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Digital Entrepreneurship as a Catalyst for Youth Employment and SME Growth in Nigerian Tertiary Institutions

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ABSTRACT

Nigeria's tertiary institutions are increasingly expected to improve graduate employment while stimulating the growth of micro, small and medium-sized enterprises. Yet entrepreneurship and digital-skills interventions are often evaluated as though educational exposure were equivalent to employment creation or firm growth. This conceptual article develops a dual-pathway capability-conversion framework that explains when and how digital entrepreneurship can act as a catalyst for youth employment and SME growth. The framework integrates human capital theory, individual employment-enactment capabilities, venture-level dynamic capabilities and entrepreneurial ecosystem theory, while using decent-work and agency considerations to evaluate outcome quality. Digital entrepreneurship is conceptualised as an institutional architecture comprising integrated curriculum, experiential practice, digital infrastructure, mentoring, incubation and industry-market linkages. These inputs build digital entrepreneurial human capital, which follows two distinct conversion routes. At the individual level, employment-enactment capabilities convert human capital into wage employment, self-employment and digitally mediated work. At the venture level, dynamic capabilities convert human capital into SME survival, revenue growth, productivity, market reach and organisational resilience. SME growth may subsequently generate additional youth employment, creating a cross-level feedback effect. Six proposition families specify the direct, mediated and moderated relationships, while digital inequality,

platform dependence, sector, venture stage, time and employment quality delimit the framework's boundary conditions. The article contributes by defining catalysis as conditional acceleration rather than automatic causation; separating participant employment from firm-level job creation; resolving the misuse of dynamic capabilities across levels of analysis; and locating the Nigerian institutional context inside the causal model. A longitudinal, multilevel research agenda and an implementation architecture are provided for Nigerian universities, polytechnics and colleges of education.

Keywords: digital entrepreneurship; youth employment; SME growth; entrepreneurship education; human capital; dynamic capabilities; entrepreneurial ecosystems; tertiary institutions; Nigeria

I. INTRODUCTION

Digital technologies have altered how entrepreneurial opportunities are recognised, tested and scaled. Their editability, recombability and connectivity allow entrepreneurs to experiment rapidly, reach dispersed customers and coordinate resources across organisational boundaries (Nambisan, 2017; Autio et al., 2018). For young people entering labour markets with limited formal vacancies, these affordances can support several routes into productive work: digitally enabled wage employment, freelance and platform-mediated work, self-employment, new venture creation and the expansion of existing SMEs. These possibilities have encouraged policymakers and tertiary institutions to present digital entrepreneurship as a response to youth employment pressure and weak firm productivity.

The promise is particularly salient in Nigeria. The country combines a large youth population, a substantial tertiary-education system, a vibrant technology and creative economy, and persistent difficulties in the transition from education to productive and secure work. Official labour-force evidence also shows why unemployment alone is an inadequate diagnostic: much employment is self-directed or informal, and job quality, hours, productivity and livelihood security remain central concerns (National Bureau of Statistics, 2024). The Nigerian Youth Employment Action Plan consequently links employability, entrepreneurship, employment and equality of opportunity, while national digital-economy and digital-literacy policies seek to widen participation in technology-enabled economic activity (Federal Ministry of Communications and Digital Economy, 2019; International Labour Organization, 2021; National Information Technology Development Agency, 2023).

Tertiary institutions occupy a strategic position within this policy landscape. Universities, polytechnics and colleges of education can combine teaching, technical infrastructure, laboratories, student communities, alumni networks and relationships with firms, financiers and public agencies. Nigeria's university regulator has similarly framed entrepreneurship education, skills development, incubation and industry collaboration as mechanisms for employability and enterprise creation (National Universities Commission, 2022). Nevertheless, institutional presence is not equivalent to institutional effectiveness. A compulsory course may change awareness without changing behaviour; an incubator may exist without accessible mentoring or finance; digital training may improve technical proficiency without strengthening commercial judgement; and a student venture may be registered without surviving, growing or creating decent work.

Research reproduces a similar input-output problem. Meta-analyses and systematic reviews generally report positive but heterogeneous effects of entrepreneurship education on human capital, intentions and behavioural outcomes (Bae et al., 2014; Martin et al., 2013; Nabi et al., 2017). More recent evidence indicates that entrepreneurship education can strengthen employability, but the effects depend on pedagogy, stakeholder engagement and institutional context (Decker-Lange et al., 2024; Huang et al., 2025). Studies of digital entrepreneurship and SME transformation likewise show that digital resources create value only when actors possess complementary capabilities and can access supportive networks (Soluk et al., 2023; Saeedikiya et al., 2024). The evidence therefore rejects a simple chain in which digital training automatically produces jobs and growth.

