# Catalysts of Change: Evaluating the Impact of Government-Funded Digital Innovation Hubs on SME Competitiveness in Nigeria

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## ABSTRACT

This study examines the transformative role of government-funded Digital Innovation Hubs (DIHs) in enhancing the competitiveness of Small and Medium Enterprises (SMEs) in Nigeria. As Nigeria advances its digital economy agenda, DIHs have been introduced as strategic mechanisms to stimulate innovation, strengthen entrepreneurial capacity, and expand digital participation among SMEs. Despite their growing relevance, limited empirical attention has been devoted to understanding how DIHs impact SME performance in developing contexts. Drawing on secondary data including government policy reports, SME surveys, and development agency publications, this paper explores the impact of DIHs on SME digital adoption, productivity, and innovation capacity across diverse regions in Nigeria. Guided by Innovation Systems Theory, the Inclusive Innovation Framework, and the Resource-Based View (RBV), the study evaluates DIH outcomes through systemic coordination, equity, and capability-building lenses. Findings indicate that DIHs facilitate knowledge diffusion, skill enhancement, and digital adoption, contributing to improved market access and productivity among beneficiary SMEs. However, benefits remain uneven, with DIHs concentrated in urban and southern regions, limiting equitable participation for rural, informal-sector, and northern-based enterprises. The study recommends expanding DIH coverage, strengthening institutional coordination, and implementing culturally and regionally responsive digital inclusion strategies. This research contributes to emerging scholarship on innovation infrastructure in developing economies and offers practical implications for policymakers, development practitioners, and SME stakeholders seeking to build inclusive and competitive digital ecosystems.

**Keywords:** Digital Innovation Hubs, SMEs, Inclusive Innovation, Innovation Systems Theory, Digital Transformation, Nigeria, Policy Analysis

## INTRODUCTION

Small and Medium Enterprises (SMEs) are the cornerstone of Nigeria's economy, contributing approximately 48% of the country's GDP and employing over 80% of its private-sector workforce (SMEDAN, 2023). Yet despite their economic weight, Nigerian SMEs face persistent barriers to competitiveness, including limited access to digital infrastructure, restricted financing, and deficits in technological capability. In an era dominated by digital economies, these constraints impede their ability to compete locally and globally. Recognizing these challenges, the Nigerian government established Digital Innovation Hubs (DIHs), publicly funded centers that provide access to digital tools, incubation support, training, and knowledge-sharing platforms. The initiative aligns with the National Digital Economy Policy and Strategy (2020–2030) and seeks to accelerate the digital transformation of SMEs, fostering innovation-led growth across all sectors. However, as the United Nations Development Programme (2022) notes, the distribution and impact of DIH remain uneven. Northern and rural regions continue to experience limited access due to inadequate infrastructure and a lack of awareness of digital opportunities.

While previous research has examined digital ecosystems and startup innovation, empirical attention to DIHs and their direct influence on SMEs remains scarce. This study fills that gap by addressing three critical questions:

1. How do DIHs influence SME digital adoption, productivity, and innovation capacity in Nigeria?
2. To what extent are DIHs accessible to SMEs in marginalized regions and informal sectors?
3. What institutional mechanisms can optimize DIH effectiveness for inclusive SME growth?

By examining these questions, this study positions DIHs as potential catalysts for structural transformation, exploring both their successes and the persistent inequities that shape their outcomes. Ultimately, it underscores the critical role of inclusive digital infrastructure and policy alignment in ensuring that technological progress translates into equitable and sustainable economic development across Nigeria.

## LITERATURE REVIEW

### Innovation Systems Theory

Innovation Systems Theory, developed by scholars such as Lundvall (1992) and Freeman (1987), posits that innovation arises from interactions among firms, institutions, and policy networks rather than from isolated organizational efforts. Within this framework, DIHs function as nodes that connect SMEs with technological infrastructure, research institutions, and government programs. Their effectiveness depends on systemic coordination, knowledge diffusion, and institutional coherence (AfDB, 2023). In Nigeria, however, fragmented implementation and uneven policy alignment undermine these linkages, particularly in underdeveloped regions.

