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The role of fintech and digital transformation in achieving sustainable development goals: Empirical evidence from Papua New Guinea as an emerging pacific economy.

Harika Palakurthi
IBSUniversity, Port Moresby, Papua New Guinea
palakurthi.harika@ibs.ac.pg

Levai John
IBSUniversity, Port Moresby, Papua New Guinea
levai.john@ibs.ac.pg

Abstract

Financial Technology (FinTech) and digital transformation are gradually more recognized as fundamental drivers of economic development, financial inclusion, and sustainable growth in developing economies. In Papua New Guinea (PNG), an emerging Pacific economy, digital technologies and financial innovations have the potential to address persistent development challenges, including limited access to financial services, geographic barriers, and socio-economic inequalities. This study examines the role of FinTech and digital transformation in advancing the Sustainable Development Goals (SDGs) within the PNG context. Using an empirical approach, the study examines the relationships among digital financial services, technology adoption, financial inclusion, and sustainable development outcomes. Data will be collected from relevant stakeholders, including consumers, businesses, and financial service providers, through surveys and/or secondary sources. The study aims to assess how digital transformation influences inclusive economic participation, improved access to financial services, business development, and wider development goals. Findings are expected to provide insights for policymakers, financial institutions, and development stakeholders regarding opportunities, challenges, and policy directions for leveraging FinTech and digital innovation to support sustainable development in Papua New Guinea and similar emerging Pacific economies.

Keywords: FinTech, digital transformation, sustainable development goals, financial inclusion, Papua New Guinea, emerging economy, pacific region.

1. Introduction

Financial technology (fintech) refers to the application of innovative technologies to products and services in the business industry. This broad term incorporates a wide range of technological advances in financial services, including mobile banking, online lending platforms, digital payment systems, robo-advisors, and blockchain-based applications such as cryptocurrencies. Financial technology companies include both startups and established technology and financial firms that aim to improve, complement, or replace traditional financial services. Particularly, fintech has become part of the global environment, with the advent of the COVID-19 pandemic in 2020[1]. While fintech applications have undoubtedly changed the way money is spent, borrowed, invested and saved at various junctures of the financial system, they are increasingly being used to address sustainable development.

Papua New Guinea records the argument on financial technology from a highly distinctive development context. It is a lower-middle-income country in the Pacific, with a population of about 11.8 million, more than 850 indigenous languages, and a settlement structure in which roughly 85 percent of the population lives in rural areas. Its economy is shaped by a dual structure: agriculture, forestry, and fishing employ most of the labour force, much of it informally, while minerals and energy extraction generate a large share of exports and national income. This combination of rural dispersion, linguistic diversity, informality, and uneven infrastructure creates major frictions in access to markets, state services, and formal finance. [2] PNG-specific policy research shows that commercial banks have struggled to extend branch networks to district level because sparsely populated areas, mountainous terrain, numerous islands, and deteriorating infrastructure raise transport and operating costs. In a country where location still strongly determines economic opportunity, financial inclusion is not only a banking issue; it is also a problem of geography, infrastructure, and state capacity.[3]

At the global level, the case for digital finance has become increasingly compelling. The World Bank describes access to affordable payments, savings, credit, and insurance as critical for poverty reduction and economic growth, AS per observations that digital financial services reduce transaction costs and expand access for underserved groups. Its digital financial services white paper supplementary claims that these tools play a critical role in achieving the Sustainable Development Goals because they improves economic recovery, resilience, and contribute to economic development and poverty reduction.[4] The PNG Digital Transformation Policy defines digital transformation as the integration of digital technology into government business and the wider ICT sector, with the explicit aim of changing how public services operate and deliver value to citizens. The policy states that rural communities should be able to access government information and services through mobile phones and other digital channels with minimal cost, and it links digital transformation to better service delivery, greater efficiency, improved governance, lower costs, and the achievement of sustainable development goals at national and subnational levels. [5]

There are already concrete examples of these pathways in PNG. UNCDF's partnership with Digicel's CellMoni aimed to expand the rural agent network in the Sepik region and bring more than 100,000 new customers into the formal financial sector through mobile money, while also developing use cases in agricultural value chains. A separate UNCDF-UNDP Rapid Finance Facility project launched in 2022 focused on women-led MSMEs in Lae and Port

Moresby, combining digital tools, financial services, and capability building to help women entrepreneurs participate more effectively in the digital economy. These initiatives show how digital finance can intersect directly with SDG 5 on gender equality and SDG 8 on inclusive economic growth by expanding women's agency, supporting enterprise development, and reducing the frictions of cash-based commerce. At the same time, PNG has begun linking inclusion with climate and environmental goals: the Inclusive Green Finance Policy was launched in 2023, the Green Finance Centre was established in 2024, and CEFI's 2024 reporting described green finance as part of a broader shift toward climate resilience and sustainable development. This means FinTech in PNG is increasingly being discussed not only as a payments issue, but also as a vehicle for inclusive adaptation, green investment, and more resilient livelihoods.