The literatures nevertheless remain fragmented. Entrepreneurship-education research is strongest on human capital, intention and proximal behaviour; employability research examines the capacity to obtain and sustain work; digital-entrepreneurship research explains technology-enabled opportunity formation; SME digital-transformation research focuses on firm adaptation and performance; and ecosystem

research explains the availability of complementary resources. None of these streams, used alone, explains how a tertiary institution can generate participant employment, venture growth and subsequent job creation without conflating levels of analysis. The central theoretical problem is therefore not whether digital entrepreneurship matters, but how institutional inputs become deployable capabilities and why the same intervention produces divergent employment and firm outcomes.

This article addresses these problems by asking: Through what capability-conversion mechanisms, and under what institutional and ecosystem conditions, can digital entrepreneurship act as a catalyst for youth employment and SME growth in Nigerian tertiary institutions? The term catalyst is used deliberately but cautiously. Digital entrepreneurship is not treated as a sufficient cause of employment or growth. It acts catalytically when it accelerates and improves the conversion of educational, technological and relational resources into productive employment and viable enterprise outcomes, while the underlying conversion remains conditional on complementary capabilities and accessible ecosystem resources.

The article makes five contributions. First, it develops a dual-pathway framework that separates the focal participant's employment from venture growth and from additional jobs created by a growing SME. Second, it distinguishes individual employment-enactment capabilities from venture-level dynamic capabilities, thereby preventing a firm-level theory from being applied indiscriminately to personal skills. Third, it theorises digital entrepreneurial human capital as a capability stock whose returns depend on conversion mechanisms rather than educational exposure alone. Fourth, it moves the Nigerian context inside the causal architecture by treating infrastructure, finance, labour-market information, market access and digital inclusion as moderators and boundary conditions. Fifth, it disciplines the optimistic language of catalysis by requiring evidence of acceleration, persistence and decent-work quality relative to a credible counterfactual.

II. APPROACH TO THEORY DEVELOPMENT

Analytical problem and source domains

This article is a conceptual theory-synthesis paper rather than an empirical report or a systematic review. Conceptual synthesis is appropriate when established constructs illuminate different parts of a phenomenon but do not yet form a coherent, level-consistent and testable explanation (Jaakkola, 2020). The focal problem is the conversion of institution-based digital entrepreneurship inputs into two outcomes located at different analytical levels: youth employment at the individual level and SME growth at the venture level.

The source base was developed purposively around five domains: entrepreneurship education and employability; digital entrepreneurship and external enablers; SME digital transformation and dynamic capabilities; entrepreneurial

ecosystems and university-based support; and Nigerian labour-market, youth, digital-economy and enterprise policy. Foundational theories, meta-analyses, systematic reviews and high-relevance empirical studies were prioritised, with official sources used to establish the Nigerian institutional and policy context. The purpose was theoretical coverage and mechanism identification rather than exhaustive bibliographic enumeration.

Integration procedure and rival-explanation checks

The synthesis proceeded through four auditable stages. First, constructs were assigned to their proper levels of analysis and adjacent concepts were separated: employability from observed employment, founder self-employment from additional job creation, and individual action patterns from firm-level dynamic capabilities. Second, each literature was mapped to one explanatory function—input, capability stock, conversion mechanism, contextual condition or outcome. Third, causal

Table 1. Positioning the framework against adjacent literatures

Literature stream	What it explains well	Unresolved limitation	Added value of the present framework
Entrepreneurship education	Human-capital formation, intentions and proximal behavioural effects (Bae et al., 2014; Martin et al., 2013; Nabi et al., 2017; Smolka et al., 2024).	Frequently treats intention, venture launch and employment as adjacent outcomes and relies on short follow-up periods.	Separates capability formation, individual employment, venture growth and additional job creation in a temporally ordered model.
Entrepreneurship education and employability	Career adaptability, employability, youth self-employment and graduate transitions (Fugate et al., 2004; Anosike, 2019; Decker-Lange et al., 2024; Huang et al., 2025; Okoro, 2021).	Rarely connects individual employment transitions to venture-level growth or firm-generated jobs.	Creates a legitimate employment pathway alongside a venture pathway and specifies distinct conversion mechanisms.
Digital entrepreneurship and external enablers	Digital affordances, opportunity formation and ecosystem interdependence (Nambisan, 2017; Autio et al., 2018; von Briel et al., 2018; Elia et al., 2020; Sussan & Acs, 2017).	Technology is sometimes treated as the focal cause, with insufficient attention to institutional capability formation and work quality.	Defines the causal input as an institutional architecture and treats digitalisation as conditional rather than intrinsically catalytic.
SME digital transformation	Digital capability, organisational renewal and firm performance (OECD, 2021; Warner & Wäger, 2019; Joensuu-Salo & Matalamäki, 2023; Soluk et al., 2023; Saeedikiya et al., 2024).	Does not explain participant employment or when firm growth creates jobs for other young people.	Adds a cross-level feedback route from SME growth to additional youth employment and permits jobless growth.
Entrepreneurial ecosystems	Complementary resources, relational coordination and regional conditions (Stam, 2015; Spigel, 2017; Stam & van de Ven, 2021; Wurth et al., 2022).	Can become descriptive unless resources are connected to specific micro- and venture-level mechanisms.	Specifies exactly which conversion relationships ecosystem accessibility moderates.
Context, inclusion and university ecosystems	Institutional embeddedness, inclusion constraints and university anchoring (Welter, 2011; Martinez Dy et al., 2017; Meyer et al., 2020; Khokhawala & Iyer, 2021; Osano, 2021; World Bank, 2019).	Context is often discussed after the causal model rather than used to explain heterogeneity in its core relationships.	Places Nigerian infrastructure, resource inequality, platform dependence and institutional continuity inside the framework.

