Operationalizing Digital Infrastructure for Nigerian SME Empowerment via Community-Based Service Learning

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Abstract. Despite national macroeconomic efforts to improve Nigeria's Ease of Doing Business (EoDB) through regulatory reforms and digital infrastructure investments, economic formalization remains inconsistent at the grassroots level. This stagnation is largely due to a significant gap in digital literacy and the underutilization of e-governance tools by micro, small, and medium enterprises (SMEs). This community service project aimed to bridge this macro-micro divide by operationalizing digital infrastructure to empower local SMEs through targeted digital capacity building. Utilizing a Community-Based Service Learning (CBSL) approach, the project integrated academic frameworks with practical community intervention. The program engaged 150 SME owners in Kano State, Nigeria. The intervention comprised a three-day intensive technical workshop followed by a one-month, one-on-one mentorship phase. Training focused on navigating online government business registration portals and integrating mobile digital payment systems. Program efficacy was evaluated utilizing pre- and post-intervention surveys alongside qualitative participant observations. The CBSL intervention yielded significant, measurable improvements in digital adoption and entrepreneurial self-efficacy. Post-intervention data indicated that 82% of participants successfully registered their enterprises online, compared to a baseline where only 18% possessed basic portal navigation skills. Additionally, the cohort demonstrated a 65% increase in the active adoption of mobile digital payment applications. Qualitatively, participants reported a 90% increase in confidence regarding regulatory compliance and formal business administration.

Keywords: Digital Infrastructure; Service Learning; Ease of Doing Business; SME Empowerment; Digital Literacy; Nigeria.

1. Introduction

The long-term economic growth of a nation is fundamentally driven by technological change, investment in human capital, and a conducive business environment (Abbas et al., 2024; Garg et al., 2024; Hlongwane & Khobai, 2025; Raut, 2024). Central to this

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environment are robust institutions, encompassing both codified regulations and informal practices which direct economic activity by lowering transaction costs and mitigating operational risks. In the contemporary global economy, this institutional framework is increasingly supported by digital infrastructure, which includes broadband internet, mobile networks, and e-governance tools (Ma & Lin, 2023; Wang et al., 2025; Zhang et al., 2023; Zhou, 2022). Consequently, improvements in regulations and digital innovations are expected to foster efficiency and enhance overall economic performance.

Academic literature consistently reinforces the phenomenon that regulatory reforms and digital infrastructure exert a positive impact on business performance and economic outcomes. Empirical evidence demonstrates that reducing regulatory burdens, particularly in the realm of business start-ups, significantly improves economic outcomes across multiple countries. Furthermore, quantitative assessments have established that a mere 1-point improvement in the Ease of Doing Business (EoDB) index can lead to a 0.15% increase in GDP growth (Ikeanyibe et al., 2021; Morano et al., 2023; Raimi & Haini, 2024; V, 2024). Additionally, digital technologies have been found to strengthen the effectiveness of these regulatory improvements by fostering transparency and expanding access to essential services.

Despite these established theoretical and empirical foundations, As noted by Abdulmalik (2023), the macroeconomic reality in Nigeria presents a more complex narrative. Over the past two decades, the Nigerian government has made concerted efforts to implement policies aimed at improving the ease of doing business such as streamlining business registration and tax procedures to stimulate economic growth and attract foreign direct investment. While investments in digital infrastructure are projected to enhance productivity within sub-Saharan Africa, cumbersome business regulations in Nigeria have historically exerted a negative effect on investment inflows and economic expansion. As a result, the anticipated impact of these institutional reforms on the country's economic growth has remained inconsistent and sluggish.

At the microeconomic or community level, the factual reality indicates that the primary bottleneck lies in the underutilization of digital infrastructure by micro, small, and medium enterprises (SMEs). The government has indeed deployed digital platforms, such as the Corporate Affairs Commission's online system, which theoretically streamline business registration procedures and boost investor trust (Aniemeke, 2024; Nwosu et al., 2020; PO et al., 2025). However, the adoption of these technologies among local SMEs remains sub-optimal. This underutilization is largely driven by a lack of digital literacy, limited technical comprehension, and the absence of targeted mentorship required to integrate these digital tools into the daily operations of small-scale businesses.

