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Impact of Fintech on Sustainable Financial Inclusion – A Theoritical Model Approach

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Abstract:

Fintech is often seen as an enabler for achieving sustainable financial inclusion goals and improve overall sustainability of a country. This paper discusses the variables that affect the attitude towards fintech adoption which further creates an impact on sustainable financial inclusion. This paper also attempts to create a conceptual model, using extension of standard TAM model to propose the relationship between Fintech and Sustainable Financial Inclusion. Standard review of existing literature has been used for this research. These findings may be used for further study and research and may also help in government policy formation, regulations and development of monitoring systems for Fintech, and in internal policy formations of technology-based enterprises.

Keywords: Fintech, Sustainable Financial Inclusion, TAM model, Sustainability, Financial Inclusion.

1.1 Introduction

Fintech refers to the use of technology to deliver financial services. It encompasses a wide range of applications, including mobile banking, digital wallets, blockchain technology, robo-advisors, and other innovations that enhance and streamline financial processes. Sustainability involves meeting the needs of the present without compromising the ability of future generations to meet their own needs. It is a holistic concept that considers the economic, social, and environmental dimensions of human activities. In the context of business and finance, sustainability often includes practices that minimize negative environmental impacts, promote social responsibility, and contribute to long-term economic viability. Financial inclusion refers to the availability and accessibility of financial services to all segments of society, especially those traditionally excluded from the formal financial system. The goal of financial inclusion is to empower people economically and reduce disparities in financial access.

1.2 Fintech

"Fintech" is a portmanteau of "financial technology," and it refers to the use of technology to provide financial services. Puschmann (2017) defines the term fintech as incremental or disruptive innovations in or in the context of the financial services industry induced by IT developments resulting in new intra- or inter-organizational business models, products and services, organizations, processes and systems. According to Gopalan et. al. (2012), IT costs account for 15–20% of all costs and thus are the second largest cost factor after labour costs. Since IT in financial services is very important, the use of IT has a long history in the financial services industry with banks, insurance companies and other financial intermediaries being early adaptors (Lamberti and Bu¨ger, 2008). Many of the recent fintech solutions were developed from start-up companies from the nonbanking sector (World Economic Forum 2015), banks have started to adopt many of these fintech solutions, too. Also, Fintech has spread its wings in almost every field of finance starting from consumer lending to peer-to-peer lending platforms, insurance, broking, banking, and payments to exclusive block-chain based investments initiatives like cryptocurrencies (Cumming et al., 2019).

The history of fintech can be traced back to several key developments:

1. The Emergence of Electronic Funds Transfer (EFT) Systems (1950s-1960s): The roots of fintech can be found in the development of electronic funds transfer systems, which began in the 1950s and 1960s.

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2. ATMs and the Rise of Retail Banking Technology (1960s-1970s): The 1960s and 1970s marked the proliferation of Automated Teller Machines (ATMs), making banking services more accessible to the general public (Setiawan & Maulisa, 2020).
3. The Advent of Online Banking (1980s-1990s): With the rise of the internet, financial institutions started offering online banking services in the 1980s and 1990s.
4. Digital Payment Systems and E-commerce (1990s-2000s): The late 1990s and early 2000s saw the emergence of digital payment systems and the growth of e-commerce.
5. The Rise of Mobile Banking and Wallets (2000s-2010s): The widespread adoption of smartphones in the 2000s paved the way for mobile banking applications and digital wallets.
6. Blockchain and Cryptocurrencies (2009 onwards): The introduction of Bitcoin in 2009 marked the beginning of the era of cryptocurrencies and blockchain technology.
7. Robo-Advisors and Automated Financial Services (2010s): The 2010s witnessed the rise of robo-advisors, automated investment platforms that use algorithms to provide financial advice and manage investment portfolios (Paul & Sadath, 2021).
8. Peer-to-Peer Lending and Crowdfunding (2010s): Peer-to-peer lending and crowdfunding platforms leverage technology to connect borrowers with lenders and facilitate crowdfunding campaigns, eg. Lending Kart.
9. Open Banking and APIs (2010s): Open Banking initiatives, which promote the use of open Application Programming Interfaces (APIs) to enable third-party developers to build applications and services around financial institutions, gained traction in the 2010s (Burke, 2021).
10. Regtech and Insurtech (2010s onwards): Regulatory technology (Regtech) and insurance technology (Insurtech) emerged to address regulatory compliance challenges and modernize the insurance industry through technological innovations.