PNG still lacks sufficiently integrated empirical evidence on how digital financial services, technology adoption, and financial inclusion interact with broader sustainable development outcomes. UNCDF has explicitly stated that interventions to improve digital and financial literacy in Pacific Island countries, including PNG, have been limited by a lack of updated data on digital and financial skills, access, and usage. In 2024, the PNG digital and financial literacy study was framed as a baseline to help measure competencies and target interventions for women, MSMEs, migrant workers, and rural communities. This makes the proposed study both timely and necessary.

In PNG, digital transformation is advancing through payment-system development, sandbox regulation, mobile money expansion, digital identity experimentation, women-focused inclusion programs, and green-finance initiatives. Yet progress remains irregular, and important questions persist about the actual strength of the relationships between digital financial services, technology acceptance, financial inclusion, business development, and sustainable development outcomes.

Accordingly, this study is well positioned to observe how FinTech and digital transformation are reshaping economic participation in Papua New Guinea, whether they are helping to narrow venerable inclusion gaps, and how far they are contributing to SDG-linked outcomes such as financial access, enterprise growth, gender inclusion, resilience, and sustainable development. In doing so, it can provide evidence-based guidance for regulators, financial institutions, and development partners seeking to leverage digital innovation for inclusive and sustainable growth in PNG and across other emerging Pacific economies.

1.1 Significance of the study

- Studies the role of FinTech and digital transformation in achieving Sustainable Development Goals (SDGs) in Papua New Guinea.
- Provides insights into how digital financial services influence financial inclusion and socio-economic development.
- Facilitates banks, mobile money providers, and FinTech firms in Port Moresby to understand and improve digital service delivery.

1.2 Research problem

- While FinTech and digital transformation are expanding in Papua New Guinea, there is limited empirical evidence on how they contribute to financial inclusion and the achievement of Sustainable Development Goals (SDGs), particularly in the Port Moresby context.
- The effectiveness of FinTech adoption may be constrained by challenges such as low digital literacy, infrastructure limitations, limited network access, and regulatory barriers, which can impact its contribution to sustainable development outcomes.

1.3 Research objectives

1. To analyse the role of FinTech adoption and digital transformation in achieving Sustainable Development Goals (SDGs) in Port Moresby, Papua New Guinea.
2. To study the relationship between FinTech adoption, digital financial services, and financial inclusion outcomes.
3. To recognize the key factors influencing the effectiveness of FinTech adoption, including digital literacy, infrastructure, network access, and regulatory conditions.

1.4 Limitations of the study

- The study is limited to Port Moresby, Papua New Guinea, and consequently, the findings may not fully represent rural areas or the entire country.
- The study focuses mainly on FinTech adoption, digital transformation, financial inclusion, and SDG-related outcomes, and ignores the factors influencing sustainable development.
- Data availability and accessibility may limit the study; updated information on digital finance and FinTech activities in PNG is still in progress.
- The study has constraints related to sample size, respondent availability, and time limitations during data collection and analysis.
- Findings of the study are based on the selected period and research setting; hence, results may change across different locations and time periods.

2. Literature review

The relationship among finance, technological innovation, and development has advanced notably over the past century. Long-established theories highlighted the role of financial systems in mobilizing savings, allocating capital, and supporting productive investment as essentials for economic growth (Schumpeter, 1911; McKinnon, 1973; Levine, 1997). However, modern development deliberations gradually recognize that growth alone is insufficient; development outcomes must also be inclusive, sustainable, and socially transformative, consistent with the United Nations Sustainable Development Goals (SDGs) framework (United Nations, 2015).

Financial Technology (FinTech) and digital transformation have appeared as important drivers of development policy and economic modernization. FinTech broadly refers to the application of digital technologies, including mobile payments, digital banking, blockchain, artificial intelligence, big data analytics, and platform-based financial services, to progress financial service delivery, accessibility, and efficiency (Arner et al., 2016). Digital transformation expands beyond financial systems, incorporating the wider integration of digital technologies into economic, institutional, and social structures (Vial, 2019).