This disparity reveals a critical gap between macro-level policy formulation and micro-level community execution. Previous studies and initiatives have predominantly examined the ease of doing business or digital infrastructure in isolation, often relying on retrospective macroeconomic data rather than practical community engagement. There is a profound scarcity of community-based interventions that directly address how digital infrastructure interacts with the daily regulatory compliance of SMEs in Nigeria. Consequently, a pressing need exists to transition the discourse on digital infrastructure from a mere statistical variable to a practical, operational tool for grassroots economic empowerment.

To address this critical gap, this community service project proposes a solution-oriented intervention utilizing a Community-Based Service Learning approach. Service

Learning is an experiential pedagogy that integrates academic frameworks with direct community engagement to foster mutual benefits for both the academic institution and the society. Through this participatory method, macro-level digital infrastructure is operationalized into localized, practical workshops and one-on-one mentorship sessions. This hands-on approach is designed to guide SME owners in navigating government portals, adopting digital payment systems, and managing business administration more efficiently.

This community service initiative holds dual significance for both local economic empowerment and academic development. Practically, the project directly bridges the digital literacy gap among Nigerian SMEs, equipping them with the necessary skills to leverage technological tools for reducing transaction costs and expanding market access. Academically, this experiential intervention provides valuable, field-tested insights for policymakers and stakeholders on the necessity of integrating grassroots capacity-building with digital transformation initiatives. It demonstrates that institutional reforms cannot succeed purely through top-down mandates without accompanied community support.

Building upon this rationale, the primary objective of this community service project is to operationalize digital infrastructure to empower SMEs in Nigeria. Specifically, the program aims to: (1) provide targeted digital literacy training to local entrepreneurs regarding the utilization of e-government services for business registration; (2) facilitate the integration of digital payment systems and mobile connectivity into their daily business operations; and (3) evaluate the practical efficacy of the Service Learning methodology in accelerating the ease of doing business at the community level.

2. Methods

This community service project adopted a Community-Based Service Learning (CBSL) framework to bridge the digital literacy gap among local entrepreneurs (Baker, 2019; Jones et al., 2016; Yahaya et al., 2025). CBSL was selected because it effectively integrates academic instruction with meaningful community engagement, allowing facilitators to address real-world business challenges collaboratively. The intervention was designed to operationalize macro-level digital infrastructure concepts into practical, micro-level applications for business owners. By embedding academic resources directly into the community setting, the project aimed to foster a sustainable ecosystem where technological adoption becomes a manageable and routine aspect of local commerce.

The target population comprised small and medium enterprise (SME) owners operating within Kano State, a region recognized for its high business activity and active regulatory frameworks (Alfa et al., 2023; Nathaniel Ajik et al., 2026). A purposive sampling technique was employed to select 150 participants from various commercial sectors, primarily focusing on retail and local manufacturing. The inclusion criteria required participants to operate an active, unregistered, or semi-formal business, possess a basic internet-enabled mobile device, and demonstrate a willingness to integrate digital tools into their operations. This targeted selection ensured that the intervention reached the specific demographic most in need of capacity building to navigate the contemporary business regulatory environment.

The execution of the service learning project was systematically structured into three core phases namely pre-intervention assessment, intensive capacity-building workshops, and targeted hands-on mentorship. Initially, baseline data regarding the participants'

existing digital literacy and business registration status were collected. Subsequently, a three-day intensive workshop was conducted, focusing on navigating online e-government portals for business registration and integrating mobile digital payment systems into daily transactions. Following the workshop, a one-month mentorship period was initiated to provide one-on-one guidance, allowing university facilitators and student volunteers to assist SMEs in overcoming specific technical hurdles encountered during the digitalization of their workflows.

To evaluate the efficacy of the intervention, a comprehensive assessment strategy was utilized. Quantitative data were gathered using pre- and post-intervention surveys to measure changes in digital literacy scores, self-reported confidence levels, and the verifiable rate of successful online business registrations. Concurrently, qualitative insights were captured through participant observation and structured feedback sessions conducted during the localized mentorship phase. This dual evaluation framework ensured that both the statistical outcomes and the practical, lived experiences of the SME owners were accurately recorded to assess the program's overall impact on economic empowerment.

