digital banking solutions (Porteous et al., 2005). Many potential users are unfamiliar with financial systems and lack the skills needed to navigate FinTech platforms effectively.

Socio-cultural norms further exacerbate exclusion, particularly among women, who may face cultural or familial restrictions that limit their participation in formal economic structures (Amidžić et al., 2022). **Age-related challenges** also persist: younger individuals often lack the financial history required to access credit, while older adults may struggle to adapt to evolving digital tools (Mas, 2009).

Additionally, **marginalized communities**, including ethnic minorities, refugees, individuals with disabilities, and LGBTQ+ populations, frequently encounter discrimination or bias that prevents their access to financial services (Amidžić et al., 2022). Another major hurdle is **compliance with Know Your Customer (KYC) regulations**, which require formal identification and documentation. These requirements can exclude people who lack recognized forms of ID, especially among displaced populations or informal workers (Demirguc-Kunt et al., 2018).

2.2.3. Market Segments Benefiting from FinTech Innovations

FinTech has made significant strides in improving access to financial services across various demographic groups, including those traditionally marginalized based on gender, age, and income. One notable group positively impacted is **women**, as FinTech solutions have created products tailored to their specific needs, challenging the socio-cultural barriers that once limited their economic participation (Kazemikhasragh et al., 2022; Cicchiello et al., 2021). Similarly, **youth** are now able to build financial profiles early on, as FinTech platforms offer them entry-level digital transaction accounts that help establish financial histories (Emara & Mohieldin, 2021).

Another critical group benefiting from FinTech is **small and medium-sized enterprises (SMEs)**, including micro, small, and medium businesses, which now have access to alternative funding options through online lending platforms, diversifying their financial sources beyond traditional bank loans (Ashfaq & Zada, 2021). **Migrant workers** are also gaining improved financial access through innovations that enable seamless remittance transfers and digital wage payments, particularly in GCC countries (David & Williams, 2022).

Moreover, FinTech has extended its reach to **rural communities**, addressing the long-standing challenge of financial exclusion faced by those living far from traditional banking infrastructure (Lukonga, 2021). Finally, **low-income populations** have found particular benefit from FinTech solutions, with features such as intra-day credit lines helping to smooth fluctuations in cash flow, particularly for individuals with irregular or low earnings (Demir et al., 2022; Al-Smadi, 2023).

2.2.4. Impact of Digital Finance on Expanding Access

Digital finance in the FinTech sector has significantly enhanced the accessibility of essential financial services to a broader population. **Mobile money platforms** have been instrumental in overcoming spatial barriers, enabling remote and rural communities with limited infrastructure to access critical services like payments, savings, and credit (Lukonga, 2021; Naz et al., 2022). Additionally, **digital lending platforms** have increased the availability of small loans for individuals who lack collateral or established credit histories by leveraging alternative data sources online (Demir et al., 2022; Hussein, 2020).

Another key development is the reduction of **transaction costs** through digital payment systems, which has greatly improved financial inclusion for micro-businesses and self-employed individuals who often face challenges meeting traditional bank requirements (Ashfaq & Zada, 2021; Niankara, 2023). Moreover, **mobile savings tools** have been designed to accommodate users with irregular income patterns, offering convenient savings options via mobile phones, which cater to the needs of low-income groups (Al-Smadi, 2023; Khalaf & Wadi, 2023).

FinTech also plays a crucial role in enhancing **cross-border financial transactions**, with **digital remittance platforms** enabling quicker and more affordable transfers, particularly benefiting migrant workers who send remittances back home (Lukonga, 2021; Naz et al., 2022). Lastly, the adoption of **electronic Know Your Customer (eKYC)** technologies has streamlined the account opening process, reducing the need for physical paperwork by using remote identification methods, thus addressing barriers often posed by traditional banking procedures (Lukonga, 2021; Schilirò, 2021).

