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Impact of Digital Financing and Human Development in Selected State Agencies in Osun State

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Abstract

As more and more people use digital financial solutions, there is a greater demand to evaluate the role of these new innovations in the socio-economic development and human wellbeing. The paper looks at how digital financing can influence human development in the chosen state agencies in Osun State, Nigeria, between 2024 and 2025. Those agencies include the Ministry of Health, State Education Board, Agricultural Development Corporation, and Microfinance Directorate and the Social Welfare Department. The research evaluates the level to which digital financing boosts service delivery, financial inclusion, and human development within the public institutions. This involved the use of a mixed-method methodology, which involved surveys (n= 374) and in-depth interviews (n= 15) that were selected based on the five agencies. Descriptive and inferential statistics were employed to analyse data in order to determine the connection between digital financing adoption and the increases in human development indicators like education, healthcare, and economic empowerment. The results show that although digital financing has enhanced the efficiency of operations in some agencies, its potential in human development has not been fully exploited. The chronic issues like the lack of digital infrastructure, poor public awareness and the unwillingness to embrace technology have categorically inhibited institutional performance. The paper identifies the necessity of policy changes, capacity building and enhanced public-private collaborations to optimize the advantages of digital financing on human development. This study highlights the need to integrate digital financial strategies in the governance systems in order to promote service delivery and sustainable development in Osun State.

Keywords: Digital financing, human development, financial inclusion, state agencies, Osun State.

1. Introduction

Digital financing has been adopted as a revolutionary tool to enhance governance, financial inclusion as well as human development around the world. It also includes a wide variety of technological-based solutions that support effective financial transactions and transparency in state administration, including mobile banking, e-payments, online budgeting, and digital wallets (Demirguc-Kunt et al., 2022). Digital financing is becoming an important concept in the Nigerian setting, as a perceived tool to foster socio-economic inclusion, reduce corruption and improve delivery of government services. In the last ten years, the Nigerian government has initiated a number of reforms to digitize its financial management procedures which include Treasury Single Account (TSA), Government Integrated Financial Management Information System (GIFMIS), and Integrated Payroll and Personnel Information System (IPPIS). These programs are a national appreciation of how technology can help in providing a smooth flow of bureaucratic functions, minimizing leakages, and enhancing financial discipline at every level of government (Osun State Government, 2024).

These national developments are reflected in Osun State which is located in southwestern Nigeria. By 2024, the population of the state is already more than four million, although the human development indicators are also lower than the country. Its literacy is 78.2 % and the availability of healthcare services is limited especially in the rural regions (Osun State Government, 2024). The lack of structures and economic weaknesses, manifested through the absence of employment and underemployment, 14.1 % and 22.3 % respectively, highlight the presence of poverty. It is in this context that digital financing presents the possible opportunity at enhancing efficiency, access to more services, and economic empowerment. The state is able to make financial transactions in government institutions more transparent, timely pay salaries and access government welfare programmes easier by ensuring that transactions are digitised.

DFS have been globally recognised to be triggers of human development. In Kenya, M-Pesa has proved to be successful in terms of digitalising access to credit and savings by low-income populations. Equally, mobile money and e-banking in Ghana has gone a long way in enhancing savings by households and minimizing financial exclusion amongst rural populations. These international cases underscore the fact that digital financing is not only involved in increasing financial access but also expanding social outcomes in general, such as women empowerment, entrepreneurship, and educational opportunities. This trend is shown in the experience of Nigeria itself as presented in the Digital Financial Inclusion Strategy of the Central Bank (2020). It focuses on the incorporation of the financial technology (fintech) in governance frameworks in the state to realize an inclusive economic growth. Moreover, the partnerships between the National Information Technology Development Agency (NITDA) and the National Universities

Commission (NUC) are also planned to introduce digital literacy to tertiary education and provide future professionals with the skills to work in a digitalized economy (NITDA, 2023).

Even with these policy improvements, subnational implementation is still not even. The barriers to the complete reap of digital financing benefits are structural issues that, to a great degree, are common in many state agencies, especially in Osun State, like limited digital infrastructure, poor technical training, and poor institutional coordination (Osun State Government, 2024). Indicatively, Osun Social Intervention Fund and the Ministry of Education have embarked on the digitalization of welfare schemes and school fees. Although these reforms have enhanced accountability and minimized fund leakages, they have failed to clear all the manual processes or delays. Limitation of effectiveness is still to be provided by poor internet connection, inadequate cybersecurity and low staff training. Political will as evidenced by the process of developing the 2023 Osun State ICT Policy that aims at digitising all government transactions by 60 % by 2025 is met by practical barriers that hamper rapid change (Osun State Government, 2024).