The history of fintech is characterized by a continuous evolution driven by advancements in technology and changing consumer behaviours. Thakor (2020), concluded that fintech intersects banking in the four dimensions namely, disruption in traditional banking, peer -to-peer lending, digital payments and smart contracts.

1.3 Sustainability

Sustainability refers to the practice of meeting the needs of the present without compromising the ability of future generations to meet their own needs. It involves a balanced approach to economic, social, and environmental considerations to ensure long-term well-being and resilience (Scoones, 2007) (Giovannoni et. al., 2013). According to Srouji & Torre, Fintech over the period of time has emerged as a major contributor in expanding digital financial services through its vast reach and its online platform helping in achieving financial inclusion goals for a country at an increased pace (Srouji & Torre, 2022). The concept of sustainability has historical roots, and its modern understanding has evolved over time.

History of Sustainability:

1. Origins in Conservation (19th Century): The roots of sustainability can be traced back to the conservation movement of the 19th century. Thinkers like John Muir and Theodore Roosevelt advocated for the preservation of natural resources and the creation of national parks.
2. Emergence of Environmentalism (20th Century): The mid-20th century saw the emergence of modern environmentalism. Concerns about pollution, deforestation, and resource depletion gained attention. The publication of Rachel Carson's "Silent Spring" in 1962 highlighted the environmental impact of pesticides.
3. First Earth Day (1970): The first Earth Day in 1970 marked a significant milestone, bringing environmental issues to the forefront of public consciousness. It led to the creation of the U.S. Environmental Protection Agency and the passage of key environmental legislation.
4. Brundtland Report and Sustainable Development (1987): The term "sustainable development" gained prominence with the release of the Brundtland Report, officially known as "Our Common Future," in 1987 by the World Commission on Environment and Development (WCED).
5. Earth Summit and Agenda 21 (1992): The United Nations Conference on Environment and Development (Earth Summit) in 1992 led to the adoption of Agenda 21, a comprehensive plan of action for sustainable development.

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6. Kyoto Protocol (1997) and Paris Agreement (2015): International efforts to address climate change progressed with the adoption of the Kyoto Protocol in 1997, which aimed to reduce greenhouse gas emissions. The Paris Agreement in 2015 marked a global commitment to limit global warming, with a focus on keeping temperature increases well below 2 degrees Celsius.

Current Situation of Sustainability:

Global Sustainable Development Goals (SDGs): The United Nations Sustainable Development Goals (SDGs), adopted in 2015, provide a universal call to action to end poverty, protect the planet, and ensure prosperity for all. The 17 goals cover a wide range of issues, including poverty, inequality, climate action, and sustainable cities.

1. Corporate Sustainability and ESG (Environmental, Social, and Governance) Criteria: Businesses are increasingly adopting sustainability practices and integrating Environmental, Social, and Governance (ESG) criteria into their decision-making processes.
2. Renewable Energy and Circular Economy: The transition to renewable energy sources and the promotion of a circular economy, which aims to minimize waste and make the most of resources, are key components of current sustainability efforts.
3. Climate Action and Resilience: Governments, businesses, and communities are working to reduce emissions, increase resilience to climate impacts, and transition to a more sustainable and low-carbon future.
4. Biodiversity Conservation: The conservation of biodiversity has gained increased attention as ecosystems face threats from habitat loss, pollution, and climate change.
5. Social Equity and Inclusion: Achieving sustainability involves addressing social equity, promoting inclusivity, and ensuring that the benefits of development are shared equitably.

The current situation of sustainability involves a global recognition of the interconnectedness of environmental, social, and economic challenges (Caradonna, 2022). Efforts are being made at local, national, and international levels to create a more sustainable and resilient future for all.