### Inclusive Innovation Framework

The Inclusive Innovation framework (Foster & Heeks, 2013) emphasizes equity, access, and participation in innovation systems. It challenges traditional models that favor urban or elite actors, advocating instead for innovation that benefits marginalized communities. Applying this lens to DIHs reveals whether these hubs promote equitable opportunities, especially for women entrepreneurs, youth-led startups, and informal enterprises. In Nigeria's case, many DIHs have not yet achieved this inclusivity, as programs often concentrate in urban centers where infrastructure and digital literacy are stronger.

### Cultural Context and Innovation Behavior in Nigeria

Beyond systemic and equity-based perspectives, cultural dynamics significantly shape digital adoption and innovation behavior in emerging economies. Nigeria's diverse socio-cultural environment, characterized by communal business norms, religious and regional identities, hierarchical social structures, and traditional knowledge systems, influences how entrepreneurs perceive and engage with innovation resources (Idemudia, 2021). Research suggests that cultural norms in sub-Saharan Africa can moderate entrepreneurial risk-taking, knowledge sharing, and trust in formal institutions, thereby affecting the effectiveness of state-led digital interventions (Nwagwu, 2020). For instance, gendered expectations in some regions restrict female digital entrepreneurship, while collectivist community structures in others enhance informal knowledge networks but reduce engagement with formal hubs. Recognizing cultural diversity is therefore essential for designing DIH programs that align with localized entrepreneurial realities and support equitable participation across Nigeria's geopolitical zones.

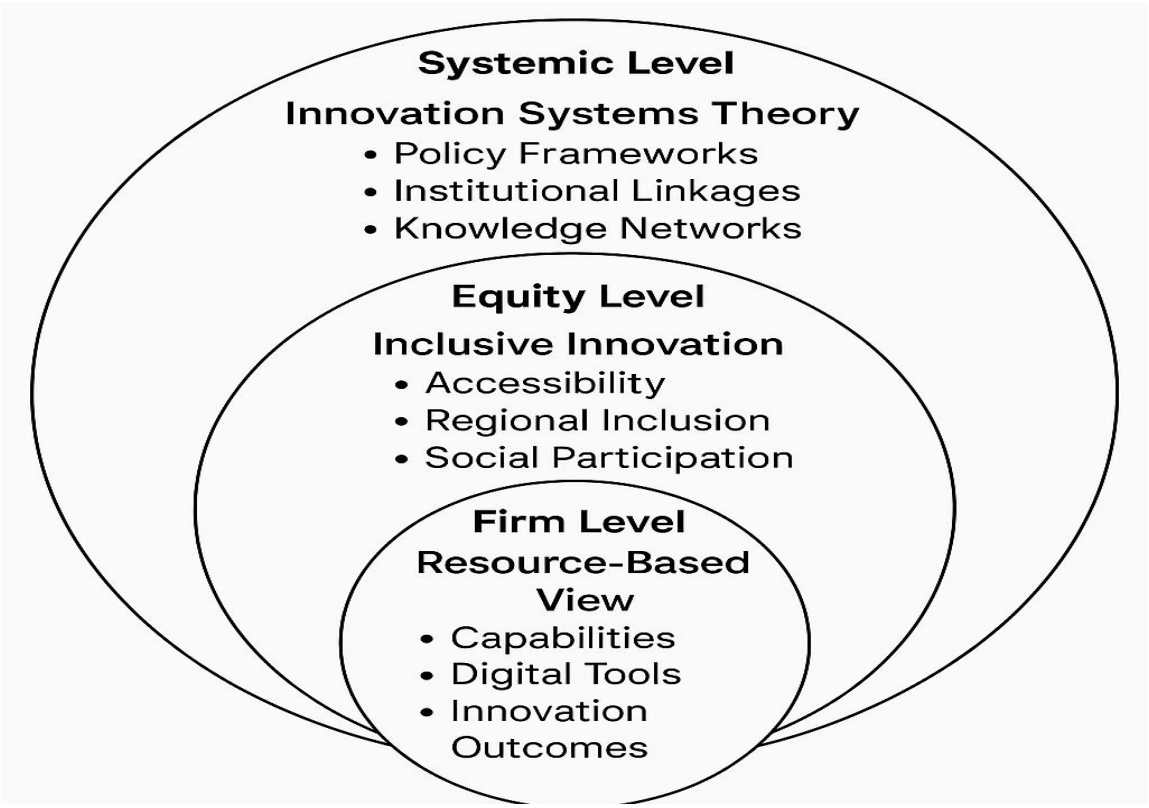
### Resource-Based View (RBV)