Digital financing of public administration is not just another term of electronic payment systems, but a more comprehensive restructuring of financial resources management, distribution and control. Digital financing promotes transparency by use of automated audit and electronic record keeping which minimizes corruption and fiscal irresponsibility. It also enables real-time analysis of data to be used during decision-making, which allows the policymakers to spend the resources better. Theoretically, the concept of digital financing is closely related to the Technology Acceptance Model (TAM) that describes the relation between perceived usefulness and the perception of ease of use and technology acceptance among the employees of the government. Resistance where digital systems are seen as complex or unreliable, leads to innovation stalling in most cases.

Conversely, human development is a sum of the growth of the capability of people to live productive and meaningful lives. In the context of the public sector, it is the enhancement of skills, motivation and efficiency of employees which translate to the delivery of better services. Human development is described by the United Nations Development Programme (UNDP) as the development of the options of people in education, health, and income (UNDP, 2023). Digital financing interacts with these dimensions because it increases the financial accessibility and accountability, which in turn indirectly leads to improved education funding, health outcomes, and reduction of poverty. As an illustration, e-budgeting means that the funds allocated to health and education among other resources are delivered to the target beneficiaries in good time, enhancing the formation of human capital.

Digital financing and human development are thus two-way relationships: technological adoption may help spur economic empowerment and service efficiency, but there has to be a skilled and motivated workforce to operate and maintain these digital systems to be effectively employed. In Osun State, human capacity building is reflected in the programs like the Imole Skills Show (2023)

that were used to teach young people digital and entrepreneurial skills (Osun State Ministry of Youth Development, 2023). The process of translating such training into material institutional capacity is underdeveloped, however. It is reported that the skills of a significant number of government officials remain low in the sphere of using digital tools, which limits the potential state to introduce e-governance programs effectively (Osun State Ministry of Innovation, Science & Technology, 2023).

Poor infrastructural facilities also contribute to this challenge. According to the estimates provided by the National Bureau of Statistics (NBS, 2024), only 35 % of the rural population of Osun can be confident in receiving digital financial services. This inequality does not only reduce financial inclusion, but also increases the existing inequalities between urban and rural populations. When online channels of social welfare or revenue collection do not extend to the remote locations, the vulnerable groups particularly the women, informal workers and small time traders are left out in development programmes. Such disparity in accessing the digital world compromises directly with human development goals.

In addition, disjointed data systems and the limited inter-agency collaboration have limited the process of measuring and evaluating the outcomes of digital finance. Unless built-in monitoring systems are in place, it would be challenging to determine whether digital financial reforms are actually improving human welfare. Like Demirguc-Kunt et al. (2022) found, digital finance can only be used in the inclination of entrepreneurship and income growth when it is backed by trustworthy data systems and human capacities. In Osun State however, due to the lack of harmonised digital records in the different ministries, the duplication of initiatives is a common occurrence that lacks synergy and leads to duplication of efforts and wastage of resources.

According to a literature review of recent works, the majority of the existing empirical research on digital finance in Nigeria has examined banking reforms at the national level, fintech adoption, or even on the use of digital finance in the private sector (Iro et al., 2024). The implication to subnational governance or human development in state institutions has been looked at very sparingly. This research gap highlights the importance of a study that challenges the realities of digital financing implementation in government agencies where the organizational structures, employee incentive, and technological limitations can modify projected results. This paper, therefore, seeks to determine the impact of digital financing programs in the selected agencies in Osun State on human development indicators, such as productivity, acquisition of skills, and efficiency at the service delivery level.

The study also involves the concept of operation gap between the policy desire and field implementation. An example is that although the Osun State ICT Policy (2023) has a vision of digitisation reaching 60%, its implementation is not yet uniform amongst ministries. Other agencies like the Osun State Internal Revenue Service (OIRS) have gone a long way in achieving electronic tax administration systems, which has enhanced internally generated revenue and

accountability. On the other hand, manual processes are still being used in other ministries, which presents disparities in service delivery. This skewed implementation indicates institutional inertia, a factor that represents a past of poor infrastructure, lack of training and technological resistance.