III. WHY THE NIGERIAN TERTIARY-INSTITUTION CONTEXT MATTERS

Employment pressure is a problem of quality as well as quantity

Youth labour-market pressure in Nigeria cannot be understood through the unemployment rate alone. Labour-force measurement

ordering was checked by asking what must exist before each subsequent construct can occur. Fourth, the framework was challenged against rival explanations, including selection into entrepreneurship programmes, pre-existing digital advantage, sectoral labour intensity, macroeconomic demand and platform governance. Variables that alter the strength, timing or sign of a core relationship were retained as moderators or boundary conditions rather than added as undifferentiated predictors.

The resulting propositions do not claim that the relationships have already been demonstrated in Nigeria. They specify falsifiable relationships and identify the evidence required to distinguish programme effects from selection, general digitalisation or favourable market conditions. Table 1 positions the framework against the principal literatures and makes explicit the theoretical problem that the integration is intended to resolve.

captures substantial participation in self-employment and informal work, while underemployment, unstable income and low productivity complicate the interpretation of being ‘employed’ (National Bureau of Statistics, 2024). The ILO’s analysis of Nigeria’s youth labour market similarly highlights the importance of school-to-work transitions and the need to distinguish labour-force participation from sustained access to productive and decent work (O’Higgins et al., 2023). A framework centred only on

venture launch or any form of income generation would therefore risk labelling precarious activity as success.

This article uses the 2019 National Youth Policy's core age range of 15–29 years as the principal policy definition of youth (Federal Ministry of Youth and Sports Development & United Nations Population Fund, 2019). Because tertiary systems also enrol older and mature students, empirical tests should report participants above 29 separately rather than silently pooling them with the focal youth population. Youth employment includes wage employment, self-employment and digitally mediated freelance or platform work, but outcomes must be assessed through stability, earnings adequacy, skill utilisation, learning opportunity, social protection where applicable and control over working conditions. Founder self-employment belongs to the individual pathway; additional workers hired by a growing venture belong to the firm-level pathway.

Digital policy ambition creates opportunity but not automatic inclusion

Nigeria has established a policy architecture intended to expand participation in the digital economy. The National Digital Economy Policy and Strategy emphasises digital infrastructure, literacy, innovation and indigenous content, while the National Digital Literacy Framework specifies competencies in device use, information and data literacy, communication, content creation, safety and problem solving (Federal Ministry of Communications and Digital Economy, 2019; National Information Technology Development Agency, 2023). The Nigeria Startup Act also provides a legal and institutional basis for supporting eligible start-ups and strengthening ecosystem coordination (Federal Republic of Nigeria, 2022).

These policy developments expand the opportunity environment, but their benefits remain mediated by access and implementation. Devices, electricity, connectivity, digital payments, cybersecurity capability and affordable data are unevenly distributed, while Nigeria's digital-economy diagnostics continue to identify infrastructure and inclusion constraints (World Bank, 2019). Platform-mediated entrepreneurs may gain rapid market entry but remain exposed to fee changes, opaque algorithms, account suspension, data asymmetry and weak bargaining power. Digital inclusion and platform governance are therefore boundary conditions of catalytic influence rather than background limitations.

Tertiary institutions can become conversion infrastructures

Tertiary institutions have three advantages over isolated training programmes. First, they can sequence learning over time rather than deliver one-off workshops. Second, they can combine disciplinary expertise with entrepreneurship, allowing students in agriculture, engineering, health, creative industries and business to develop sector-specific opportunities. Third, they can connect learners to laboratories, mentors, alumni, employers, procurement opportunities, financiers and public programmes. These features

allow an institution to function as an ecosystem anchor rather than merely a course provider (Meyer et al., 2020; Osano, 2021).

The same institutions also face limitations. Entrepreneurship centres may be weakly linked to academic departments, career services and industry; practical work may be under-resourced; selection into incubation may favour already advantaged students; and support may end at graduation, precisely when ventures and job searches become most vulnerable. The central issue is therefore not whether tertiary institutions offer entrepreneurship education, but whether they construct a coherent architecture that carries learners from exposure to capability, from capability to action, and from action to verified employment and firm outcomes.

IV. CONSTRUCT CLARIFICATION AND ANALYTICAL BOUNDARIES

Population, institutional and enterprise boundaries

The framework focuses on current students and graduates within approximately five years of completing a programme in Nigerian universities, polytechnics and colleges of education, including public and private institutions. The five-year boundary is an attribution rule rather than a claim that later outcomes are unimportant: it limits the period within which employment or early venture outcomes can plausibly be linked to institution-based exposure without extensive evidence about intervening experiences. Long-run SME growth may be followed beyond five years, but the strength of direct institutional attribution should be expected to decline.