1.4 Financial Inclusion

Financial inclusion refers to the accessibility and availability of financial services for all individuals and businesses, especially those who are unbanked or underbanked. The goal is to ensure that people have access to affordable and appropriate financial products and services, allowing them to manage their finances, save, invest, and protect against risks (Ozili, 2021). Here's a brief overview of the history and present situation of financial inclusion:

History of Financial Inclusion:

1. Early Banking Systems: Early banking systems catered primarily to the affluent, leaving a significant portion of the population without access to formal financial services.
2. Microfinance and Grameen Bank (1970s): The concept of microfinance gained prominence in the 1970s, notably with the establishment of the Grameen Bank in Bangladesh by Muhammad Yunus. Microfinance aimed to provide small loans to low-income individuals, particularly women, to support entrepreneurship and alleviate poverty.
3. Telecommunications and Mobile Money (2000s): The widespread adoption of mobile phones, particularly in developing countries, opened new avenues for financial inclusion. Mobile money services, such as M-Pesa in Kenya, allowed people to conduct financial transactions using basic mobile phones, reducing the need for physical bank branches (Demirgüç-Kunt & Klapper, 2012).

Present Situation of Financial Inclusion:

1. Digital Financial Services: The rise of digital technology has been a game-changer for financial inclusion. Digital financial services, including mobile banking, digital wallets, and online payment platforms, have made it easier for people to access and use financial services without the need for traditional brick-and-mortar banks (Sarma & Pais, 2011).

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2. Regulatory Initiatives: Regulatory frameworks that enable the establishment of new financial institutions, ease the process of account opening, and encourage innovation have contributed to expanding financial access.
3. Fintech for Financial Inclusion: Fintech companies play a crucial role in advancing financial inclusion (Beck, 2020). Through innovative technologies fintech firms are creating solutions that address the specific needs of underserved populations, including access to credit and insurance.
4. Global Initiatives: International organizations and governments have recognized the importance of financial inclusion in achieving broader development goals. The United Nations' Sustainable Development Goals (SDGs) include a target (SDG 8.10) to ensure that everyone has access to financial services by 2030.
5. Partnerships and Collaborations: Public-private partnerships and collaborations between financial institutions, governments, and non-profit organizations are becoming increasingly common.
6. Financial Literacy and Education: Efforts to enhance financial literacy and education are integral to promoting financial inclusion.

Challenges and Opportunities:

Challenges to financial inclusion still exist, including issues related to infrastructure, regulatory barriers, and cultural considerations. However, ongoing efforts and technological advancements present opportunities to overcome these challenges and further expand financial access globally.

The present situation of financial inclusion reflects a dynamic landscape with continuous advancements driven by technology, policy changes, and collaborative efforts to ensure that financial services are accessible to all, regardless of their socioeconomic status.

2.1 Financial Inclusion and Sustainability – Sustainable Financial Inclusion

Financial inclusion and sustainability are interconnected, and the term "sustainable financial inclusion" may be used to encapsulate the idea of making financial services accessible, affordable, and beneficial for all while considering long-term environmental, social, and economic impacts (Le, Chuc, & Taghizadeh-Hesary, 2019).

The below table shows the challenges in achieving specific SDGs and the opportunities provided by digital financial inclusion in achieving the stated goals.

	SDG	Challenges	Opportunities through Digital Financial Inclusion
SDG1	No Poverty	Illness, natural disaster, no bank account	Protects against risk, low-cost financial services.
SDG2	No Hunger	agricultural risk, lower returns to farmers	Credit line access to farmers, digital micro-insurance for risk coverage
SDG3	Good Health & Well Being	Expensive healthcare, low health insurance coverage	Affordable healthcare, micro-insurance
SDG4	Quality Education	Costly, delayed payments to teachers	Student loans, timely wages to teachers
SDG5	Gender Equality	Lesser women entrepreneurs, credit gap and lower wages for women	Inclusive banking brings more women to formal banking system, increased credit lines
SDG6	Clean Water & Sanitation	Billing, metering, collecting costs for water and other facilities, high costs for utility	Lower operating costs, increased modes of payments, sustainable services
SDG7	Affordable & clean energy	High costs of power, low collections	Sustainable & affordable energy, more ways of collections, reduced costs
SDG8	Decent work & economic growth	Cash payments of wages & salaries, no credit lines for business expansion	Online & real-time payments, credit lines availability
SDG9	Industry, Innovation & infrastructure	Lower access to finance, expensive	Cost effective, increased credit lines for MSME