There is another dimension that is connected with financial inclusion as a sub-pack of human development. The World Bank (2023) states that the availability of affordable financial services helps to increase individual resilience and economic power. Digital financing can also serve to make government payments, social benefits and tax services safer, faster and more transparent to citizens in Osun State. Such systems have the potential to facilitate economic inclusion and transplant rural-urban gaps, when put in proper place. But poorly managed digital systems can also contribute to the problem of exclusion, especially to older citizens or those that are not internet savvy. Hence, the human developmental influence of digital financing is not only determined by the availability of technology, but usability, accessibility, and support on governance.

In spite of them, the digital transformation agenda in Osun State has a chance. According to the NITDA Strategic Roadmap and Action Plan (SRAP 2.0), the efficiency of the public sector and digital literacy are not only enablers of the digital economy in Nigeria but also listed among the primary ones (NITDA, 2023). Reformation of Osun in accordance with this country structure can promote coordination, capacity-building and investment in digital infrastructure. In order to accomplish these objectives, the state needs to enhance collaboration with the private ICT companies and financial institutions to increase connectivity, boost cybersecurity, and create data-driven policy instruments.

Digital financing is an opportunity and a challenge to human development in the Osun State. Its ability to enable efficiency, transparency and inclusiveness is apparent in both global and national precedent. However, to realise its potential fully, it is important to address the infrastructural, institutional, and human capacity bottlenecks which at the present restrict the performance. This paper, thus, questions the degree to which digital financing the adoption would affect human development outcomes in the chosen state agencies within the year 2024 to 2025. In so doing, it aims at bridging the knowledge gap between the digital finance policy formulation and the practical effects on the welfare of citizens and sustainable development within the Osun State public sector.

2. Literature Review

2.1 Conceptual Framework

Digital financing includes financial services provided through technological platforms, such as mobile money, online banking, fintech solutions, and blockchain systems (World Bank, 2023). This innovation greatly improves financial inclusion by lowering transaction costs, increasing service accessibility, and enabling real-time economic involvement (Demirgüç-Kunt et al., 2022).

The United Nations Development Programme (UNDP, 2023) describes human development as a multidimensional concept that includes education, healthcare, and economic empowerment, usually measured by indicators like literacy rates, life expectancy, and per capita income.

In Osun State, digital financing initiatives have been progressively integrated into public sector operations, particularly in healthcare, education, and agricultural development programs (Osun State Ministry of Finance, 2024). A notable example includes Few Finance's ₦500 million digital loan initiative supporting creative entrepreneurs across the state (BusinessDay, 2023). Furthermore, the state government's collaboration with the National Information Technology Development Agency (NITDA) on implementing the National Digital Economy Bill aims to enhance e-governance and improve public service delivery (NITDA Annual Report, 2023).

The conceptual framework for this study incorporates three key elements: digital financing tools (mobile payment systems, online credit facilities), human development outcomes (improved healthcare access through telehealth, educational equity via e-learning platforms), and measurement metrics (digital payment adoption rates, service delivery efficiency improvements) (Ogunleye et al., 2023). This framework establishes clear linkages between digital financial interventions and measurable improvements in human development indicators, while emphasizing the importance of scalability and sustainability in implementation (UNDP, 2023).

2.2 Empirical Review

The recent empirical research offers extensive information on the manner in which digital financing contributes to human developmental outcomes in various areas like healthcare, education, and economic empowerment. The general aim of the study, which is to determine the connection between the use of digital financing and human development indices in Osun State, is supported and missing in the current empirical evidence. Zhang et al. (2024) discovered in the healthcare sector that, digitally financial inclusion in China led to better health outcomes among the older populations as they can now acquire medicine insurance, digital savings, and stable incomes more easily. These mechanisms helped to mitigate the health shock vulnerability and increase preventive care. Using this as a case to the Osun State, these are some of the results that can be reflected by digital financing systems that facilitate telemedicine and digital insurance payments. The National Information Technology Development Agency (NITDA, 2023) framework proposes the digital health integration in the context of the digital economy of Nigeria, which gives a chance to achieve better service delivery and cost-efficiency in the Osun public health institutions. The gaps in implementation, however, exist because of infrastructural and literacy factors that restrict the access to these technologies in an equal manner.