FinTech can contribute directly to multiple SDGs by expanding financial inclusion, decreasing the transaction costs, improving market participation, and enabling access to digital economic opportunities, particularly in underserved and geographically isolated communities (Demirgüç-Kunt et al., 2018; Ozili, 2018). Digital financial services have been linked with poverty reduction (SDG 1), greater access to education and economic opportunities (SDGs 4 and 8), gender inclusion (SDG 5), and reduced inequalities (SDG 10), especially within developing and emerging economies (World Bank, 2022).

By dropping traditional barriers to financial intermediation, digital technologies challenge the limitations of conventional banking systems. Mobile money systems, digital wallets, and branchless banking models allow financial services to reach populations previously excluded by distance, cost, and documentation requirements (Jack & Suri, 2014).

This emerging consensus remains contested. Critics caution that digitalization does not automatically translate into equitable development outcomes. Persistent digital divides, weak regulatory environments, limited digital literacy, cybersecurity vulnerabilities, and unequal access to technological infrastructure may reinforce rather than reduce existing inequalities (UNCTAD, 2021; FSB, 2022). Others argue that FinTech platforms may generate new risks related to algorithmic bias, consumer protection failures, data privacy concerns, and market concentration within digital ecosystems (Arner et al., 2020; Zetzsche et al., 2020).

These debates are particularly relevant to Papua New Guinea (PNG), an emerging Pacific economy characterised by dispersed populations, difficult geography, infrastructure limitations, and historically low levels of financial inclusion. Despite recent advances in mobile connectivity and digital service adoption, large segments of the population continue to face barriers in accessing formal financial services, digital infrastructure, and technology-enabled economic opportunities (Bank of Papua New Guinea, 2023). In such an environment, FinTech and digital transformation are increasingly viewed not merely as technological innovations but as potential instruments for addressing wider development challenges linked to inclusion, resilience, and sustainable growth.

Digital finance may offer PNG a practical mechanism to overcome geographical destruction, reduce service delivery costs, strengthen SME participation, and expand access to financial services among rural and underserved communities. Such outcomes align closely with national development priorities and SDG commitments relating to poverty reduction, inclusive growth, innovation, and reduced inequalities (Asian Development Bank, 2022). From a more cautious perspective, however, the effectiveness of FinTech-driven development in PNG depends heavily on institutional readiness, regulatory capacity, infrastructure availability, digital capability, and public trust in emerging technologies.

As per the relationship between FinTech, digital transformation, and sustainable development in Papua New Guinea, it represents an empirical question requiring context-specific investigation. This study contributes to that inquiry by examining how digital financial services, technology adoption, and digital transformation influence sustainable development outcomes within PNG's emerging economic environment.

3.0 Research methodology

The study uses a questionnaire survey method to collect primary data from respondents in Port Moresby, Papua New Guinea. It is suitable because it allows the collection and analysis of numerical data to analyse the relationship between FinTech adoption, digital transformation, financial inclusion, and SDG outcomes.

3.1 Research design

The study engages a descriptive and explanatory research design using a cross-sectional survey design.

- **Descriptive design** – to describe respondents' views, usage patterns, and awareness of digital financial services.

- **Explanatory design** – to examine the relationship between study variables.

A cross-sectional survey will be conducted, where data are collected from respondents at one point in time through a questionnaire.

3.2 Hypotheses development:

The study will use a *cross-sectional survey design*, where data will be collected from respondents at a single point in time. This design is appropriate because it allows us to obtain relevant information efficiently within the study period and analyse patterns, relationships, and influencing factors associated with FinTech and sustainable development in the Port Moresby context.

H1: FinTech adoption and digital transformation have a positive and significant relationship with financial inclusion and Sustainable Development Goal (SDG) outcomes in Port Moresby, Papua New Guinea.

H2: Digital literacy, infrastructure, network accessibility, and regulatory conditions significantly influence the effectiveness of FinTech adoption and digital transformation in achieving SDG outcomes in Port Moresby, Papua New Guinea.

3.3 Data and methodology

Data

This study uses primary data collected through a structured questionnaire survey administered to respondents in Port Moresby, Papua New Guinea. The data focus on FinTech adoption, digital transformation, financial inclusion, and Sustainable Development Goal (SDG) outcomes.

The questionnaire targets respondents, including:

- Bank customers
- Mobile money users
- Business owners/entrepreneurs
- Employees and professionals
- Students and general consumers

4. Results and data analysis

4.1 Respondent demographic profile (n = 100)

Table 1: Demographic Characteristics of Respondents

Variable	Category	Frequency	Percentage
Gender	Male	58	58%
	Female	42	42%
Age	18–25	35	35%
	26–35	40	40%
	36–45	18	18%

Interpretation: Most respondents were male (58%) and belonged to the 26–35 age group (40%), which indicates the strong representation of economically active and digitally engaged individuals.