The enterprise pathway includes micro, small and medium-sized businesses because most student and graduate ventures begin as microenterprises before any transition to small or medium scale. Empirical studies should record official enterprise-size categories, venture age, sector and ownership status, and should distinguish student- or graduate-owned ventures from pre-existing community SMEs that merely participate in an institutional programme. The model concerns SMEs with a documented institutional connection; it does not attribute the performance of unrelated regional firms to tertiary education.

Tertiary-institution digital entrepreneurship architecture

Digital entrepreneurship refers to entrepreneurial action in which digital technologies materially shape opportunity formation, venture processes or value creation (Nambisan, 2017). Within tertiary institutions, however, the relevant causal input is broader than entrepreneurial action by an individual. This article defines tertiary-institution digital entrepreneurship architecture as the coordinated bundle of curricular, experiential, technological, relational and venture-support arrangements through which an institution enables students and graduates to create, obtain or expand work using digital resources.

The architecture has five components. Integrated curriculum combines opportunity recognition, customer value, business

models, digital marketing, data use, online payments, cybersecurity, intellectual property and responsible platform use. Experiential venture practice requires learners to discover problems, interview users, test assumptions, develop minimum viable offerings and interpret market evidence. Digital infrastructure provides devices, software, connectivity, laboratories and technical support. Venture support includes mentoring, incubation, finance readiness and post-graduation continuity. Industry and market linkages connect learners to employers, customers, suppliers, alumni, financiers and public procurement. The construct therefore captures institutional coherence rather than the mere presence of individual activities.

Digital entrepreneurial human capital

Human capital theory treats knowledge, skills and experience as productive resources accumulated through education and practice (Becker, 1994). Entrepreneurship research indicates that task-related human capital has a stronger association with entrepreneurial success than undifferentiated education alone (Unger et al., 2011). Digital entrepreneurial human capital is accordingly defined here as the integrated knowledge, judgement and confidence required to recognise, evaluate and enact work and venture opportunities through digital technologies.

Four dimensions are distinguished. Digital opportunity literacy is the ability to interpret customer, labour-market and platform information. Commercial and data judgement concerns value propositions, pricing, unit economics, evidence quality and ethical data use. Venture-execution knowledge concerns experimentation, customer acquisition, digital operations and resource mobilisation. Career adaptability concerns the capacity to reposition skills, construct a portfolio of evidence, navigate multiple work arrangements and learn as technology and demand change. Human capital is a stock of productive potential; it is not itself employment, venture creation or growth.

Individual employment-enactment capabilities

At the individual level, the missing bridge between human capital and employment is not a firm-level dynamic capability. It is an employment-enactment capability: a repeatable capacity to sense career and market opportunities, commit to an employment or self-employment route, and reconfigure skills, portfolios and networks as evidence changes. Sensing includes interpreting employer demand, customer problems and platform signals. Enactment includes applying for roles, presenting credible evidence of competence, negotiating work and launching a market test. Reconfiguration includes updating skills, repositioning a portfolio, diversifying work channels and mobilising new relationships. This construct draws on employability and capability-conversion logic while remaining analytically distinct from an organisation's dynamic capabilities (Fugate et al., 2004; Decker-Lange et al., 2024; Huang et al., 2025).

Venture dynamic capabilities

At the team and venture levels, dynamic capabilities retain their established organisational meaning: sensing opportunities and threats, seizing opportunities through commitments and business-model choices, and reconfiguring resources and routines as circumstances evolve (Teece, 2007). Digital-transformation studies show that technology produces performance benefits through these adaptive processes rather than through acquisition alone (Warner & Wäger, 2019; Saeedikiya et al., 2024). Venture dynamic capabilities therefore include systematic market sensing, evidence-based channel and pricing decisions, and the recombination of technologies, partners, routines and resources. They are properties of an entrepreneurial team or firm, not synonyms for every digital skill held by an individual.

Youth employment and SME growth

Youth employment is defined as a person-level transition into, or improvement in, productive work. Indicators include entry into wage employment, self-employment, freelance or platform-mediated work; duration and stability of work; earnings and hours; skill utilisation; progression; and perceived control. Employability is treated as a proximal capability rather than a final outcome: it concerns the capacity to obtain, create and sustain work, but must be followed by observed labour-market transitions where feasible (Fugate et al., 2004; Decker-Lange et al., 2024).

SME growth is a venture-level change in the scale, productivity, resilience or market position of a firm. Indicators include survival, revenue, customer base, market reach, productivity, innovation, formalisation, workforce size and the quality of jobs created. Growth is not synonymous with venture registration, social-media presence or short-term sales. Digital entrepreneurship may support growth by lowering search and transaction costs, improving customer reach and enabling new business models, but firms require managerial, organisational and network capabilities to realise these benefits (Joensuu-Salo & Matalamäki, 2023; Soluk et al., 2023).