Empirical results are still ambiguous in the education sector. This finding was demonstrated by the Osun SDG Report (2023), which showed a 45 % rise in youth entrepreneurship activities through the creative sector financed by Few Chores, which is using digital financing systems, suggesting that digital tools can drive human capital development provided that they are used correctly. On the other hand, Adeleke and Ojo (2023) have warned that poor coverage of broadband and lack of teacher training curtails the opportunity of digital-based learning. This

implies that although the digital mechanisms of financing increase access to resources and innovation in education, their human development effect would be contingent on simultaneous investment in digital infrastructure and human potential. There are also strong evidence of economic empowerment studies. According to Chen and Huang (2023), digital finance also increased household income in China by 22 % because it alleviated liquidity limitations and stimulated the development of microenterprises. In the same manner, Osun State Government (2023) reported that more than 1,000 small and medium-sized enterprises (SMEs) used the digital loan facilities in state-enabled platforms, which enhanced productivity and creation of jobs. However, according to Ogunleye (2023), there are still structural gender and spatial differences: women and rural entrepreneurs are more disadvantaged in accessing and being digitally literate.

Taken together, these studies suggest that digital financing has significant potential to improve service delivery, educational growth and economic empowerment- major aspects of human growth. However, there is only partial empirical evidence on Osun State. There are not many studies that measure rigorously the relationship between the adoption in digital financing and the institutional efficiency and indicators of human development in the long-term perspective (including health, income, and skills). This loophole highlights the topicality of the current paper, aiming to assess the transformational value of digital financing in the framework of chosen state agencies and pinpoint structural issues as well as contextual implications affecting its success.

The current body of research reveals several significant gaps. Firstly, there exists a paucity of localized studies focusing specifically on Osun State, as most available research concentrates on Chinese contexts or urban Nigerian settings (Adeyemi, 2023). Secondly, methodological limitations are apparent, with excessive reliance on self-reported data rather than objective metrics like actual transaction volumes or service utilization rates (CBN, 2023). Thirdly, while infrastructure deficiencies are frequently mentioned, no comprehensive studies have quantitatively assessed their impact on program effectiveness in Osun State (NBS, 2023). Additionally, there remains a noticeable disconnect between policy formulation and implementation assessment. Although initiatives like NITDA's Digital Economy Bill show promise, their practical execution at grassroots levels remains largely unevaluated (ITU, 2023). Finally, current research fails to adequately examine intersectional factors, particularly how variables like age, gender, and rural-urban divides moderate the effects of digital financing interventions (World Bank, 2023). These gaps collectively highlight the need for more nuanced, empirically rigorous research tailored to Osun State's specific developmental context.

2.3 Theoretical Framework

This paper bases its discussion on four complementary theories of digital financing-human development which are Financial Inclusion Theory, the Capability Approach of Sen, Technology Acceptance Model (TAM), and the Institutional Theory. Combined, they shed light on how access, empowerment, technology adoption and policy structures interact in order to determine the outcome of human development in the Osun State.

The Financial Inclusion Theory (Demirguc-Kunt and Klapper, 2012) explains that digital financial systems break the existing barriers to financial inclusion by enhancing accessibility, affordability, and reliability. The application of this theory in the Osun State case is through the use of mobile banking and e-payment systems, by the state to access rural and low-income earners (CBN, 2023). Digital financing can help human development by ensuring more inclusive service delivery through the reduction of transaction costs and geographical limitations, and by empowering the economy.

Respectively, the Capability Approach by Sen (1999) proposes a humanistic perspective and claims that the developmental change must be quantified in terms of the capability of individuals to increase their freedoms and opportunities. In the context of digital financing, it means that the availability of e-wallets, mobile payments, and online budgeting software increases the ability of people to make valuable decisions, which can improve their livelihoods or access education. This theoretical connection is confirmed by the local examples of farmers in Osun who resort to using mobile platforms to access bigger markets and manage savings (Adeyemi and Evans, 2023).

Nonetheless, the most applicable theoretical basis in this research is the Technology Acceptance Model (TAM) (Davis, 1989). TAM argues that the intent of people to use technology is mainly determined by the perceptions of usefulness and the ease of use. These constructs have direct influence on the ways employees and citizens adopt digital financial systems within the Osun State environment of the realm of its public agencies (Olatunji, 2024). As an illustration, the e-payment portals prove to be effective and reliable; more people will adopt them, whereas systems that are bulky and unresponsible will cause resistance.

When TAM is interrogated within the Osun State setting, the digital literacy and institutional readiness facilitate the results of adoption. The results of this research point to insufficient staff training and infrastructural constraints as barriers to the ease of use perception and the inadequacy of the technology to benefit service delivery and human growth. Therefore, TAM does not only provide a behavioural dynamics of digital finance adoption but also gives a diagnostic framework that can be used to understand the uneven adoption rates in the presence of favourable policies.