The RBV, articulated by Barney (1991) and Wernerfelt (1984), focuses on firm-level competitive advantage derived from valuable, rare, inimitable, and non-substitutable resources. DIHs strengthen SMEs by providing digital tools, technical training, and managerial knowledge, resources that build internal capacities for innovation and productivity. The degree to which SMEs can leverage DIH offerings directly affects their sustained competitiveness and ability to scale.

### Empirical Evidence on DIHs and SME Competitiveness

Empirical studies show that DIHs enhance SME innovation, particularly through digital training, mentoring, and incubation. For instance, the OECD (2021) found that DIHs in Europe significantly improved digital adoption rates, while the World Bank (2020) observed similar patterns in Nigerian pilot regions. Yet, the UNDP (2022) reports that benefits remain uneven, with most DIHs concentrated in Lagos and Abuja. These studies underscore the need for localized, evidence-based analysis to understand DIHs' inclusive potential.

**Figure 1.** Conceptual Framework: DIHs as Catalysts for SME Competitiveness




This framework demonstrates how DIHs bridge macro-level systems and micro-level enterprise performance through inclusive and resource-enhancing mechanisms.

**Note.** Framework developed by the author based on Innovation Systems Theory (Lundvall, 1992; Freeman, 1987), Inclusive Innovation (Foster & Heeks, 2013), and the Resource-Based View (Barney, 1991; Wernerfelt, 1984).

Following the conceptual framework in Figure 1, which illustrates how DIHs enable SME competitiveness through systemic, inclusive, and resource-based mechanisms, Table 1 provides a comparative synthesis of empirical and conceptual studies on DIHs and SMEs. This comparative summary highlights key patterns in the literature while identifying persistent contextual gaps, particularly the limited evidence from African and Nigerian settings, thereby reinforcing the need for localized analysis.

**Table 1.** Comparative Summary of Empirical Studies on DIHs and SMEs

Table 1 summarizes key empirical and conceptual studies on Digital Innovation Hubs (DIHs) and Small and Medium Enterprises (SMEs), outlining research focus, methodologies, and major findings while identifying knowledge gaps relevant to the Nigerian context.

| Author/Year | Country/Region | Methodology | Focus Area | Key Findings | Identified Gaps |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| OECD (2021) | EU | Mixed Methods | SME-DIH Interactions | DIHs improve digital adoption and innovation capacity. | Limited insights for African contexts. |
| UNDP (2022) | Nigeria | Policy Review | Inclusion and Accessibility | Highlights uneven DIH reach and limited rural participation. | Lacks quantitative performance data. |
| World Bank (2020) | Nigeria | Diagnostic Analysis | Digital Economy Readiness | DIHs support SME growth and digital skills. | Regional disparities not explored. |
| Foster & Heeks (2013) | India & Africa | Conceptual | Inclusive Innovation | Framework for equity-driven innovation diffusion. | Requires empirical testing in Nigeria. |

**Source:** Author's compilation based on OECD (2021), UNDP (2022), World Bank (2020), and Foster and Heeks (2013).

# METHODOLOGY

### Research Design

This study adopts a qualitative, exploratory research design centered on secondary data analysis and content-based policy evaluation. The qualitative approach is suitable because it allows for an in-depth examination of contextual and institutional dynamics surrounding Digital Innovation Hubs (DIHs) and SME competitiveness. The design draws upon three theoretical perspectives: Innovation Systems Theory, Inclusive Innovation, and the Resource-Based View (RBV) to interpret the interconnections between systemic structures, equity mechanisms, and firm-level outcomes.

### Sampling Method and Sample Selection

A purposive sampling strategy was employed to identify and select relevant documents that provide rich insights into the relationship between DIHs and SME competitiveness in Nigeria. The selection process focused on three categories of sources:

1. Government policy documents that articulate national digital and innovation strategies (e.g., National Digital Economy Policy and Strategy 2020–2030, NITDA Implementation Reports).
2. International development reports from multilateral organizations such as the World Bank, UNDP, and the African Development Bank that assess Nigeria's digital economy, innovation infrastructure, and SME performance.
3. Academic and peer-reviewed literature that explores DIHs, inclusive innovation, and SME competitiveness in developing contexts.