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SDG10	Reduced Inequality	Poor rural population, high cost of remittances	Increased reach and financial product penetration, reduced remittances cost
SDG11	Sustainable cities & communities	Poor transport systems & poor living systems	Improved transportation through easy & faster fare collection systems, micro-mortgages by DFS platforms
SDG13	Climate Action	Global warming, displaced population due to climate change	Responsible & environment friendly investment, sustainable and green power financing
SDG16	Peace Justice & Strong Institutions	Harder to trace funds, high transaction costs for the government	Transparent, auditable records, reduced operational costs

Table 1: SDGs – Challenges & Opportunities

Here's how financial inclusion contributes to sustainability, and why the term "sustainable financial inclusion" is apt:

1. Economic Development: As people gain access to financial services, they can better manage their finances, invest in education and entrepreneurship, and contribute to overall economic growth.
2. Poverty Alleviation: Access to credit, savings, and insurance enables individuals to weather financial shocks, invest in income-generating activities, and break the cycle of poverty (Machdar, 2020).
3. Environmental and Social Impact Investing: Fintech platforms, for instance, can facilitate impact investing by connecting investors with projects that align with sustainability goals, such as renewable energy initiatives or socially responsible enterprises.
4. Resilience to Climate Change: Financial inclusion can enhance communities' resilience to climate change by providing access to insurance and financial tools.
5. Reduced Inequality When marginalized and vulnerable populations gain access to financial services, it can lead to a more equitable distribution of resources, fostering social cohesion and stability.
6. Inclusive Economic Growth: Sustainable financial inclusion supports inclusive economic growth by ensuring that the benefits of development are shared across all segments of society (Yang & Zhang, 2020).
7. Gender Equality: By providing women with access to financial services, including credit and savings, it can empower them economically and contribute to more balanced and sustainable development.
8. Environmental Responsibility in Finance: This may include encouraging green finance initiatives, investments in sustainable technologies, and incorporating environmental criteria into lending and investment decisions.
9. Social and Community Development: Financial inclusion contributes to the social development of communities by enabling them to access resources for education, healthcare, and infrastructure (Alhammadi, 2023).
10. Long-Term Economic Stability: When individuals and businesses have access to a range of financial services, they are better equipped to navigate economic challenges, contributing to the overall sustainability of the economy and providing long-term economic stability.

In summary, the term "sustainable financial inclusion" encompasses the idea that providing financial services to all segments of society should not only be inclusive in the short term but should also consider the long-term impacts on the environment, society, and the economy. This integrated approach recognizes the interconnectedness of financial inclusion and sustainability in achieving holistic and lasting development.

2.2 Fintech's impact on Sustainable Financial Inclusion

2.2.1 Concept creation

According to existing literature review, Fintech has a significant impact on sustainable financial inclusion (Nurohman, Kusuma, & Narulitasari, 2021). Fintech leverages innovative technologies to provide financial services more efficiently, affordably, and inclusively (Philippon, 2019). Here's how fintech contributes to sustainable financial inclusion:

1. Increased Accessibility: Fintech solutions, particularly mobile banking and digital wallets, have expanded financial services to areas with limited access to traditional banking infrastructure.