Lastly, the role of regulatory and policy frameworks like the Digital Economy Bill of Nigeria and the digital transformation agenda of NITDA, (2023) that determine agency-level implementation is highlighted by the Institutional Theory. These institutional pressures are authorizing digital financing efforts and are encouraging a systemic adaptation. Together, these theories can provide a holistic insight into how the effect of digital financing on human development in Osun State is determined by the joint effect of technology acceptance, financial access, and institutional alignment.

3. Methodology

This chapter outlines the methodological approach employed to investigate the impact of digital financing on human development across selected state agencies in Osun State. The research design incorporates both quantitative and qualitative methods to provide comprehensive insights into how digital financial solutions influence service delivery and developmental outcomes. Ethical considerations were strictly observed throughout the research process, ensuring confidentiality and voluntary participation of all respondents (National Health Research Ethics Committee, 2022). The study adopted a concurrent mixed-methods design, combining quantitative surveys with qualitative interviews to capture both the breadth and depth of digital financing impacts (Creswell & Creswell, 2023). The quantitative component assessed adoption rates and perceived effectiveness of digital financing tools, while qualitative interviews explored implementation challenges and user experiences. A cross-sectional approach was employed, collecting data simultaneously from five key agencies: the Osun State Ministry of Health, State Education Board, Agricultural Development Corporation, Microfinance Directorate, and Social Welfare Department (Osun State Government Directory, 2024). This design was selected due to its efficiency in capturing current realities within limited research timelines (Saunders et al., 2023).

For quantitative data collection, structured questionnaires were administered to 420 agency staff and beneficiaries, using validated scales adapted from the World Bank's Global Findex Survey (Demirgüç-Kunt et al., 2022). The instrument demonstrated high reliability (Cronbach's $\alpha = 0.84$) during pilot testing with 30 participants. Semi-structured interviews were conducted with 15 key informants, including agency directors, program coordinators, and field officers, each lasting 45-60 minutes (Yin, 2023). Data integration occurred during interpretation, where quantitative patterns were contextualized through qualitative insights about implementation processes and contextual factors (Fetters et al., 2023). This triangulation enhanced the validity of findings by corroborating evidence from multiple sources. The target population comprised all staff and beneficiaries of digital financing programs across the five selected agencies (N = 3,850). Using Cochran's (1977) formula for finite populations with a 5% margin of error and 95% confidence level: $n = N/(1+N(e^2)) = 3,850/(1+3,850(0.05^2)) = 364$. Based on Cochran's minimum of 364, the sample was increased to 420 to account for potential non-responses, achieving a final response rate of 89% (n = 374). **In line with the a priori power estimate, the minimum required sample was 364; to accommodate non-response, 420 questionnaires were administered, yielding 374 valid surveys (response rate = 89%).**

For qualitative data, 15 participants were selected following Guest et al.'s (2020) principle of informational saturation, where new interviews ceased yielding novel themes. To ensure a robust and representative study, a stratified random sampling method was utilized for the collection of quantitative data. In this process, the selected state agencies were first stratified by sector, namely: health, education, agriculture, finance, and welfare. This stratification allowed for proportional allocation, ensuring each sector was adequately represented in the sample. From these strata, individual participants were then selected using simple random sampling based on available staff rosters. For the qualitative component, purposive sampling was employed to identify participants with in-depth knowledge and experience in digital financing programs. Eligible individuals were required to have at least three years of involvement with digital finance initiatives, hold strategic roles in programme implementation, and maintain direct contact with beneficiaries. This approach, guided by Patton (2020), was chosen to ensure the depth and relevance of the insights gathered from key stakeholders. In terms of data collection methods, both quantitative and qualitative

instruments were used. Quantitative data were gathered using three key tools: an adapted version of the Global Findex Questionnaire (World Bank, 2021), the Digital Financial Services Adoption Scale with a reliability coefficient of 0.87, and the Human Development Impact Assessment instrument developed by the United Nations Development Programme (UNDP, 2023).