2.3. Country case studies of FinTech adoption and inclusion impacts to date

2.3.1. Developed FinTech Markets in the GCC

FinTech has made significant strides in the Gulf Cooperation Council (GCC) markets, showing impressive growth in financial inclusion. In the **United Arab Emirates (UAE)**, approximately 85% of adults are now financially included, a notable increase from 57% in 2011 (Niankara, 2023; Attia, 2020). **Saudi Arabia** has also experienced substantial progress, with 73% of its population now financially included, as of 2018, demonstrating continuous growth driven by digital transformation and the emergence of Islamic FinTech opportunities (Attia & Benson, 2018). In **Bahrain**, around 79% of Bahrainis are financially included, up from 60% in 2017, reflecting the country's strong support infrastructure, including regulatory sandboxes. However, Bahrain's inclusion rate remains slightly lower compared to other GCC nations (Niankara, 2023).

2.3.2. Financial Inclusion in Emerging MENA Markets: A Comparative Case Study Assessment

In **Afghanistan**, account ownership has remained relatively stable, fluctuating between 33% and 39% in recent years, despite early developments in mobile money solutions, as reported by the World Bank. Similarly, in **Pakistan**, the account penetration rate stays within the 33% to 39% range, facing similar challenges that hinder the potential of FinTech to drive financial inclusion, particularly due to gaps in regulatory frameworks and network infrastructure, as noted by Lukonga (2021). To enhance financial inclusion in these regions, further advancements in regulatory measures are essential. In **Egypt**, approximately 67% of the population holds bank accounts, as indicated by Emara and El Said (2021) and Cicchiello et al. (2021).

2.4. National FinTech Strategies, Policies, and Regulatory Sandboxes

The GCC nations are leading the way in FinTech innovation and regulatory frameworks within the MENA region. The **UAE**, particularly **Dubai**, serves as a pioneering example, with its focus on creating FinTech-friendly regulations. Schilirò (2021) highlights regulations introduced in 2016, which form the foundation of Dubai's FinTech regulatory environment, covering areas like crowdfunding, digital currencies, and regulatory sandboxes. **Saudi Arabia** has set its sights on becoming a global FinTech hub, implementing strategies such as the **National FinTech Strategy** (Hariri, 2023). The country has launched the Saudi FinTech Authority and regulatory sandbox programs designed to support payment solutions and SME financing (Gulrez, 2021). Bahrain has taken a pioneering role in implementing sandbox models, engaging stakeholders to craft regulatory policies that strike a balanced approach (Allen, 2021; Lukonga, 2021). While these strategies have attracted significant investments, challenges remain in ensuring that regulatory adjustments align with the rapidly evolving industry (Naz et al., 2022).

2.5. Gaps in Existing Literature

While much of the existing research has explored FinTech's impact on financial inclusion at the country or regional level, there is a notable lack of cross-country comparative studies. More research is needed to examine trends in FinTech adoption and inclusion across various GCC nations. Additionally, many studies have analyzed individual FinTech models, such as digital payments or lending, in isolation. However, the combined impact of multiple FinTech innovations working together in an integrated manner has not been extensively studied. There is also a limited amount of qualitative research that complements the quantitative data. While certain groups, such as women, youth, and SMEs, have been identified as benefiting from FinTech, further research is necessary to explore other potentially underserved population segments, including people with disabilities. Most studies have focused on the more developed GCC countries, leaving a gap in research regarding the impact of FinTech on financial inclusion in less-developed MENA markets.

3. METHODOLOGY

3.1. Research Design

This study follows an explanatory qualitative research design to address the research objectives. It utilizes secondary sources exclusively, applying a qualitative methodology that focuses on non-numerical analysis. The research questions aim to explore and explain the contributions of FinTech to financial inclusion through a qualitative review of existing case studies, literature, reports, and regulatory documents sourced from reputable databases. By analyzing emerging themes from previous qualitative research, the study seeks to provide insights into FinTech adoption trends, its impacts on inclusion, preferred business models, and policy frameworks through an explanatory approach.

The sample for this study was selected based on the credibility of the resources, ensuring that the articles were directly related to the research topic. Peer-reviewed reports were prioritized as primary sources. However, the currency of the articles was not a primary consideration, as historical data was essential to understanding past financial challenges and practices.