In total, 25 documents were analyzed: 8 government and institutional reports, 6 international development assessments, and 11 peer-reviewed journal articles. This sample was sufficient to ensure thematic saturation and triangulation across diverse perspectives.

### Data Sources

Data were drawn from:

- Government publications (e.g., SMEDAN SME Surveys, NITDA Digital Economy Reports).

- Development agency reports (e.g., World Bank Nigeria Digital Economy Diagnostic [2020]; UNDP Digital Inclusion and Innovation Policy Brief [2022]).
- Academic literature covering innovation systems, inclusive development, and SME transformation in emerging economies (e.g., Lundvall, 1992; Foster & Heeks, 2013; Barney, 1991).

### Analytical Framework and Data Analysis

Data were analyzed using a three-tiered analytical framework, guided by qualitative content analysis and thematic coding.

1. Systemic Mapping: Identification of DIH distribution, governance mechanisms, and institutional linkages within Nigeria's innovation ecosystem.
2. Comparative Performance Analysis: Examination of SME outcomes, digital adoption, productivity, and innovation in DIH-supported versus non-DIH regions using available SMEDAN and NBS datasets.
3. Equity and Inclusion Assessment: Evaluation of accessibility for marginalized SME groups (e.g., women-led, youth-driven, and informal sector enterprises) across Nigeria's geopolitical zones.

Qualitative themes were derived inductively from the data, supported by document coding matrices that highlighted relationships between innovation infrastructure, regional disparities, and SME performance. Triangulation of multiple data types increased the validity of interpretations.

### Ethical Considerations

Since this study relies solely on secondary data, ethical approval was not required. However, ethical rigor was maintained through accurate citation, acknowledgment of original data sources, and transparency in reporting limitations. Care was taken to avoid regional bias and ensure balanced representation of diverse perspectives.

## LIMITATIONS

Several limitations were acknowledged. First, variations in the quality and granularity of available data limited the ability to draw precise causal inferences. Second, the absence of longitudinal datasets constrained the temporal analysis of DIH performance. Finally, differences in regional reporting standards may have influenced comparative assessments. Nonetheless, cross-referencing multiple data sources and applying theoretical triangulation helped mitigate these limitations and strengthened the reliability of findings.

## FINDINGS

### DIH Distribution and Systemic Mapping

Analysis of government and development reports shows that DIHs are concentrated primarily in Lagos, Abuja, and Port Harcourt—regions with robust digital infrastructure and economic activity. Northern and rural states lag due to infrastructural deficits and limited awareness campaigns.

**Key Observation:** Funding distribution correlates more strongly with economic density than with equity targets, suggesting the need for decentralization of DIH governance.

**Figure 2.** Geographic Distribution of DIHs in Nigeria

(Description): A heat map illustrating higher DIH concentrations in the South-West and South-South regions (dark zones) and sparse representation in the North-East and North-West (light zones).

### Comparative SME Performance

Findings from SMEDAN and NBS datasets reveal that SMEs with DIH access exhibit higher digital adoption rates, improved market reach, and greater innovation outcomes.

| Metric | DIH-Supported SMEs | Non-DIH SMEs | Difference |
|---|---|---|---|
| Digital Adoption | 73% | 42% | +31% |
| Productivity Growth | 56% | 38% | +18% |
| New Product Development | 48% | 27% | +21% |
| Workforce Skill Upgrade | 61% | 33% | +28% |

These differences illustrate the measurable advantage that DIHs confer on SMEs in terms of competitiveness and innovation.

**Equity and Accessibility**

Despite positive outcomes, access remains uneven. Rural enterprises, women-led SMEs, and informal operators face persistent barriers, including low digital literacy, limited internet connectivity, and minimal exposure to DIH programs. While inclusion-oriented initiatives exist, they are sporadically implemented and lack standardized monitoring mechanisms. Cultural norms further contribute to uneven DIH access and participation. In several northern and rural communities, traditional business networks and conservative gender roles shape entrepreneurial engagement patterns, limiting participation in formal technology programs. Informal market structures, reliance on peer-learning, and skepticism toward government initiatives also influence adoption behavior. These cultural dynamics suggest that awareness and training efforts must be tailored to reflect localized socio-economic realities and trust systems.