Table 1 Implementation Phases of the Service Learning Intervention

Phase	Duration	Key Activities	Objectives
Phase 1: Pre-Assessment	1 Week	Baseline surveys, community mapping, and stakeholder onboarding.	To identify existing digital literacy levels and specific operational bottlenecks faced by local SMEs.
Phase 2: Capacity Building	3 Days	Interactive workshops on e-government portal navigation and digital payment integration.	To equip participants with the fundamental technical skills required for modern business compliance and transactions.
Phase 3: Mentorship	4 Weeks	One-on-one field assistance, troubleshooting, and guided online business registration.	To provide sustained support, ensuring the practical application of skills learned during the workshop.
Phase 4: Evaluation	1 Week	Post-intervention surveys, data analysis, and focus group reflections.	To measure the quantitative and qualitative impact of the intervention on SME operational efficiency.

Table 1 delineates the structured phases of the community service intervention, illustrating the progressive pedagogical approach utilized in the Service Learning program. The framework transitions logically from a foundational needs assessment to practical skill acquisition, culminating in an extended period of personalized mentorship and rigorous evaluation. This phased methodology was strategically designed to ensure that the introduction of digital infrastructure was not merely an isolated educational event, but a continuous, supported process that maximized the participants' ability to independently sustain their newly acquired digital business capabilities.

3. Results and Discussion

The community-based service learning intervention yielded significant measurable outcomes in bridging the digital divide for local SMEs in Kano State. The results are categorized into three primary domains: improvements in e-government navigation for business registration, the adoption of digital payment systems, and enhanced confidence in regulatory compliance.

3.1. Improvement in Digital Literacy and E-Government Navigation

The baseline assessment of the participating community revealed a substantial and systemic disconnect between the national availability of digital infrastructure and its actual utilization at the micro-economic level. Despite governmental investments in broad digital frameworks, the grassroots reality highlighted significant barriers to entry for small-scale entrepreneurs. Prior to the service learning intervention, a comprehensive survey of the 150 participating SME owners demonstrated that merely 18% possessed the foundational technical knowledge required to navigate the government's online business registration portals. This low baseline underscored a critical deficiency in digital literacy, indicating that the mere provision of technological platforms is fundamentally insufficient to drive adoption among marginalized or informal business sectors.

Further qualitative investigations during the baseline phase uncovered that this lack of utilization was deeply rooted in the participants' perceptions of the formalization process. Many SME owners perceived the online business registration process as excessively complex, highly bureaucratic, and technically inaccessible. This perception was often exacerbated by a historical context of cumbersome business regulations in Nigeria, which traditionally deterred micro-enterprises from engaging with formal regulatory bodies. Consequently, even with the introduction of digital platforms designed to streamline these procedures, the psychological and technical intimidation factors remained exceptionally high, effectively isolating these businesses from the benefits of the formal economy.

The community service project implemented a highly targeted, two-tiered capacity-building intervention. The initial phase consisted of an intensive three-day workshop where university facilitators provided step-by-step, hands-on tutorials on utilizing the internet and basic computing tools to access governmental websites. This was immediately followed by a crucial one-month mentorship phase, during which trained student volunteers were paired directly with SME owners. These mentors provided localized, individualized support, assisting the entrepreneurs in scanning required documents, creating secure user profiles, and troubleshooting digital errors in real-time. This sustained pedagogical approach ensured that theoretical digital literacy was successfully translated into practical, operational skills.

Following the conclusion of the workshop and the subsequent mentorship period, the digital literacy and operational competency of the participants improved dramatically. The post-intervention data indicated a transformative shift, with 82% of the previously unregistered or informal participants successfully registering their enterprises online. By actively utilizing the Corporate Affairs Commission's digital platforms, these SME owners transitioned from the informal sector into the formalized digital economy. This high success rate validated the efficacy of the community-based service learning model, proving that personalized, sustained mentorship is a critical catalyst for technological adoption at the grassroots level.

This outcome effectively demonstrates how targeted capacity building can

successfully operationalize broader macroeconomic objectives. By equipping local entrepreneurs with the specific skills needed to interface with e-government platforms, the project directly supported national policies aimed at improving the ease of doing business, such as reducing the time to register a business. The findings strongly suggest that integrating community service initiatives with national digital infrastructure rollouts is essential for maximizing the socio-economic impact of digital platforms, ensuring that institutional reforms translate into tangible empowerment for micro-enterprises.