What “catalyst” means in this framework

A catalyst accelerates a process without constituting the complete causal explanation. Applied here, digital entrepreneurship is catalytic when it increases the speed, probability or quality with which institutional resources become employment and SME outcomes. Three implications follow. First, catalytic influence is conditional: weak infrastructure, inaccessible finance or poor pedagogy can neutralise it. Second, a catalyst can operate through more than one pathway: the same capability stock can improve a graduate's employability, support self-employment or strengthen an existing SME. Third, catalytic influence should be evaluated against counterfactual trajectories and time: researchers must ask whether participants obtain better outcomes, sooner and more durably, than comparable non-participants or than they would under classroom-only provision.

Table 2. Construct definitions, levels of analysis and observable indicators

Construct	Level of analysis	Definition	Illustrative indicators
Tertiary-institution digital entrepreneurship architecture	Institution/programme	Coordinated curricular, experiential, technological, relational and venture-support arrangements.	Applied modules; live projects; digital access; mentoring; incubation; employer/customer linkages; post-graduation continuity.
Digital entrepreneurial human capital	Individual/team	Knowledge, judgement and confidence for digitally enabled opportunity recognition, work creation and venture execution.	Opportunity-evaluation tests; commercial/data judgement; digital portfolio quality; venture-execution knowledge; career adaptability.
Individual employment-enactment capabilities	Individual	Repeatable sensing, enactment and reconfiguration processes through which a participant converts human capital into work.	Job/customer search; applications and pitches; portfolio evidence; freelance market tests; skill and network reconfiguration.
Venture dynamic capabilities	Team/venture	Market sensing, opportunity seizing and resource/routine reconfiguration that adapt a venture under change.	Customer experiments; channel and pricing changes; partner mobilisation; process redesign; product/business-model revision.
Participant youth employment	Individual	Entry into or improvement in productive work by the focal student or graduate.	Wage employment; self-employment; freelance/platform work; earnings; hours; stability; progression; skill use; work quality.
SME growth	Venture	Sustained improvement in scale, productivity, resilience or market position.	Survival; revenue; customers; market reach; productivity; formalisation; innovation; workforce change.
Additional youth employment	Worker/venture interface	Jobs generated for people other than the founder as an SME expands.	Net additional youth workers; contract type; duration; wages; training; supplier and local-market employment effects.
Catalytic influence	Cross-level	Acceleration or improvement of capability conversion, conditional on complementary resources.	Shorter transition time; higher conversion probability; greater persistence; better-quality outcomes relative to a counterfactual.

V. THEORETICAL FOUNDATIONS OF THE INTEGRATED FRAMEWORK

Human capital theory: capability formation, not outcome attribution

Human capital theory explains why education and experience can raise productive capacity. In entrepreneurship education, the relevant returns arise not from attendance itself but from the development of knowledge and skills applicable to opportunity recognition, resource mobilisation and venture management. Meta-analytic evidence supports positive associations between entrepreneurship education, entrepreneurship-related human capital and outcomes, while also showing that effect sizes depend on programme design and research quality (Martin et al., 2013).

Human capital theory alone is insufficient because it does not explain whether knowledge will be used, whether complementary resources are accessible or whether the resulting employment is secure and productive. The present framework therefore assigns it a specific role: explaining capability formation. Digital entrepreneurial human capital is necessary but not sufficient; its economic value depends on conversion capabilities and context.

Employment-enactment capabilities: the individual conversion mechanism

Employability research explains why knowledge and adaptability can improve a person's capacity to obtain and sustain work, but employability remains a proximal capability rather than an observed labour-market outcome (Fugate et al., 2004). The present framework extends this logic by specifying employment enactment: individuals must interpret opportunities, present credible evidence, commit to a pathway and revise their strategy when feedback is negative. This mechanism explains why identical training may generate different employment transitions and why wage employment, freelance work and self-employment should be treated as alternative—not hierarchically ordered—routes into productive work.

The construct also protects level-of-analysis integrity. Career-opportunity sensing is analogous to, but not identical with, organisational sensing; an individual's portfolio revision is not automatically a firm's resource reconfiguration. By naming the individual mechanism separately, the framework can test whether human capital affects employment through personal enactment without assuming that every participant possesses a dynamic capability in the Teeceian sense.

Venture dynamic capabilities: the organisational conversion mechanism

The dynamic capabilities perspective resolves the knowledge–action gap at the venture level. Digital markets are volatile: platform rules change, customer feedback alters demand, new tools lower entry barriers and competitors imitate rapidly. Static knowledge depreciates unless an entrepreneurial team or firm can sense change, commit resources and reconfigure routines (Teece, 2007; Warner & Wäger, 2019). Studies of incumbent and transforming SMEs similarly show that digital resources generate performance benefits only when combined with managerial, organisational and network capabilities (Joensuu-Salo & Matalamäki, 2023; Soluk et al., 2023; Saeedikiya et al., 2024).