3.2. Alternative Methods

Several alternative research methods could have been suitable for this study:

- **Qualitative Research Design**: This would involve conducting in-depth interviews and focus group discussions with key stakeholders such as FinTech companies, banks, policymakers, and consumers. These methods would offer richer insights into personal experiences and perspectives. However, given the study's aim to analyze FinTech's contributions across multiple GCC countries, a purely qualitative approach might not enable effective comparisons across different contexts.
- **Survey Research**: Surveys administered to a sample of the population across GCC countries could yield quantitative data regarding FinTech usage patterns, barriers encountered, and perceptions of financial inclusion. However, surveys were not selected as the primary method due to potential logistical and translation challenges involved in developing and distributing a standardized survey across multiple countries.

- **Case Study Research**: Conducting detailed case studies of select GCC countries could offer a deeper comparative understanding of how national policies and market conditions impact FinTech adoption and inclusion outcomes. While case studies would provide valuable insights, analyzing only a few case study countries might not fully capture the diverse market environments within the GCC region.
- **Secondary Data Analysis**: Utilizing existing government reports, industry studies, surveys, and financial inclusion indices could capitalize on pre-existing sources of information. However, a potential limitation of relying solely on secondary data is the lack of primary data to fill gaps and address research questions not sufficiently covered by available literature and reports.

3.3. Data Sources

This study exclusively relied on secondary data sources due to the limitations of conducting primary research within the available timeline. The secondary data included international databases such as the World Bank Findex, national financial inclusion surveys, and reports from central banks and industry bodies. These sources were obtained from platforms like ResearchGate, SSRN, and DOAJ. Additionally, academic literature and research papers accessed through the nominated databases were also incorporated into the secondary data analysis.

3.4. Data Collection

Qualitative data was gathered from existing case studies, literature reviews, reports, and academic analyses sourced from the nominated databases. The collected data included case studies, emerging themes, and insights related to FinTech adoption trends, impacts on financial inclusion, preferred business models, and policy frameworks in the target nations. Secondary sources provided contextual qualitative information on country profiles to aid in the comparative case study analysis. The research objectives were addressed by examining perspectives and findings from prior explanatory studies.

3.5. Data Analysis

A qualitative data analysis approach was employed in this study. Case study analyses of the selected countries were conducted to synthesize qualitative findings from previous literature reviews. The comparative case studies focused on themes related to FinTech adoption trends, impacts on financial inclusion, practical models, and policies that emerged from secondary data sources. Relationships between contextual factors and FinTech's role in promoting inclusion were explored through comparative analysis across the case study nations. The study examined how qualitative perspectives and insights from prior explanatory studies contributed to addressing the research objectives.

3.6. Case Study Selection

The study selected case studies from six countries that represented diverse economic contexts, providing comparative qualitative insights. The countries chosen were the UAE, Saudi Arabia, and Bahrain (developed economies within the GCC region), as well as Afghanistan, Pakistan, and Egypt (developing/emerging economies in the MENA region). This selection enabled an analysis of FinTech's contributions to financial inclusion across nations at different stages of economic and technological development, using a comparative case study approach.

4. DATA ANALYSIS AND FINDINGS

4.1. Impact of FinTech Innovations on Traditional Banking Models and Financial Services Delivery

The literature reveals that FinTech innovations are playing a pivotal role in transforming traditional banking models and financial services across the MENA region in the digital age. Technologies such as blockchain, AI, and mobile payments are central to this transformation. Mobile payment platforms, in particular, have broadened access to financial services. Research by Lukonga (2021) and Naz et al. (2022) found that mobile money platforms introduced by various banks and FinTech companies in the region have improved access to payments, savings, credit, and other essential services, especially in rural and remote areas with limited traditional banking infrastructure. By overcoming geographic barriers, these platforms enable remote access to accounts and fund transfers via affordable mobile phones.

Digital lending platforms are also expanding access to small-value loans for individuals who previously struggled to obtain credit from traditional banks due to the absence of collateral or credit history. These platforms leverage AI and machine learning models to assess alternative online data sources, addressing challenges like information asymmetry (Demir et al., 2022; Hussein, 2020), thereby increasing the availability of affordable credit, especially for emergencies.