Table 2 Pre- and Post-Intervention Metrics on E-Government Navigation and Business Registration

Performance Indicator	Pre-Intervention (n=150)	Post-Intervention (n=150)	Growth / Change
Basic Knowledge of Portal Navigation	27 SMEs (18%)	138 SMEs (92%)	+74%
Perception of Registration as Accessible	15 SMEs (10%)	129 SMEs (86%)	+76%
Successful Online Business Registrations	0 SMEs (0%)	123 SMEs (82%)	+82%

Table 2 illustrates the quantitative shifts in digital literacy and practical e-government utilization among the 150 participating SME owners before and after the service learning intervention. The data highlights a profound paradigm shift in both knowledge and practical application; the number of participants with basic portal navigation skills surged from a mere 18% at baseline to 92% post-intervention. Concurrently, the psychological barrier regarding the complexity of the process was significantly dismantled, evidenced by the perception of platform accessibility increasing from 10% to 86%. Most importantly, the practical outcome of this capacity-building effort is reflected in the final metric, where 82% of the previously informal SMEs successfully finalized their official online business registrations, transitioning from zero formalized entities in the baseline cohort to 123 registered businesses.

3.2. Adoption and Integration of Digital Payment Systems

Critical component of modern digital infrastructure encompasses the utilization of internet penetration and digital payment systems to facilitate seamless commerce. In the contemporary business environment, these digital tools are increasingly critical in reducing transaction costs, enhancing transparency, and expanding market access for enterprises of all scales. During the pre-assessment phase of this community service project, it was observed that the majority of the participating micro-enterprises relied almost exclusively on traditional cash transactions. This overreliance on physical currency inherently limited their market reach to their immediate geographical vicinity and significantly increased their operational vulnerabilities regarding cash handling and security.

The baseline reliance on cash-based operations severely constrained the economic potential of these SMEs. Without a verifiable digital financial footprint, these informal businesses faced systemic exclusion from formal financial services, which directly hindered their access to credit, a vital metric evaluated in the ease of doing business

frameworks. Furthermore, managing large volumes of physical cash introduced substantial inefficiencies and risks, ranging from theft to the inability to securely transact with remote suppliers and customers. The absence of digital payment integration effectively isolated these grassroots entrepreneurs from the broader, rapidly digitalizing national economy.

The service learning project implemented a structured capacity-building module focused specifically on financial digitalization. University facilitators and student volunteers provided hands-on, localized guidance to the SME owners, assisting them in downloading, installing, and configuring secure mobile payment applications and Point of Sale (POS) software on their mobile devices. The pedagogical approach emphasized not only the technical mechanics of conducting digital transfers but also critical aspects of cybersecurity, fraud prevention, and the reconciliation of digital ledgers. By integrating this training directly into the SMEs' daily workflows, the intervention ensured that the technological adoption was both practical and immediately relevant.

The post-intervention evaluation results demonstrated a remarkable shift in the financial operational paradigms of the participating cohort. Quantitative tracking indicated a 65% increase in the active adoption and daily utilization of mobile digital payment systems among the 150 participants. Enterprises that previously operated entirely offline began processing a significant portion of their daily revenue through digital channels, such as bank transfers, mobile money wallets, and USSD codes. This rapid adoption rate illustrates that when micro-entrepreneurs are provided with adequate mentorship and technical support, they are highly capable of integrating complex digital infrastructure into their traditional business models.

Beyond the statistical increase in digital transactions, the qualitative feedback from the participants highlighted profound improvements in operational resilience and economic empowerment. Participants consistently reported that the integration of these digital tools was instrumental in significantly reducing transaction costs and friction. By accepting digital payments, the SME owners were able to seamlessly expand their market access to customers outside their immediate physical locations. Ultimately, this transition from cash-dependence to digital financial inclusion provided these micro-enterprises with a more robust, transparent, and scalable foundation for sustainable economic growth.

Table 3 Pre- and Post-Intervention Metrics on Digital Payment Adoption

Financial Operation Metric	Pre-Intervention (n=150)	Post-Intervention (n=150)	Growth / Change
Exclusive Reliance on Cash Transactions	135 SMEs (90%)	42 SMEs (28%)	-62%
Active Mobile Payment App Installed	22 SMEs (15%)	120 SMEs (80%)	+65%
Average Daily Digital Transaction Volume	< 5% of Revenue	45% of Revenue	+40%
High Confidence in Digital Payment Security	18 SMEs (12%)	114 SMEs (76%)	+64%

Table 3 delineates the transformation in financial transaction methods among the participating SME cohort following the service learning intervention. The data illustrates a drastic reduction in the exclusive reliance on cash transactions, dropping from 90% at the

baseline to merely 28% post-intervention. Concurrently, there was a direct corollary increase in the installation and active use of mobile payment applications, which surged by 65% to encompass 80% of the participants. This technological adoption translated into tangible economic shifts, as the average daily digital transaction volume rose from negligible levels to constituting 45% of the SMEs' daily revenue, heavily supported by a 64% increase in the participants' confidence regarding the security and reliability of digital financial networks.