VI. ENTREPRENEURIAL ECOSYSTEM THEORY: ACCESS TO COMPLEMENTARY RESOURCES

Entrepreneurial ecosystems are configurations of interdependent actors and conditions that enable or constrain productive entrepreneurship (Stam, 2015; Stam & van de Ven, 2021). Their elements include infrastructure, institutions, finance, knowledge, networks, support services, leadership and access to demand. Ecosystem theory challenges the assumption that one intervention can independently generate enterprise outcomes.

For tertiary institutions, ecosystem value depends on accessibility and coordination. A mentor, fund or laboratory that students cannot reach has little causal relevance. Likewise, numerous programmes may coexist without creating a usable pathway from coursework to market access. Institutions can reduce search and transaction costs by acting as trusted intermediaries, but only when they connect actors, maintain transparent selection and provide stage-appropriate support (Spigel, 2017; Meyer et al., 2020).

Decent work and agency: an outcome-quality lens

Employment quantity is not a sufficient measure of developmental value. Young people may enter low-paid, unstable or hazardous work; platform work may shift risk to workers; and self-employment may reflect a lack of alternatives rather than opportunity. The ILO's youth-employment agenda therefore emphasises productive, freely chosen and decent work, while an agency perspective asks whether individuals gain meaningful resources, decision authority and livelihood choice (International Labour Organization, 2021, 2024; Kabeer, 1999).

This lens does not add another causal chain to the framework. It disciplines outcome interpretation. A programme should not be judged successful merely because participants report any income or register firms. Employment and growth outcomes should be assessed alongside work quality, resilience, control, inclusion and exposure to financial or platform risk.

The dual-pathway capability-conversion framework

Figure 1 presents the integrated framework. Tertiary-institution digital entrepreneurship architecture builds digital entrepreneurial human capital. Human capital then divides into two level-specific conversion mechanisms. Individual employment-enactment capabilities feed the participant-employment pathway; venture dynamic capabilities feed the SME-growth pathway. SME growth may subsequently create jobs for other young people, establishing a cross-level feedback effect. Accessible institutional and entrepreneurial ecosystems moderate capability formation and the conversion of capabilities into outcomes, while inclusion, platform dependence, sector, venture stage, time and decent-work quality delimit the conditions under which the title's catalytic claim is defensible.

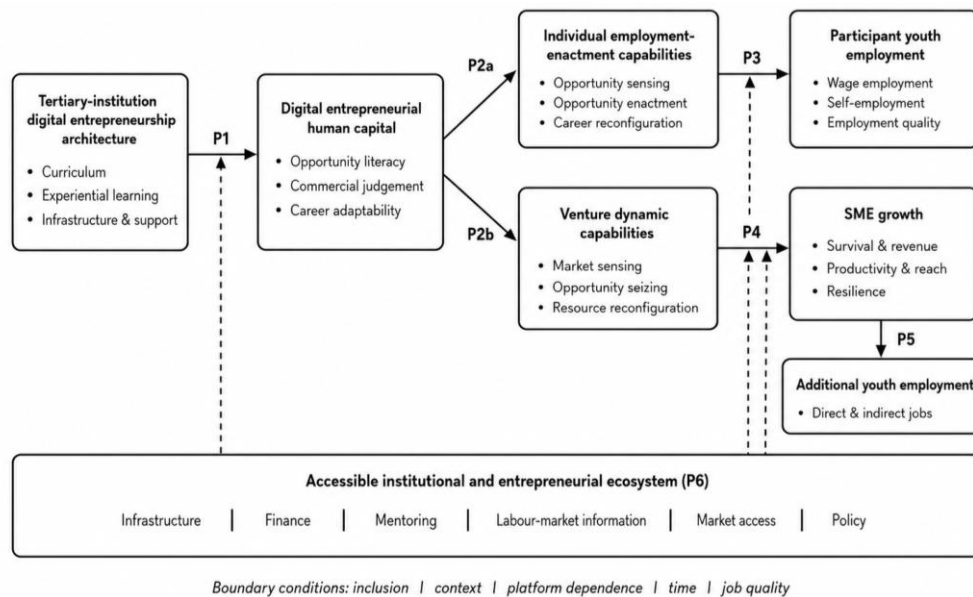


Figure 1. Dual-pathway capability-conversion framework for digital entrepreneurship, youth employment and SME growth in Nigerian tertiary institutions. Solid arrows represent direct relationships. Dashed arrows indicate the relationships moderated

by ecosystem accessibility. Individual employment-enactment capabilities and venture dynamic capabilities are separated to preserve levels of analysis.

From institutional architecture to digital entrepreneurial human capital

Programme exposure is unlikely to create usable human capital when it is predominantly lecture-based, detached from disciplinary problems or assessed through memorisation. Experiential learning requires students to encounter uncertainty, generate evidence and revise decisions. Contact with entrepreneurs, employers and customers adds contextual knowledge and credible performance signals. Digital infrastructure enables repeated practice rather than simulated familiarity. Incubation and mentoring extend learning into resource mobilisation and accountability.