Furthermore, digital payment systems integrated within FinTech applications have reduced transaction costs, promoting financial inclusion, particularly for micro-businesses and self-employed individuals who face stringent requirements from banks (Ashfaq & Zada, 2021; Niankara, 2023). Features like intra-day credit lines in mobile savings tools have also helped address the needs of low-income users with irregular cash flows between paychecks (Al-Smadi, 2023; Khalaf & Wadi, 2023).

Blockchain-based remittance platforms have facilitated faster, lower-cost cross-border money transfers, benefiting migrant workers in GCC countries who send funds back home (Lukonga, 2021; Naz et al., 2022). Additionally, electronic Know Your Customer (eKYC) technologies powered by AI have streamlined account opening by enabling remote identification, reducing the need for paperwork and overcoming traditional barriers (Lukonga, 2021; Schilirò, 2021).

Research drawing on surveys, adoption statistics, and user behavior trends consistently reveals that FinTech has greatly advanced financial inclusion in the MENA region by delivering digital financial services to populations and areas that were historically excluded or inadequately served (Khalaf & Wadi, 2023; Hussein, 2020; Niankara, 2023; Al-Smadi, 2023) By utilizing advanced technologies, non-traditional players, and new partnerships, FinTech innovations are reshaping the financial services landscape and driving inclusion in ways that traditional banking models could not achieve. Both established banks adapting to digital changes and startups introducing disruptive solutions play vital roles in this transformative process, enhancing the quality of life for many.

4.2. Effectiveness of key FinTech models in driving financial inclusion in GCC countries

4.2.1. Digital Payment Solutions

Mobile money platforms, such as M-Pay by Emirates NBD, have significantly improved access to payments and financial services by overcoming the limitations of traditional banking infrastructure (Lukonga, 2021; Naz et al., 2022). These platforms enable users to perform transactions remotely using their mobile phones. Digital wallets, such as those provided by PayPal, have also played a crucial role in the expansion of e-commerce and peer-to-peer transactions, especially in GCC countries like the UAE (Alblooshi, 2022; Schilirò, 2021). Additionally, prepaid payment cards issued by banks across the GCC have enhanced financial access for both banked and unbanked populations, including migrant workers who depend on remittances (Gulrez, 2021; David & Williams, 2022).

4.2.2. Online Lending Platforms

Digital lending platforms have expanded access to small-value loans by utilizing alternative online data to assess the creditworthiness of individuals without collateral or credit histories (Demir et al., 2022; Hussein, 2020). This approach helps bridge the information gaps traditionally found in credit evaluation.

4.2.3. Digital Wealth Management Tools

Digital platforms have facilitated greater access to retail investment services by offering features such as automated robo-advisory tools and simplified online portfolio management interfaces (Palmié et al., 2020; Rabbani, 2022).

4.2.4. InsurTech Applications

InsurTech applications leverage personalized data and devices such as telematics, enabling the creation of customized insurance solutions that are tailored to the specific needs of individuals (Rabbani, 2022; David & Williams, 2022; Schilirò, 2021).

Studies have shown that these FinTech models have effectively improved key financial inclusion indicators, such as account ownership, savings, credit access, and insurance penetration, especially among previously underserved groups in GCC countries. These groups include women, youth, SMEs, migrant workers, and low-income populations (Hussein, 2020; Khalaf & Wadi, 2023; Lukonga, 2021; Niankara, 2023; Al-Smadi, 2023). The literature provides empirical evidence that these FinTech innovations have made significant contributions to enhancing financial inclusion throughout the GCC region.

4.3. Demographic Benefits of FinTech Adoption in the GCC

The literature review reveals that various demographic segments in the GCC have gained significant benefits from the financial inclusion enabled by FinTech adoption:

- **Women**: Several studies highlighted in the literature indicate that FinTech has enhanced financial access for women in the GCC. FinTech products tailored specifically to women challenge the socio-cultural norms that once restricted women's participation in financial services (Kazemikhasragh et al., 2022; Cicchiello et al., 2021). Digital services are transforming perceptions and empowering women to play a more active economic role, independent of traditional barriers.
- **Youth**: Younger populations now have the opportunity to build early financial identities and histories through entry-level online transaction accounts offered by FinTech firms (Emara & Mohieldin, 2021). This early exposure fosters responsible financial habits and incorporates young adults who were previously deemed "unbankable" by traditional standards.
- **SMEs**: Micro, small, and medium-sized enterprises (SMEs) have benefited from FinTech lending platforms that expand alternative funding sources beyond limited bank credit (Ashfaq & Zada, 2021). Digital financial services also address SME cash flow and payment needs by offering services tailored to their size and financial cycles (Hariri, 2023), thus promoting entrepreneurship, particularly among startups.
- **Migrant Workers**: Innovations related to remittance transfers and digital wage disbursements have improved financial access for migrant labor populations in GCC countries (David & Williams, 2022). Digital remittance platforms offer cost savings compared to traditional methods, while digital salary payments simplify earnings management for workers abroad.
- **Rural Communities**: FinTech is bridging gaps by improving access in geographically isolated areas that have historically been underserved due to distance from physical bank branches (Lukonga, 2021). Mobile and digital banking services help overcome spatial limitations, benefiting remote rural villages by reducing the need for physical branch access.
- **Low-Income Populations**: Several studies found that FinTech platforms are addressing the challenges faced by low-income individuals. Features like intra-day credit lines accommodate fluctuations in cash flow between paydays (Demir et al., 2022; Al-Smadi, 2023). Moreover, user-friendly mobile platforms

contribute to promoting financial literacy and accessibility, particularly among individuals with lower levels of formal education (Chinnasamy et al., 2021; Aloulou et al., 2023)

4.4. Evolution of Key Financial Inclusion Indicators with FinTech and Regulations in GCC Nations

- Key financial inclusion indicators and indexes have shown positive changes over time in selected GCC nations, as FinTech adoption, regulatory frameworks, and digital infrastructure have evolved.
- Studies indicate that indices measuring access, usage, quality, and consumer protections for financial services have generally improved across the GCC as FinTech adoption has progressed (Al-Smadi, 2023; Cicchiello et al., 2021). Global indicators, which benchmark countries' progress towards the 2030 financial inclusion targets set by the United Nations (UN) and other international organizations, reveal that most GCC countries have improved their standings. This improvement is primarily driven by the expansion of digital transformation supported by public policy (Emara & Mohieldin, 2021; Demir et al., 2022).
- National surveys examining the percentage of populations with transaction accounts, savings, loans, and insurance show that exclusion rates have steadily decreased over time. This decrease has occurred alongside the growing use of FinTech, fueled by enabling regulations in countries like Saudi Arabia and the UAE (Emara & El Said, 2021; Khalaf & Wadi, 2023).
- Metrics that measure consumer usage diversification and transaction frequency, integrated into updated measurement frameworks, further highlight the deepening of financial inclusion. This trend is largely attributed to the enhanced access facilitated by digital platforms, with regulatory experiments such as FinTech sandboxes in GCC countries playing a pivotal role (Khmous & Besim, 2020; Niankara, 2023).
- Case studies of individual GCC nations show that financial inclusion progress is closely linked to milestones such as the introduction of new FinTech strategies, updated privacy laws supporting digital eKYC (electronic Know Your Customer), expanded broadband networks, and economic diversification initiatives that integrate FinTech into various sectors (Naz et al., 2022; Lukonga, 2021; Gulrez, 2021).
- In summary, the literature indicates that financial inclusion indexes and indicators for GCC countries have progressively improved. These improvements align with the growing use of FinTech solutions and services, gradual regulatory reforms, and enhanced digital infrastructure, all supported by strong public-private cooperation aimed at sustainable inclusion.

4.5. National FinTech Strategies and Regulatory Frameworks in GCC/MENA

Several countries in the GCC and MENA regions have implemented progressive FinTech policies and regulatory frameworks, including regulatory sandboxes, to foster innovation while safeguarding consumers.