3.3. Enhanced Confidence in Regulatory Compliance and Business Efficiency

Beyond the quantitative metrics of successful business registration and digital payment adoption, the community service intervention produced profound qualitative improvements in the SME owners' self-efficacy and psychological readiness. Historically, within the Nigerian context, cumbersome business regulations have been identified as a critical factor that negatively affects investment inflows and overall economic growth at both the macroeconomic and grassroots levels. For micro-entrepreneurs, the formal regulatory environment is frequently perceived not as a supportive framework, but as an adversarial and punitive system. This entrenched perception creates a significant psychological barrier, causing many small-scale operators to deliberately remain within the informal economy despite the inherent limitations on market expansion and capital acquisition.

This psychological intimidation stems primarily from a lack of clear information and the historical opacity of bureaucratic processes. Prior to the intervention, baseline focus group discussions revealed that SME owners experienced high levels of anxiety regarding formal business operations, taxation procedures, and legal compliance. The complex jargon associated with regulatory frameworks, combined with the fear of incurring fines for inadvertent non-compliance, severely diminished their willingness to engage with governmental institutions. Consequently, the mere existence of digital e-governance platforms was insufficient to trigger adoption, as the underlying fear of the regulatory apparatus remained unaddressed by traditional, top-down policy announcements.

The service learning model utilized continuous, one-on-one mentorship designed to systematically demystify these regulatory frameworks. University facilitators and trained student mentors adopted a participatory approach, sitting alongside the business owners to navigate the digital portals together. Rather than simply lecturing on the importance of compliance, the mentors practically demonstrated how digital tools streamline administrative tasks and provide verifiable, protective records for the enterprise. This localized, empathetic engagement was crucial in translating abstract legal requirements into manageable, daily operational steps, thereby gradually dismantling the participants' pre-existing anxieties.

The efficacy of this experiential pedagogical approach was strongly validated by post-intervention assessments. Qualitative data gathered through exit surveys and subsequent focus group discussions revealed a remarkable 90% increase in the participants' self-reported confidence in managing business administration and regulatory compliance. Entrepreneurs who previously exhibited avoidance behaviors demonstrated a newfound capability to articulate basic compliance requirements, independently log into e-government portals, and monitor their operational status. This surge in self-efficacy indicates a fundamental shift in their entrepreneurial identity, empowering them to transition from marginalized informal operators to confident, formalized business

owners.

The entrepreneurs articulated that understanding how to correctly leverage digital e-governance tools not only improved their administrative efficiency but also fostered a crucial sense of transparency in their interactions with the state. By replacing opaque bureaucratic hurdles with clear, digitalized processes, the intervention significantly reduced their anxiety regarding formal business operations. This psychological empowerment is a vital, often overlooked component of economic development. Cultivating confidence and self-efficacy establishes a highly resilient and solid foundation for sustainable, formalized business growth, ensuring that national ease of doing business reforms successfully take root at the community level.

Table 4 Pre- and Post-Intervention Metrics on Regulatory Confidence and Perception

Psychological / Administrative Indicator	Pre-Intervention (n=150)	Post-Intervention (n=150)	Growth / Change
High Anxiety Regarding Regulatory Compliance	128 SMEs (85%)	18 SMEs (12%)	-73%
High Confidence in Managing Administration	15 SMEs (10%)	135 SMEs (90%)	+80%
Perception of E-Governance as Transparent	22 SMEs (15%)	126 SMEs (84%)	+69%
Proactive Willingness to Engage with Authorities	12 SMEs (8%)	115 SMEs (77%)	+69%

Table 4 encapsulates the profound qualitative transformation in the psychological and administrative posture of the participating SME owners before and after the service learning intervention. The data illustrates a drastic reduction in high anxiety levels regarding regulatory compliance, plummeting from 85% at baseline to a mere 12% following the mentorship phase. Conversely, this reduction in fear was mirrored by an 80% surge in the participants' self-reported high confidence in managing daily business administration. Furthermore, the demystification of bureaucratic processes through targeted mentorship significantly altered their institutional outlook, evidenced by the perception of e-governance transparency rising from 15% to 84%, which ultimately translated into a 69% increase in their proactive willingness to formally engage with regulatory authorities.