Formal and non-formal entrepreneurship education can build different forms of entrepreneurial human capital, with applied approaches often producing stronger skill development than classroom instruction alone (Debarliev et al., 2022; Onjewu et al., 2021). The architecture construct therefore predicts capability formation from the coherence and intensity of the bundle, not simply from course participation.

P1. A coherent tertiary-institution digital entrepreneurship architecture is positively related to students' and graduates' digital entrepreneurial human capital; the relationship is stronger when learning is sustained, experiential, discipline-relevant and connected to external stakeholders.

From human capital to level-specific conversion capabilities

Human capital becomes economically consequential only when it alters action. Digital opportunity literacy and career adaptability should strengthen an individual's capacity to search, present evidence, test work opportunities and reconfigure a career strategy. Commercial judgement and venture-execution knowledge should strengthen a team's or firm's capacity to sense demand, seize opportunities and reconfigure resources. The two mechanisms share a conversion logic but are not interchangeable: one is located in the individual's employment transition, the other in the venture's adaptive routines.

P2. Digital entrepreneurial human capital is positively related to (a) individual employment-enactment capabilities and (b) venture dynamic capabilities; the relative strength of each relationship depends on whether the learner pursues an employment route, a venture route or both.

The participant-employment pathway

Digital entrepreneurship can improve youth employment through more than venture creation. Students who learn to identify customer problems, communicate value, analyse data and manage projects may become more employable within established organisations. Their project portfolios can provide signals of

applied capability, while contact with firms can improve labour-market information and matching. Entrepreneurship education can therefore support wage employment and intrapreneurial roles as well as self-employment (Decker-Lange et al., 2024; Huang et al., 2025).

A second route is work creation by the participant. Digital tools can support freelance services, e-commerce, creative work, online education, technology-enabled professional services and hybrid businesses. These routes differ in capital intensity, regulation and exposure to platform risk, but all require conversion from capability to market engagement. The immediate outcome should be measured as a transition into productive work, not merely intention or confidence.

P3. Individual employment-enactment capabilities mediate the positive relationship between digital entrepreneurial human capital and participant-level youth employment, including wage employment, self-employment and digitally mediated work.

The venture-growth pathway

For nascent or operating ventures, sensing supports the identification of demand, competitors and technology changes; seizing supports channel, pricing, partner and investment decisions; and reconfiguration supports adaptation of products, processes and resource combinations. Digital capabilities can enhance performance, but their returns depend on opportunity capability, leadership and complementary organisational routines (Joensuu-Salo & Matalamäki, 2023; Warner & Wäger, 2019).

The framework therefore rejects venture launch as the endpoint. An institution may increase registrations while producing fragile firms. Growth should be examined through survival, revenue, productivity, market reach, innovation, resilience and formalisation over time. The effect may also be nonlinear: excessive dependence on a single platform, technology provider or network can reduce autonomy and increase vulnerability.

P4. Venture dynamic capabilities mediate the positive relationship between digital entrepreneurial human capital and SME survival and growth; the relationship is stronger when ventures possess complementary managerial and organisational routines.

SME growth as a feedback mechanism for youth employment

The two outcome pathways are connected but should not be collapsed. Founder self-employment is a person-level employment outcome. Additional jobs created when a venture expands are firm-level consequences of growth. The distinction matters because many digital microbusinesses remain owner-operated, while some firms grow revenue through automation or outsourcing without increasing local employment.

Where SME growth increases production, customer service, logistics, content, sales or supplier demand, it can generate direct and indirect youth employment. The employment effect should therefore be tested rather than assumed, and job quality should be assessed. This feedback mechanism connects institution-level intervention to wider local development without attributing all employment effects directly to education.

P5. SME growth is positively related to additional youth employment, but the magnitude and quality of job creation depend on sector, labour intensity, automation, formalisation and growth strategy.

Accessible ecosystems as the enabling and moderating context

Capability conversion requires complementary resources. Connectivity and power affect the reliability of digital operations. Finance affects the ability to experiment, purchase tools and carry working capital. Mentors and incubators help actors interpret feedback, establish legitimacy and access specialist knowledge. Labour-market information improves matching; industry and

procurement linkages create demand; and predictable regulation lowers uncertainty.

The presence of these resources is insufficient if access is opaque, fragmented or captured by already advantaged participants. Ecosystem accessibility includes awareness, affordability, geographic reach, transparent selection, coordination and relevance to the actor's stage and sector. In emerging economies, incubator and mentor networks can bridge institutional gaps, but their value depends on the quality of connections rather than the number of organisations listed (Khokhawala & Iyer, 2021; Osano, 2021).

P6. Accessible and coordinated institutional and entrepreneurial ecosystem support strengthens (a) the relationship between institutional architecture and digital entrepreneurial human capital, (b) the relationship between individual employment-enactment capabilities and participant employment, and (c) the relationship between venture dynamic capabilities and SME growth.