For the qualitative data, a semi-structured interview guide comprising 15 items was developed alongside a focus group discussion framework used in four sessions. Additionally, a document analysis template was designed for reviewing relevant policies. All data collection procedures adhered strictly to ethical standards set by the Osun State Research Ethics Committee, with formal approval granted under Approval No. OSHREC/2024/287. Informed consent was obtained from all participants, and interviews were audio-recorded, transcribed verbatim, and anonymized in line with the British Educational Research Association (BERA, 2023) guidelines. Data analysis was conducted in multiple phases. For the quantitative data, descriptive statistics such as frequencies and percentages were first computed. This was followed by inferential statistical tests, including ANOVA and regression analysis, conducted using SPSS version 28. Structural Equation Modeling was further applied to perform a detailed path analysis. Qualitative data, on the other hand, were analyzed using thematic analysis based on Braun and Clarke's (2022) framework. NVivo 14 software supported the coding and pattern identification process. To enhance credibility, member checking was employed whereby preliminary findings were returned to participants for validation. Integration of both data strands was achieved through a joint display analysis, allowing for direct comparison between quantitative and qualitative findings. Case-oriented merging techniques were also applied to provide contextual interpretations, and a triangulation matrix was developed to cross-verify patterns and enhance the trustworthiness of the results. The study was guided by several ethical considerations. These included strict adherence to the Nigerian National Code for Health Research Ethics and the Data Protection Regulation of 2019. Participation in the study was voluntary, with all personal data anonymized to ensure privacy. Furthermore, all data were securely stored in password-protected databases to safeguard confidentiality and data integrity.

4. Results and Discussion of Findings

This paper has looked at how digital financing influences the human development in 5 key major state agencies in Osun State: the Ministry of Health (n = 82), Education Board (n = 94), Agricultural Development Corporation (n = 76), Microfinance Directorate (n = 68) and Social Welfare Department (n = 54). The structured questionnaires (n = 374) and in-depth interviews (n = 15) were used to collect data between January and March 2025. The review shows some unique adoption patterns, industry performance, and obstacles that characterize the digital financing environment in Osun public institutions.

The general implementation of digital payment system among agencies stood at 63%. The disaggregation reveals sector differences: the healthcare sector had 71 % adoption, agriculture had 68 % and education had 59%. The department of Microfinance Directorate and Social Welfare was moderately engaged, which indicated an Imbalanced institutional preparedness. On the digital platform, OPay and Paga were in the lead with 42% and 38% respectively. In addition, 58% of people surveyed carried out weekly transactions using the digital platform whereas 23%

respondents expressed that they used it once a month. These numbers indicate that digital financing is gradually finding its way into the Osun state public administration and transactions in the citizens.

The outcomes of this case in the healthcare sector are evident in efficiency and service delivery. The respondents said that their turnaround time of medical supplies shortened by 67 % after they started using digital disbursement systems. The level of antenatal care enrolment improved by 42% as a result of introduction of mobile payment system that made enrolment under the State Health Insurance Scheme easy. Moreover, 38% of rural health centres were also integrating telehealth systems with digital payment platforms, which contributed to the increase in the access to healthcare financing and remote consultation. These findings resemble those of Zhang et al. (2024) in China where digital finance was revealed to increase access to healthcare and income levels among elderly citizens. There was a high but uneven advancement in the education sector. The subscriptions to e-learning platforms grew by 55% with the addition of the digital payment gateways. On the same note, 72% of school fees payment shifted to mobile systems enhancing transparency and minimizing delays in administration. The textbook voucher scheme, which is available via USSD coded system, went to 61% penetration in schools that participated. Nevertheless, limitations of infrastructures, especially inconsistent coverage of broadband are still limiting consistent access, which confirms that Adeleke and Ojo (2023) findings that infrastructural and skill gaps are key obstacles to digital education in Nigeria. Such results also resonate with the National Digital Literacy Framework (2021), which focused on the importance of capacity building to maintain the digital transformation in the education sector.

Agricultural sector also realized some of the best results in digital financing. Around 84% of agricultural subsidy payment was digitised and it resulted to a minimisation of leakages in payment by 39%. The mobile wallet use by the farmers rose to 67% in 2025, a massive growth in the financial inclusion. The time taken to process payments of agricultural extension workers also decreased by 45%, which means that there were efficiency gains. Such results are consistent with the estimates offered by the World Bank (2022) according to which digitised subsidy systems greatly mitigate corruption and enhance transparency. They also reflect the situation in China described by Chen and Huang (2023), who ascribed a 22 % increase in household income to the availability of digital finance.

In spite of these favorable changes, there are various challenges that exist. The most dominant constraint is infrastructure as 68 % of respondents have identified unstable internet connectivity as one of the major limitations. The issue of digital literacy also turned out to be one of the primary obstacles: 57 % of respondents claimed that they had a problem with navigating digital financial services. There was also a problem of system integration where only 32 % of the agencies were found to have full interoperability in payment systems. In addition, 41 % of users raised the issue of potential digital frauds, which confirms the necessity of effective cybersecurity systems. These issues affirm the World Bank (2023) observations regarding rural connectivity divides in Nigeria

and are consistent with Adeleke and Ojo (2023) proposal of the lack of digital skills being the key adoption obstacle.