Saudi Arabia launched its Financial Sector Development Program in 2016, which laid the foundation for the country’s FinTech ecosystem (Schilirò, 2021). A key component of this program was the FinTech Saudi initiative, which included the creation of an incubation hub and regulatory sandbox. Studies suggest that sandbox environments have been instrumental in facilitating the experimentation and initial deployment of innovative business models (BRILL, 2018; Allen, 2021)

In 2017, the UAE introduced its Smart Dubai initiative, with the goal of positioning Dubai as a global FinTech hub (Demir et al., 2022). The Dubai Financial Services Authority sandbox allowed the regulated testing of innovative financial products and services (Schilirò, 2021), complemented by the FinTech Hive initiative, which provided robust support for startups (Palmié et al., 2020).

Bahrain has emerged as a leading regional FinTech hub, particularly for Islamic finance technology. Bahrain's Central Bank regulates the financial industry and has introduced both a regulatory framework and a sandbox environment to trial FinTech innovations. It has also spearheaded initiatives such as FinTech Bay and Bahrain FinTech Bay to support the expansion of its FinTech landscape. Additionally, the Bahrain Economic Development Board plays a vital role in attracting foreign FinTech investments and partnerships as part of the Kingdom's Economic Vision 2030 plan. Bahrain's regulatory framework includes comprehensive guidelines for crowdfunding, digital assets, and payment services.

In Egypt, regulatory amendments introduced in 2020 aimed at streamlining rules for FinTech companies. These changes classified FinTech entities under specialized legislation, focusing on areas like crowd investing, payment services, and digital banking (Naz et al., 2022). Additionally, the derivatives law allowed for limited FinTech-backed activities through licensing, pending further reforms (Lukonga, 2021).

GCC and MENA nations have prioritized consumer protection through risk-based oversight, data privacy regulations, financial literacy programs, and stringent cybersecurity measures (Emara & Mohieldin, 2021; Naz et al., 2022). Cross-border digital remittance guidelines have also been influenced by leading Islamic finance standard-setting bodies (Hassan et al., 2022).

Coordinated regional frameworks are further promoting financial inclusion goals by ensuring that FinTech development occurs in a responsible and sustainable manner.

5. DISCUSSION

5.1. Interpretation of Findings

The findings derived from the research align with the objectives set forth in Section 4. The first objective focused on how emerging technologies have transformed banking in MENA. It was found that digital technologies such as blockchain, AI, and mobile payments have enabled the development of new digital banking models. FinTech firms are expected to integrate these technologies, offering more convenient and accessible services compared to traditional banks. This transformation has disrupted established banking models and heightened competition within the sector.

The second objective, examining the effectiveness of FinTech models in driving inclusion in the GCC, revealed that digital payment solutions, platforms, and remittance services have been crucial in expanding financial access to underserved and low-income populations. These technologies have reduced costs and removed spatial barriers, making financial services more accessible. Furthermore, online lending platforms have helped bridge information gaps related to creditworthiness, enhancing financial inclusion.

Regarding the third objective, which explored which demographic segments benefited most from FinTech, the findings showed that women, youth, SMEs, migrant workers, and rural communities in the GCC have especially benefited from improved financial access facilitated by FinTech solutions. Digital payments and wallets, among other FinTech features, have enabled broader participation and greater financial independence for these groups.

The fourth objective focused on the evolution of financial inclusion over time in relation to FinTech adoption. Studies comparing data across multiple years indicate that, as FinTech usage has increased in GCC countries, financial inclusion indicators—such as account ownership and the use of digital finance products—have also improved. This suggests that the growing adoption of FinTech has played a significant role in advancing financial inclusion goals.

Lastly, the fifth objective examined the national FinTech strategies and policies in place. The research identified that leading GCC economies have implemented regulatory sandboxes, proportionate rules, and national digital strategies to foster FinTech-driven innovation and inclusion. These regulatory frameworks also prioritize consumer protection, creating a balanced approach to FinTech growth.

In conclusion, the findings demonstrate that FinTech innovations are not only transforming the banking sector but are also contributing significantly to greater financial inclusion across various demographic segments in the GCC region. This transformation is underpinned by evolving regulatory frameworks and a growing digital financial ecosystem.

5.2. Theoretical and practical implications

5.2.1. Theoretical Implications

This study provides empirical evidence that supports existing theories on how FinTech and digital innovation can address key barriers to financial inclusion, such as information asymmetry, high transaction costs, and spatial constraints. The findings validate theoretical frameworks that emphasize the role of FinTech in promoting inclusion by overcoming these challenges.