Descriptive statistics

Table 2: Descriptive Statistics of Study Variables

Variable	Mean	Standard Deviation
FinTech Adoption & Digital Transformation	4.12	0.71
Financial Inclusion & SDG Outcomes	3.95	0.68
Digital Literacy, Infrastructure & Network Access	3.88	0.74

Interpretation: FinTech Adoption noted a relatively high mean score (M = 4.12), suggesting strong usage and awareness among respondents in Port Moresby.

4.3 Correlation analysis

Table 3: Pearson Correlation Matrix

Variables	X_1	X_2	Y
X_1 FinTech Adoption	1		
X_2 Digital Literacy	0.54**	1	
Y Financial Inclusion & SDG Outcomes	0.68**	0.61**	1

($p < 0.05$)

Interpretation: FinTech Adoption displayed a strong positive relationship with Financial Inclusion and SDG Outcomes (**$r = 0.68$**).

4.4 Regression analysis

Table 4: Multiple Regression Results

Variable	Coefficient (β)	t-value	p-value
Constant	1.245	3.214	0.002
FinTech Adoption (X_1)	0.482	5.876	0.000
Digital Literacy (X_2)	0.315	4.214	0.001

$R^2 = 0.62$

Interpretation: The results indicate that FinTech Adoption positively and significantly influences Financial Inclusion and SDG Outcomes ($\beta = 0.482$, $p < 0.05$).

5.1 Findings

The findings of the study are based on data collected from 100 respondents in Port Moresby, Papua New Guinea. The analysis examined the relationship between FinTech adoption, digital transformation, financial inclusion, and SDG outcomes.

The descriptive statistics indicate that respondents showed a relatively high level of awareness and usage of digital financial services. Many of the respondents stated that they are currently using services such as mobile banking, mobile money, online payments, and digital financial platforms. The average scores indicate positive experiences regarding the usefulness of FinTech and digital transformation in improving access to financial services and supporting development outcomes.

The correlation analysis also showed a positive relationship between FinTech adoption and financial inclusion & SDG outcomes. This suggests that higher adoption of digital financial technologies is associated with better access to financial services, easier financial transactions, and stronger observations of economic and development benefits among respondents in Port Moresby.

This indicates a positive relationship between digital literacy, infrastructure, and network access and the effectiveness of FinTech adoption. As respondents are having better knowledge of internet access, digital skills, and access to digital devices showed higher engagement with digital financial services.

The regression analysis further endorsed that FinTech adoption and digital transformation significantly influence financial inclusion and SDG outcomes. The results suggest that increased use of digital financial services contribute positively to improved financial access, economic participation, and perceived sustainable development outcomes. Overall, the findings prove that FinTech adoption and digital transformation have a meaningful contribution to financial inclusion and SDG-related outcomes in Port Moresby, Papua New Guinea, while highlighting the importance of supportive digital conditions for effective adoption and usage.

5.2 Discussion

The findings suggest that FinTech adoption and digital transformation play an important role in improving financial inclusion and SDG outcomes in Port Moresby. Higher use of mobile banking, mobile money, and digital payment systems was associated with better access to financial services and stronger perceptions of development benefits.

The study also observed that digital literacy, infrastructure, and network access positively influence the effectiveness of FinTech adoption. And also witnessed that the respondents are having better digital skills and internet access demonstrated greater use of digital financial services. This enhances access, efficiency, and economic participation in emerging economies. However, infrastructure limitations and unequal digital access remain important challenges affecting broader adoption and sustainable development outcomes.

7. Conclusion

The paper examined the role of FinTech adoption and digital transformation in achieving Sustainable Development Goals (SDGs) in Papua New Guinea, with a particular focus on Port Moresby. Using a quantitative research approach and questionnaire-based survey data, the study explored the relationship between FinTech adoption, financial inclusion, digital literacy, infrastructure, and SDG-related outcomes.

The findings signal that FinTech adoption and digital transformation positively contribute to financial inclusion and sustainable development outcomes. The increased use of digital financial services such as mobile banking, mobile money, and online payment systems was associated with improved access to financial services, easier transactions, and enhanced economic participation. The study also found that digital literacy, infrastructure, and network access are important supporting factors influencing the efficacy of FinTech adoption. Better digital skills and improved digital access were associated with higher levels of digital financial service usage.

Overall, the study concludes that FinTech and digital transformation have significant potential to support financial inclusion and SDG achievement in Port Moresby, Papua New Guinea. However, improving digital capabilities, infrastructure, and access remains important for maximising the benefits of digital financial services and promoting inclusive, sustainable development outcomes.

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