## DISCUSSION

**Institutional Governance, Funding, and Regional Coordination of DIHs**

The effectiveness of Nigeria's Digital Innovation Hubs (DIHs) ultimately depends on coherent institutional governance, transparent funding mechanisms, and regionally balanced coordination. While DIHs are jointly supported by the National Information Technology Development Agency (NITDA), the Ministry of Communications, Innovation and Digital Economy, and state-level partners, the absence of a unified governance framework has led to duplication of roles and inconsistent resource allocation. Fragmented funding structures, often reliant on short-term grants or donor-driven initiatives, undermine the long-term sustainability of hubs, particularly outside major cities. Establishing an integrated governance model that links DIHs to broader innovation and SME policies under the National Digital Economy Policy and Strategy (NDEPS, 2020–2030) would ensure institutional coherence and enable regional hubs to function as complementary, rather than competing, entities. Strengthened coordination across geopolitical zones would also promote resource parity and align DIHs with Nigeria's economic diversification goals under the Economic Recovery and Growth Plan (ERGP).

**DIHs as Nodes in Nigeria's Innovation System**

Drawing from Innovation Systems Theory, DIHs serve as structural nodes within Nigeria's broader innovation ecosystem, facilitating knowledge exchange among government agencies, academic institutions, and private enterprises. However, their potential is constrained by limited regional collaboration and weak institutional linkages between research centers and SME networks. To foster systemic efficiency, Nigeria must transition from a centralized model toward a regionally adaptive framework where state governments co-finance DIHs based on local innovation priorities. This approach would not only enhance diffusion of technology and knowledge but also strengthen accountability and stakeholder ownership, key determinants of system-wide resilience and sustainability.

**Inclusion and Equity Imperatives**

The Inclusive Innovation Framework emphasizes that equitable participation is as vital as technological advancement. Although DIHs have successfully expanded digital literacy in urban centers, their limited

penetration into rural and underserved communities highlights ongoing disparities in access and awareness. To close these gaps, policies must target women, youth, and informal-sector entrepreneurs through mobile DIH units, community-based innovation labs, and localized partnerships with civil society groups. For example, collaboration with organizations such as SheCodes Africa, Tech4Dev, and Women in Tech Nigeria could strengthen female participation, while youth-oriented programs like NITDA's Digital States Initiative could accelerate digital skill development in non-urban regions. Embedding such initiatives into DIH programming would align directly with the inclusivity pillars of NDEPS and enhance Nigeria's broader human-capital objectives.

**Cultural Dimensions and Innovation Engagement**

Cultural norms significantly mediate engagement with DIHs. In high-context societies like Nigeria, trust, hierarchy, and community endorsement shape how entrepreneurs interact with formal innovation structures. Rural enterprises, for instance, often rely on informal apprenticeship systems rather than institutionalized training. Integrating DIHs with existing cultural and market systems, such as trade associations, cooperatives, and faith-based organizations, can increase legitimacy and adoption. Moreover, designing gender-sensitive and multilingual training programs can counteract exclusionary norms that restrict women's and youth participation in certain regions. These culturally adaptive strategies reinforce the Inclusive Innovation principle that sustainable transformation must reflect the socio-cultural realities of its beneficiaries.

**Resource-Based View and SME Capability Development**

At the firm level, the Resource-Based View highlights that DIHs enhance SMEs' internal competencies by providing access to digital tools, managerial mentoring, and innovation ecosystems. However, to ensure these resources translate into sustained competitiveness, DIHs must move beyond short-term skill building to long-term capability accumulation. Embedding DIH training into vocational institutions, technical colleges, and university entrepreneurship programs would institutionalize innovation learning. Furthermore, introducing outcome-based funding models, where resource allocation is tied to measurable SME growth indicators, could improve efficiency and accountability across DIHs.