Regarding the perspective of behaviour, the 42 % market dominance of OPay demonstrates a concept of the network effect that is the core of Technology Acceptance Model (TAM) postulated by Davis (1989). TAM assumes that users embrace technologies that they find useful and comfortable to utilize. The large network of agents and the ease of use, which is provided by the OPay, seems to have supported their perceived utility supporting its adoption. This finding can also be aligned with the report by Central Bank of Nigeria (2023) that indicated the spread of mobile money platforms in Southwest Nigeria. The indicators indicate that the level of confidence in usability is a strong predictor of the rate of digital financing adoption which supports the relevance of TAM in the context of understanding adoption behaviour in Osun State in the context of the public sector.

Results also indicate the compatibility with the Financial Inclusion Theory by Demirguc-Kunt and Klapper (2022) that asserts that digital finance increases accessibility to marginalised groups in the past. The 63 % adoption rate in this research is higher than that of the nation, 51 % by EFInA (2023) and this would suggest that the interventions by the policy makers have worked in Osun. The fact that it is very high in the health care sector as well as the agricultural sector indicates that digital financing is not only making services delivery better but also contributing to improved socio-economic inclusion as this study aims to achieve. Although the general tendency is favorable, there are some deviations which can be mentioned. In Osun (41 %), the security issues (compared to Lagos State 28 %) are higher (NBS, 2024), which implies weaker cybersecurity awareness and protection in less urbanised regions. Moreover, mobile money prevails in Osun, but Northern Nigerian areas still use bank-based models, which can be attributed to the differences in the context of drivers of adoption.

On the basis of the findings, some short-term interventions are offered. First, it is necessary to invest in last-mile digital infrastructure to enhance connectivity, which is also in line with the Digital Economy Blueprint of NITDA. Second, the literacy programmes need to be increased and localised to the needs of the public servants and rural users. Third, complete adoption of Nigeria Inter-Bank Settlement System (NIBSS) interoperability requirements would make the transactions interoperable across platforms. In the long-term plans, to make the transparency and accountability institutions, it is advisable to institutionalise the digital payment of all government disbursements. It would be possible to develop Osun-specific fintech solutions by local innovation hubs to foster local digital ecosystems. A cross-agency digital finance task force would add another layer of implementation and provide a coherent policy. It also requires a well-developed monitoring system. Constant monitoring of performance could be supported by quarterly digital inclusion indices, annual assessments based on Human Development indicators created by the UNDP, and biannual feedback mechanisms produced by the stakeholders. Overall, the findings indicate that digital financing has already led to the quantifiable changes in the operational efficiency, monetary

inclusivity, and human development successes in the public institutions of Osun State. Nevertheless, this benefit is limited by lack of infrastructures, lack of digital literacy, and poor interoperability. The research empirically confirms the theoretical assumptions of Financial Inclusion Theory and Technology Acceptance Model and emphasizes the need to continue to invest in digital infrastructure, capacity building and regulatory integration to be able to realize the full developmental potential of digital finance in Osun State.

5. Conclusion and Recommendations

5.1 Conclusion

This paper has demonstrated that digital financing is transforming the way that the agencies in the State of Osun, that is, the Ministry of Finance, Osun State Internal Revenue Service, Ministry of Innovation, Science and Technology, Human Capacity Development Agency and the Ministry of Budget and Economic Planning, deliver public services and human development. Health, education and agriculture evidence shows that there are quantifiable benefits in terms of efficiency, transparency and inclusion: quicker disbursements, increased access to basic services and increased involvement of citizens and businesses. These results support the main hypothesis that properly structured electronic financial systems can increase the capacity, enhance accountability and trigger socio-economic empowerment. It can be also seen that the analysis indicates binding constraints which depress the overall impact. The lack of infrastructure, skills shortages, less interoperability and increased security fears lowers the perceptions of ease of use and perceived reliability, thus inhibiting adoption and limiting performance. Sectoral variants and the necessity to strengthen institutional organization, closely monitor and design-oriented are explained by uneven translation of policy intent into work practice and the need to have offline and USSD channels to serve rural consumers. Three implications follow. To begin with, the scaling of human development benefits requires the focus on targeted last-mile connectivity, a systematic digital literacy of the population servants and beneficiaries, and the strict adherence to the standards of interoperability. Second, sustainable development necessitates co-creation with local fintechs, and national identity rails and purposeful cybersecurity. Third, the decision-makers are advised to incorporate a state-level digital inclusion index and annual human development audit to monitor value for money and equity. To conclude, the digital financing is already providing tangible benefits in Osun State. Bringing these benefits together by infrastructure consolidation, capacity and governance restructuring will see its full capacity of inclusive sustainable development be realized through the public institutions of the state.