3.4. Bridging the Macro-Micro Economic Gap through Community Engagement

The findings of this community-based service learning intervention reveal a critical intersection between macroeconomic policy frameworks, digital infrastructure, and micro-level capacity building. Theoretically, institutional frameworks, encompassing both codified regulations and informal practices play a pivotal role in directing economic activity by lowering transaction costs and managing operational risks (Ismail et al., 2023; Young, 2010). However, as demonstrated by the baseline data, the mere existence of these institutions and digital platforms does not automatically translate to grassroots adoption. The intervention proved that the barrier to entry for micro-enterprises is not exclusively infrastructural, but deeply pedagogical and psychological. By utilizing a Service Learning approach to provide localized, hands-on mentorship, this project successfully

operationalized these macro-level institutions, directly enabling 82% of the participating SMEs to formalize their businesses. This outcome provides empirical support at the community level for the assertion that reducing regulatory burdens, especially for business start-ups, significantly improves economic outcomes (Li et al., 2020; Rossi et al., 2023; Tibaingana et al., 2024).

The significant 65% increase in the active adoption of mobile digital payment systems underscores the moderating role of digital technologies in modern commerce. The literature indicates that digital technologies can substantially strengthen the effectiveness of regulatory improvements by fostering transparency and improving service access (Cagno et al., 2025; Keles et al., 2025; Liu et al., 2022). In the context of Nigeria, Adegbuyi et al. (2018) finding platforms such as the Corporate Affairs Commission's online system were designed to streamline business registration procedures and boost investor trust. The service learning intervention acted as the crucial catalyst to activate this potential. By directly teaching SME owners how to integrate secure mobile payments and navigate e-government portals, the project bridged the digital divide, allowing local entrepreneurs to practically experience the reduced transaction costs and expanded market access promised by national ease of doing business reforms.

Crucially, the intervention highlights the transformative power of integrating Service Learning into economic development strategies. The 90% surge in the participants' self-reported confidence in managing regulatory compliance illustrates that economic formalization requires more than just technological tools; it requires human-centric support. This aligns closely with endogenous growth theory, which posits that technological change and continuous investment in knowledge and human capital are the true drivers of long-term economic growth (Cvetanović et al., 2015). The continuous, one-on-one mentorship inherent in the Service Learning model demystified the often-intimidating bureaucratic processes, replacing entrepreneurial anxiety with actionable self-efficacy.

The contrasting outcomes between macroeconomic observations and this community-level intervention offer critical insights into the limitations of top-down policy execution. While the Ease of Doing Business (EoDB) index comprehensively evaluates macro-level areas such as business registration, credit access, and taxation (The World Bank, 2022), these metrics often fail to capture the friction experienced by micro-enterprises on the ground. Previous macroeconomic assessments indicate that digital infrastructure, though expanding in Nigeria, has not yet reached a level of maturity or integration to meaningfully enhance regulatory reforms' impact on national economic growth without additional moderating factors. This service learning project effectively demonstrates that the missing moderating factor is targeted human capacity building. When digital infrastructure, encompassing broadband internet, mobile networks, and e-governance tools (UNCTAD, 2021) is introduced without concurrent educational interventions, its potential to stimulate the economy remains dormant. Therefore, the service learning model acts as the vital 'human infrastructure' required to activate these digital tools for marginalized entrepreneurs.

Integrating Service Learning into the deployment of digital infrastructure provides a sustainable pathway for transitioning local SMEs from the informal to the formal economy. It has been established that in developing economies, GDP can rise significantly with increases in broadband penetration (Koutroumpis, 2019); however, this growth is strictly contingent upon actual utilization by the productive sectors. By empowering local