**Policy and Managerial Implications**

Integrating DIHs with Nigeria's innovation and diversification strategies offers a dual advantage: it positions SMEs at the forefront of industrial modernization while aligning public investments with national priorities. Policymakers should develop a unified performance dashboard to evaluate DIH outcomes using indicators such as regional inclusivity, job creation, and SME innovation rates. Managers of SMEs, in turn, should view DIHs not merely as training centers but as long-term strategic partners for digital transformation and market expansion. Strengthened collaboration among government agencies, academia, and the private sector will be critical to achieving sustainable and equitable innovation growth.

## CONCLUSION AND RECOMMENDATIONS

This study reaffirms that government-funded Digital Innovation Hubs (DIHs) are transformative instruments for advancing Nigeria's digital economy, yet their impact remains uneven across regions and demographic groups. By situating DIHs within the frameworks of Innovation Systems Theory, Inclusive Innovation, and the Resource-Based View, this paper has illustrated that competitiveness arises not only from technological infrastructure but also from effective governance, equitable inclusion, and sustained capability development. Therefore, these theoretical perspectives reveal that successful innovation ecosystems rely on both structural and human factors. The Innovation Systems approach underscores coordination among institutions; the Inclusive Innovation lens prioritizes equitable participation; and the Resource-Based View situates competitiveness within firm capabilities. Integrating these dimensions provides a holistic foundation for evaluating and redesigning DIHs as inclusive engines of transformation. DIHs have demonstrably improved digital adoption, productivity, and innovation among SMEs; however, their centralization in economically dominant cities risks exacerbating regional and social inequalities.

To align with Nigeria's **National Digital Economy Policy and Strategy (2020–2030)** and **Economic Diversification Agenda**, Strengthening DIHs aligns with national goals and with Africa's broader digital transformation strategy, which emphasizes innovation-driven industrialization and inclusive participation. By positioning DIHs as regional knowledge networks, Nigeria can play a leading role in achieving SDG targets on decent work, innovation, and sustainable industrial growth. DIHs must evolve into coordinated, inclusive, and sustainable networks. Achieving this requires stronger institutional governance, decentralized funding models, and policy synchronization between NITDA, SMEDAN, and state innovation councils. Integrating gender-responsive and youth-centered frameworks will ensure that digital transformation contributes to both economic and social development. Importantly, embedding DIHs into existing cultural and community systems will enhance trust, local ownership, and participation, key ingredients for lasting impact. Ultimately, the future of Nigeria's innovation ecosystem will depend on embedding digital inclusion into the nation's development DNA. When DIHs evolve from donor-dependent projects into self-sustaining innovation ecosystems, they will not only transform SMEs but also define Nigeria's standing as a continental leader in digital entrepreneurship, inclusive development, and knowledge-driven growth.

## POLICY RECOMMENDATIONS

1. **Integrated Governance Framework:** Create a National DIH Council under NITDA to coordinate funding, performance monitoring, and regional integration.
2. **Decentralized Funding and Co-Management:** Encourage state–private partnerships to finance and manage DIHs according to local development needs.
3. **Gender, Youth, and Rural Inclusion:** Expand outreach through mobile DIHs, multilingual training, and collaboration with community and women-led organizations.
4. **Alignment with National Policies:** Ensure DIH objectives explicitly support NDEPS pillars (digital skills, innovation, and infrastructure) and ERGP diversification targets.
5. **Outcome-Based Evaluation:** Establish a public DIH performance dashboard tracking inclusivity, SME productivity, and innovation outcomes.
6. **Sustainable Financing:** Introduce revolving innovation funds and public–private partnerships to ensure long-term viability beyond donor cycles.
7. **Cultural Adaptation:** Integrate local trade associations, cooperative societies, and traditional leadership structures into DIH engagement models.

### Future Research Directions

Further research should adopt mixed and longitudinal designs to measure DIHs' medium- and long-term contributions to SME growth, employment, and innovation diffusion. Comparative regional analyses across sub-Saharan Africa could identify best practices for inclusive innovation governance, while qualitative studies involving women and rural entrepreneurs would illuminate lived experiences behind the statistics.

In sum, Nigeria's DIHs hold immense potential to drive inclusive digital transformation, but realizing this promise depends on institutional coherence, social inclusivity, and policy alignment. When governed sustainably and designed equitably, DIHs can transcend their pilot status to become enduring engines of innovation, productivity, and national competitiveness.

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