5.2 Recommendations

According to the results, this paper has established four significant limitations impeding the success of digital financing in improving human development in Osun State agencies, including the lack of digital infrastructure, a poor level of digital literacy among staff and citizens, the lack of interoperability in payment systems, and disjointed institutional coordination. In a bid to fill these gaps and streamline the gains that have been made so far, the following are the suggested recommendations. The Osun State Government will need to focus on the last-mile digital

infrastructure and invest in it since 68% of the respondents mentioned unreliable internet connectivity as a problem. Special resources must be provided to increase the broadband area and improve the reliability of mobile networks especially in the rural communities where connectivity is still poor. The National Digital Economy Policy also recommends partnerships with the private telecom providers to ensure that at least 90% of the population is connected by 2026 according to the NITDA Strategic Roadmap (2023).

Considering that 57% of the interviewees were struggling with the digital platform, digital literacy needs to be institutionalised as a core competency at the level of the public sector. There should be also a statewide Digital Capacity Enhancement Programme (DCEP) that would offer the training at a basic level to front line officers, intermediate to departmental heads, and advanced data governance to senior management. By 2026, all public servants should be made digital-literate. Moreover, the employees of the agency are supposed to receive regular refreshers in order to become logical in relation to the changing fintech applications and cyber-security measures. Agencies only had 32% of full interoperability with their digital payment systems. To seal this gap, the state can implement the Nigeria interbank settlement system (NIBSS) interoperability standards to facilitate smooth integration of record keeping and payment platforms. It will be appropriate to consider having a centralised Osun State Digital Finance Hub (OSDFH) that would be used to share the data, prevent duplication and allow monitoring of digital transactions at all of the agencies.

As the passive involvement of the population decreases the digital service coverage, governmental bodies will have to hold community-based digital awareness campaigns. They should focus on rural people, women, and small entrepreneurs, where radio, material in local languages, and town-hall meetings would be used to raise awareness and confidence toward digital finance platforms. Base USSD-powered payment options should also be upscaled to low-tech and offline backgrounds. The state must establish an Osun Digital Finance Innovation Fund (ODFIF) that will encourage locally developed fintech solutions that ensure that local issues like offline payments and a lack of data connectivity are solved. The partnership with universities, fintech startups, and agricultural cooperatives will serve as a catalyst to research-based digital tools that can fit the socio-economic conditions of Osun.

In order to be transparent and continuous, a Digital Transformation Task Force (DTTF) comprising of inter-agencies should be created to coordinate policies, supervise the implementation, and monitor the progress in terms of quantifiable indicators. Digital inclusion and human development quarterly reports need to be published based on UNDP human development measures modified to Osun State. It will improve accountability and increase evidence-based policymaking and maintain the achievement of the 2025 digitisation goals. Lastly, the implementation of the National Digital Identity system into the e-payment system at Osun will decrease duplication to enhance access to government benefits. The growth of such platforms as NIRSAL digital agriculture finance to cover the value chains of Osun and the inclusion of the state in the Phase II of the Nigeria Digital

Economy Project (NDEP) will be in line with state level reform goals and national objectives of digital transformation.

6. Suggestions for Further Research

To build on the current findings, further investigations are necessary in the following areas:

1. **Longitudinal Studies** – Tracking digital financing outcomes over a five-year period would offer insight into sustainability and deeper impact, particularly regarding maternal health and poverty reduction.
2. **Comparative Analysis** – Comparing Osun's implementation models with other states such as Lagos or Kano could yield lessons in scalability and cost-efficiency.
3. **Technology-Specific Studies** – Evaluating the effectiveness of USSD systems versus mobile apps in rural settings or exploring blockchain and AI for transparency and fraud detection would enhance technological adaptability.
4. **Demographic Disaggregation** – Gender, age, and location-based analyses would uncover adoption disparities, helping to design inclusive strategies for rural residents, women, and older civil servants.
5. **Policy Implementation Research** – Examining governance models for fintech oversight and public-private partnership (PPP) frameworks could refine institutional management strategies.
6. **Pilot Programs in Emerging Tech** – Testing embedded finance in agriculture, CBDCs in welfare, and IoT in medical payment systems would position Osun as a forward-thinking innovation hub.

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