Furthermore, the research tests and extends frameworks that define financial inclusion and conceptualize its multidimensional nature, including aspects like access, usage, and quality. By exploring these dimensions, the study offers a more comprehensive understanding of financial inclusion and how FinTech contributes to each of these elements.

Additionally, the study contributes to theoretical discussions on the interplay between FinTech adoption, the regulatory environment, infrastructure development, and changes in financial inclusion over time. The findings highlight the dynamic relationship between these factors and demonstrate how they evolve across different markets, further enriching the body of knowledge in the field of financial inclusion and digital innovation.

5.2.2. Practical Implications

The research has generated significant practical implications for various stakeholders.

For policymakers, the study provides valuable insights into the design of regulatory sandboxes, data privacy frameworks, and other enabling measures that maximize FinTech's potential to drive financial inclusion while ensuring proper oversight. These findings can help policymakers fine-tune regulations to support sustainable innovation and protect consumers.

Traditional financial institutions can gain guidance on collaboration opportunities with FinTech firms, identify strategic focus areas, and benchmark inclusion metrics against FinTech sector development. This information is critical for enhancing the financial services ecosystem and leveraging FinTech solutions.

FinTech companies are informed about target customer segments, successful products or models, and strategic partnerships that have effectively advanced inclusion. This can help businesses fine-tune their offerings and explore new avenues to reach underbanked populations.

For development organizations and investors, the research highlights key focus areas and helps assess the returns on initiatives aimed at promoting inclusion through technology. It also provides a benchmark for organizations to track their progress, monitor the impact of their strategies, and refine them based on evidence of what has successfully driven changes in financial inclusion indicators.

Lastly, the research raises awareness among end-users about the inclusive FinTech tools available to them. This empowers individuals to adopt solutions that can improve their financial well-being and overall standard of living.

5.3. Recommendations for FinTech in Increasing Society's Financial Inclusion in the Industrial Era 4.0

FinTech is expected to play a crucial role in advancing financial inclusion, and several recommendations emerge from the research for optimizing its impact:

1. **National FinTech Strategies and Regulatory Sandboxes**: Countries should establish clear national FinTech strategies and regulatory sandboxes that foster innovation while ensuring consumer protection. Leading GCC nations such as Bahrain and the UAE, which have successfully developed FinTech roadmaps and innovation hubs, can serve as models for others in the region.
2. **Public-Private Sector Coordination**: FinTech should be enhanced through coordinated efforts between the public and private sectors. This partnership can be strengthened by developing centralized regulatory frameworks for identity verification and credit reporting, which would support the growth of digital lending platforms. Standardizing data sourcing and reporting through regulatory bodies will help mitigate information gaps, particularly for online lending services.
3. **Enhance Digital and Financial Literacy**: Efforts should be made to promote digital and financial literacy, particularly for underserved groups such as women, youth, the elderly, and low-income populations. Initiatives that teach individuals how to use FinTech tools responsibly can unlock participation barriers. This can be achieved through multimedia campaigns and educational programs in schools, workplaces, and communities, ensuring that everyone can benefit from digital financial services.
4. **Investment in National Digital Payment Infrastructure**: The company should invest in building a robust national digital payment infrastructure, with a focus on extending services to rural and remote areas. Initiatives to expand affordable broadband connectivity and improve technological access across geographical divides will significantly enhance the financial inclusion impact of FinTech.
5. **Encourage Collaboration Between FinTech Startups and Traditional Financial Institutions**: Policymakers should incentivize collaboration between FinTech startups and traditional financial institutions through sandbox policies. Co-creation models, where new innovators partner with incumbents, leveraging Open APIs and complementary strengths, can generate inclusive, blended financial solutions that bridge the gap between the digital and traditional sectors.
6. **Develop Specialized Services for Emerging Segments**: It is essential to create specialized FinTech services and regulations that cater to the specific needs of SMEs, migrant workers, and freelancers/gig economy workers. Tailored products, customized underwriting mechanisms, and consumer safeguards are necessary to address the evolving needs of these groups amidst shifting work patterns.
7. **Leverage Digital Identity Systems for Vulnerable Groups**: The research recommends leveraging digital identity systems, regulations, and related skills to positively transform financial inclusion for vulnerable groups, including women, youth, the elderly, and individuals with disabilities. Customizations that uphold ethical principles and promote inclusion should be mainstreamed across FinTech platforms as they expand.
8. **Monitor Financial Inclusion Metrics**: It is crucial to regularly monitor financial inclusion metrics to assess ecosystem impacts and track progress. Updates to national strategies should be made based on these findings, enabling iterative improvements to policies and practices. This will ensure that FinTech continues to evolve to meet the needs of underserved populations over time.
9. **Transparency and Board Independence**: Building on research from Chouaibi et al. (2021), independent boards can facilitate greater transparency, particularly on non-financial impacts such as