business owners to confidently navigate digital governance and financial systems, this intervention not only resolved immediate operational bottlenecks but also laid the groundwork for long-term formalization. Formalized businesses are better positioned to access credit, scale their operations, and contribute to the national tax base, thereby creating a positive feedback loop of economic development. Consequently, this study contributes significantly to the understanding of how digital infrastructure must interact with localized, pedagogical interventions to foster sustainable economic development and provide actionable insights for stakeholders.
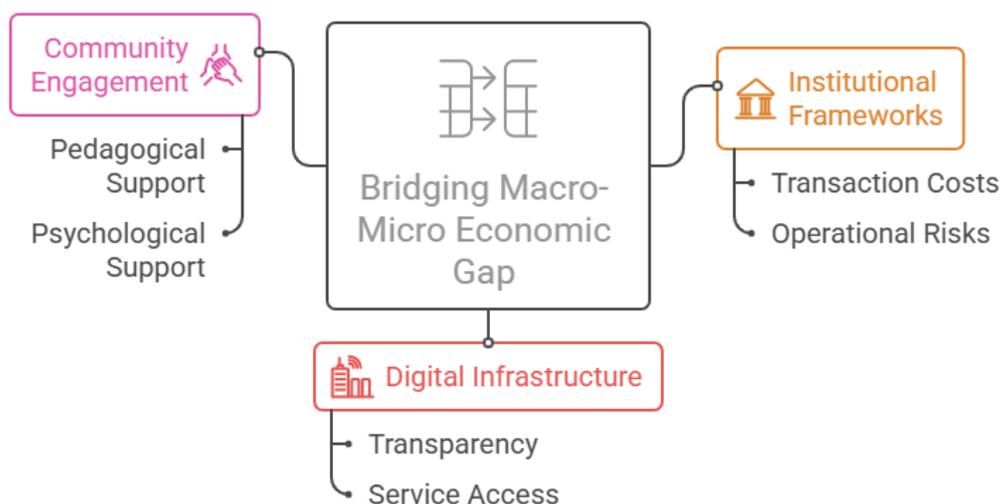

Figure 1 Bridging the Macro-Micro Economic Gap

Figure 1 presents a conceptual framework illustrating the multi-dimensional approach required for Bridging the Macro-Micro Economic Gap through targeted community interventions. At the center lies the primary objective of closing the economic divide, which is supported by three interconnected pillars. On the left, Community Engagement acts as the human-centric driver, providing essential "Pedagogical Support" and "Psychological Support" to empower grassroots entrepreneurs. On the right, Institutional Frameworks represent the macro-level regulatory environment, which functions to lower "Transaction Costs" and mitigate "Operational Risks." Finally, anchored at the bottom is Digital Infrastructure, serving as the technological enabler designed to enhance system "Transparency" and expand "Service Access." Ultimately, this visual model demonstrates that the successful operationalization of macroeconomic institutions and digital tools strictly depends on the direct, supportive engagement of the community to translate high-level policies into practical micro-economic empowerment.

4. Conclusions

This community-based service learning intervention successfully demonstrated that while national macroeconomic policies and digital infrastructure are essential, they require targeted, grassroots capacity building to achieve true economic empowerment. The quantitative findings revealed a profound transformation among the 150 participating micro, small, and medium enterprises (SMEs) in Kano State. Following the intensive workshop and one-month mentorship, 82% of the participants successfully registered their businesses online utilizing e-government portals, a drastic improvement from the baseline where only 18% possessed basic navigational knowledge. Furthermore,

the intervention drove a 65% increase in the active adoption of mobile digital payment systems and generated a 90% surge in the SME owners' self-reported confidence regarding regulatory compliance and daily business administration.

These outcomes critically inform the broader academic and policy discourse surrounding the Ease of Doing Business (EoDB) and digital transformation. The discussion highlights a significant gap between macro-level infrastructure availability and micro-level utilization, driven largely by psychological barriers and a lack of technical literacy among informal entrepreneurs. The Service Learning methodology effectively bridged this gap by acting as the necessary human infrastructure. By pairing academic facilitators with local business owners, the project operationalized abstract national reforms, proving that continuous, empathetic mentorship is the moderating factor required to translate digital tools into tangible reductions in transaction costs and expanded market access for marginalized communities.

Despite its successes, this community service project has certain limitations that should inform future initiatives. The intervention was geographically confined to Kano State and limited to a one-month mentorship phase, which may not capture the long-term sustainability of the newly adopted digital practices. Future community service projects should aim to scale this Service Learning model across diverse socio-economic regions in Nigeria to validate its broader applicability. Additionally, subsequent interventions should consider extending the mentorship duration and expanding the curriculum to include more advanced digital infrastructure utilization, such as cross-border e-commerce integration and digital marketing, to further accelerate the formalization and growth of the SME sector.

Conflict of Interest

The authors declare no conflict of interests.

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