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2. Lower Costs and Affordability: Fintech has the potential to reduce the cost of financial services through digital channels. This makes financial products more affordable for individuals with lower incomes, addressing a key barrier to traditional banking for many unbanked and underbanked populations.
3. Alternative Credit Scoring: Fintech firms often use alternative data sources, such as mobile phone usage and payment history, to assess creditworthiness. This enables them to provide credit to individuals who may not have a traditional credit history.
4. Digital Identity Solutions: Fintech plays a role in creating and implementing digital identity solutions, which are crucial for financial inclusion (Arner et. al., 2020). Digital identities can help individuals without traditional forms of identification to access financial services securely, facilitating their participation in the formal financial system.
5. Peer-to-Peer Lending and Crowdfunding: Fintech platforms facilitate peer-to-peer lending and crowdfunding, allowing individuals and small businesses to access funding directly from a network of investors (Maskara, et. al., 2020). This decentralized approach can provide financing to those who may be excluded from traditional banking systems.
6. Blockchain for Financial Inclusion: Blockchain technology, a decentralized and secure ledger system, is used in fintech for applications such as cross-border payments, remittances, and supply chain finance. These applications can reduce transaction costs, enhance transparency, and increase financial inclusion, especially in regions with limited access to traditional banking (Schuetz & Venkatesh, 2020).
7. Insurtech for Microinsurance: Fintech solutions enable the delivery of microinsurance products, making insurance more accessible and affordable for low-income individuals and small businesses (Adeola et. al., 2017). This helps protect them against various risks.
8. Financial Education and Inclusion Apps: Fintech applications can empower individuals with the knowledge and skills to make informed financial decisions, promoting a more sustainable and responsible use of financial services (Raj & Upadhyay, 2020).
9. Regulatory Technology (Regtech): Fintech solutions in the regulatory technology (Regtech) space help streamline compliance processes. Simplifying regulatory requirements can lower the barriers for financial institutions to offer services to underserved populations while ensuring adherence to necessary regulations.
10. Collaboration and Partnerships: Fintech firms often collaborate with traditional financial institutions, governments, and non-profit organizations to create inclusive solutions.

In summary, fintech plays a crucial role in advancing sustainable financial inclusion by leveraging technology to overcome traditional barriers, reduce costs, and create innovative solutions that empower individuals and businesses to participate in the formal financial system. This contributes to broader economic development and social progress.

2.2.2 Variables identification

The Technology Acceptance Model (TAM) is a widely used framework for understanding and predicting users' acceptance and adoption of technology (Khatri, et. al., 2020). In the context of fintech adoption and its impact on sustainable financial inclusion, one can build upon the TAM framework and extend it to include variables that are relevant to both fintech adoption and sustainable financial inclusion.

Basis the review of existing literature the following variables have been identified that affect the Attitude towards Fintech Adoption which further affects the Sustainable Financial Inclusion.

Independent Variables:

1. Perceived Usefulness (PU): It may be defined as the degree to which an individual believes that using fintech will enhance their effectiveness in achieving financial inclusion goals sustainably. PU has a **positive** impact on ATTITUDE as per existing literature.
2. Perceived Ease of Use (PEOU): It may be defined as the degree to which an individual believes that using fintech is free of effort or is easy to use. PEOU has a **positive** impact on ATTITUDE as per existing literature.
3. Perceived Risk (PR): Perceived risk in the context of fintech adoption refers to the individual's assessment of potential negative outcomes or uncertainties associated with using fintech services. This can include concerns

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related to data security, privacy, financial loss, or the reliability of fintech platforms. Existing literature suggests that PR has a **negative** impact on ATTITUDE.

4. Responsible Financial Practices (RFP): Responsible financial practices refer to ethical and sustainable behaviours in financial activities. This includes transparency, fair lending practices, and adherence to ethical standards in financial transactions. It also involves a commitment to social and environmental responsibility in financial decision-making. Existing literature suggests that RFP has a **positive** impact on ATTITUDE.
5. Perceived Social Equity (PSE): Perceived social equity is the individual's perception of fairness, justice, and inclusivity in the distribution of financial resources and opportunities within society. In the context of fintech, it reflects how individuals perceive the impact of fintech adoption on reducing social and economic disparities. Existing literature suggests that PSE has a **positive** impact on ATTITUDE.

Dependent Variables:

1. Attitude towards Fintech Adoption (ATTITUDE): Attitude towards Fintech Adoption is a dependent variable that may be defined as the consumers' overall positive or negative feelings to use the fintech platform or product. All the independent variables have an impact on ATTITUDE.
2. Sustainable Financial Inclusion (SFI): Sustainable Financial Inclusion refers to the long-term and equitable provision of financial services to individuals and communities, taking into account economic, social, and environmental factors. It involves promoting inclusive financial practices that contribute to economic development, reduce social inequalities, and align with principles of environmental sustainability. ATTITUDE has an impact on SFI. SFI is the dependent variable and the final outcome variable of the proposed research model.