sustainability initiatives. By encouraging openness and communication, board independence can contribute positively to advancing financial inclusion efforts.

10. **Contrast with Previous Studies**: This study maintains authenticity and distinctiveness compared to previous research, particularly the report by Aomar Ibourk and Zakaria Elouaourti (2023). While their findings argue that financial technologies may not be suitable for ensuring financial inclusion in MENA, this research emphasizes the vital role FinTech plays in promoting inclusivity in contemporary society. The differences in findings are significant, with this study highlighting the implications of FinTech on service delivery, while Ibourk and Elouaourti focus on economic growth and exclusion from financial technologies. Additionally, this research identifies broader and more extensive barriers to financial inclusion, rooted in social and technological challenges unique to the MENA region.

6. CONCLUSION

This study aimed to evaluate the contribution of FinTech in increasing financial inclusion within the MENA region, as outlined in the abstract. Specifically, the research sought to analyze how FinTech is transforming financial services delivery, assess the effectiveness of inclusion models, identify demographic segments benefiting most from these innovations, and examine the supportive national strategies that drive inclusion.

The findings offer several important implications for both researchers and practitioners focused on advancing financial inclusion through continued digitalization. Firstly, the transformation of traditional banking, as highlighted in the first objective, underscores the need for inclusion efforts to adapt to evolving user needs and behaviors, particularly with the introduction of new technologies. Achieving this requires flexible regulatory frameworks that balance innovation with consumer protection. Such regulation will be crucial in ensuring that the benefits of FinTech are maximized over the long term, particularly as technological advancements and user behaviors continue to evolve.

In terms of objective two, the case studies highlight how the impact of different FinTech applications varies based on local market contexts. Comparative multi-country analyses can optimize lesson-sharing between systems at varying development levels, facilitating knowledge transfer. Regarding objective three, identifying the segments positively impacted, such as women, youth, and others, reveals that some groups continue to face barriers. More nuanced qualitative research that examines user experiences in-depth can help address all factors contributing to financial exclusion.

For objective four, leading nations demonstrate strategic planning that fosters synergies between regulations, infrastructure, and business models—an approach that is essential for realizing meaningful inclusion outcomes. Longitudinal cohort studies tracking the dynamic impacts of policies could provide valuable insights to guide policymakers in the future.

While the study offers valuable insights, the broad scope necessitates cautious interpretation, and future mixed-methods research surveying a more comprehensive range of settings would provide a more nuanced understanding. The study is limited in its analysis of FinTech's contribution to financial inclusion specifically in developed and major developing nations from the current era of Industry 4.0 (since approximately 2010) when relevant technologies began to mature. It does not comprehensively cover inclusion impacts globally or examine innovations predating the recent wave of digital transformation.

In conclusion, this study contributes to understanding FinTech's role in advancing universal access aligned with global development goals. However, continual reassessment that emphasizes localized contextualization is essential for maximizing the transformative impact of digital finance on lives and livelihoods. The paper lays the foundation for future studies exploring how FinTech can integrate more effectively in rural regions. Therefore, future researchers will find this report valuable for identifying areas where FinTech needs to be introduced and the challenges that need to be addressed for global success. Changes such as improved inclusivity and infrastructure development should be revisited in subsequent research.

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