2.2.3 Proposed Theoretical Model

Upon study of existing articles and extensive review of literature undertaken a research model is proposed which is an extension to the standard TAM model which is diagrammatically represented below.

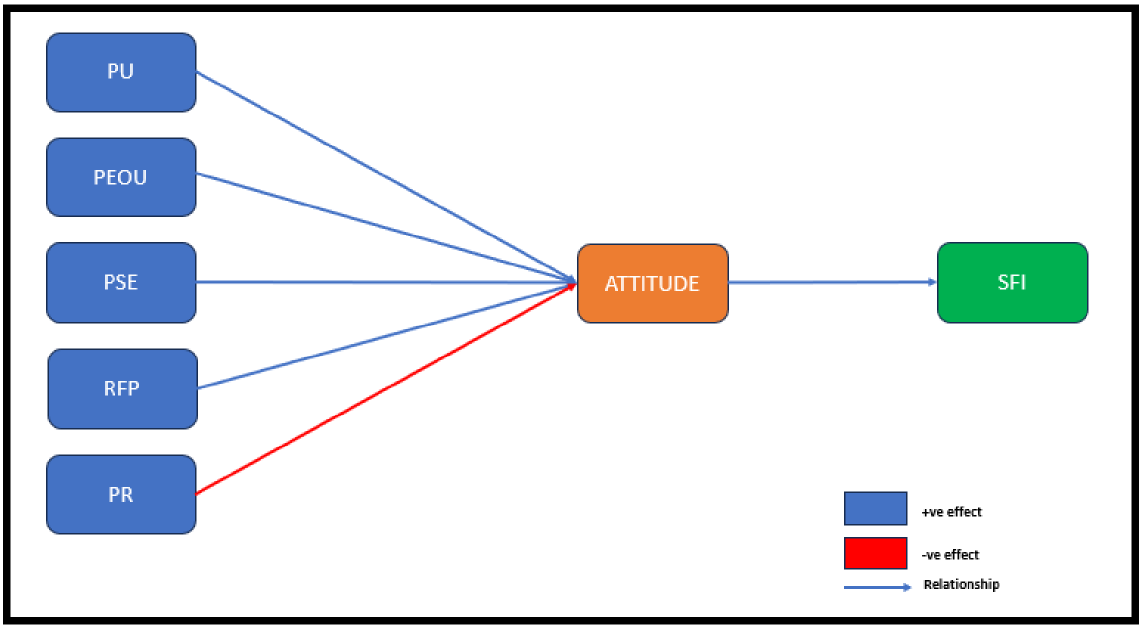

Fig 1: Diagrammatic representation of proposed model

3.1 Conclusion

Basis the existing literature the impact of fintech adoption on sustainable financial inclusion is studied. The existing literature suggests that positive increment in the Attitude towards Fintech Adoption has a positive impact on Sustainable Financial Inclusion. Also, by extending the standard Technology Acceptance Model or TAM major variables that affect

Attitude towards Fintech Adoption has been identified. The identified variables like Perceived Usefulness, Perceived Ease of Use, Responsible Financial Practices, Perceived Social Equity has a positive impact on the Attitude towards Fintech Adoption and Perceived Risk has a negative impact on the Attitude towards Fintech Adoption.

Fintech's collaboration with various financial industries may help in quickly achieving the sustainable financial inclusion goals. Thus, it can be concluded that increased Fintech Adoption may help in achieving the sustainable financial goals quickly and more effectively.

4.1 Implication and Limitation

The results may help in formation of government policy, regulations, and developing a monitoring system that shall further streamline and support Fintech to meet sustainable financial inclusion goals. This study shall also help the management teams in internal policy formulation of various banks, corporates, and technology-based enterprises.

The major limitation is that the lack of research in the fields combining the overall impact of Fintech on Financial Inclusion and Sustainability. This study proposes a theoretical model and contributes to the existing literature and may be tested using primary and secondary data. There is further scope of research in this field.

5.1 Conflict of Interest

The author declares no conflict of interest.

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