Table 3. Summary of theoretical propositions and observable mechanisms

Proposition	Relationship	Core mechanism and observable implication
P1	Institutional architecture → digital entrepreneurial human capital	Coherent and experiential provision develops verified opportunity literacy, commercial judgement, venture-execution knowledge and career adaptability.
P2	Human capital → individual employment-enactment and venture dynamic capabilities	The same capability stock is converted through different mechanisms depending on whether action is person-level, venture-level or dual-path.
P3	Employment-enactment capabilities → participant youth employment	Opportunity sensing, credible enactment and portfolio/network reconfiguration improve transitions into wage, self-employed and digitally mediated work.
P4	Venture dynamic capabilities → SME growth	Market sensing, seizing and resource/routine reconfiguration improve survival, revenue, productivity, market reach and resilience.
P5	SME growth → additional youth employment	Growth creates net jobs only when sector and business-model characteristics translate scale into labour demand and acceptable work quality.
P6	Ecosystem accessibility moderates capability formation and conversion	Infrastructure, finance, mentoring, labour-market information and market access raise the usability and returns of capabilities at specified stages.

VII. BOUNDARY CONDITIONS, TENSIONS AND POTENTIALLY ADVERSE OUTCOMES

Digital inclusion, resource inequality and institutional selection

Students do not enter tertiary institutions with equal devices, connectivity, prior digital exposure, financial slack, social networks or household support. Gender, disability, discipline and location can shape participation in practical activities and the ability to sustain work or a venture after graduation. Digital

entrepreneurship may therefore widen opportunity while reproducing inequality (Martinez Dy et al., 2017).

Institutional selection can compound these inequalities. Incubation and competitive funding often favour participants who already possess stronger networks, prior digital exposure or financial support, while successful participants attract further resources. Observed success may therefore reflect selection and cumulative advantage rather than programme effect. Baseline resources, eligibility rules and participation attrition must be measured, and distributional outcomes should be reported by

gender, income, disability, location, discipline and prior digital access.

Platform governance and strategic dependence

Platform governance creates a second boundary. Market access can expand rapidly, but dependence on platform-controlled data, algorithms and accounts can weaken bargaining power and resilience. Institutions that teach only platform operation may create tactical competence without strategic autonomy. Compensatory access, safe participation, diversified channels, data rights and cyber-risk capability are thus part of effective programme design.

Platform dependence can weaken either pathway even when short-term market access improves. Participants may obtain work or sales while losing control over data, prices, customer relationships or account continuity. Channel diversification, data rights, cybersecurity, bargaining capability and contingency planning should therefore be treated as strategic capabilities and measured as moderators of persistence rather than assumed to be routine technical skills.

Sector, venture stage and the possibility of jobless growth

Digital affordances differ across sectors. Creative services and software may permit low-cost experimentation, whereas agriculture, manufacturing and health ventures may require physical assets, certification and longer development cycles. The relevance of platform skills, data capability and rapid iteration therefore varies. Venture stage also matters: nascent entrepreneurs need problem validation and initial resource mobilisation, while operating SMEs may require process integration, analytics, cyber-risk management and organisational change. A uniform curriculum is unlikely to serve both effectively.

Research should consequently model sector and stage as contingencies rather than control variables of minor interest. Programme portfolios may need pathway-specific modules, mentors and finance instruments. The catalytic effect will be strongest where the architecture is aligned with the technical, regulatory and market demands of the focal domain.

Digital growth does not necessarily increase employment. Automation can raise productivity while reducing labour demand; outsourced or remote work may shift jobs outside the local economy; and platform-based ventures may rely on unpaid family labour or precarious contractors. Firm growth and youth employment can therefore diverge. This possibility is not a defect in the framework but a reason to retain two separate outcome constructs.

Evaluation should distinguish gross jobs from net jobs, founder employment from additional employment, and job counts from decent-work quality. It should also document business exit, debt, stress, unpaid work and income volatility. A balanced assessment

prevents the title's optimistic framing from becoming an unfalsifiable assumption.

Temporal ordering and persistence

Capability formation, employment transition and firm growth unfold on different timescales. Knowledge and confidence may change during a semester; sensing and experimentation may appear soon afterwards; employment entry or venture launch may take months; and survival, productivity, job creation and livelihood security require longer observation. Immediate intention measures can therefore overstate impact, while very early firm-performance measures can understate it.

Catalytic influence implies speed as well as eventual outcome. Longitudinal designs should estimate time to employment, time to first sale, time to repeat customers and time to first hire, while also examining persistence. A programme that accelerates launch but increases failure or debt would not represent unambiguously beneficial catalysis.

Time is therefore a boundary condition rather than a seventh proposition. Effects should appear first in knowledge and behaviour, then in participant employment or venture processes, and later in survival, growth and additional job creation. Catalytic influence requires not only speed but acceptable persistence: a programme that accelerates launch while increasing failure, debt or precarious work cannot be regarded as unambiguously developmental.

VIII. THEORETICAL CONTRIBUTIONS

The first contribution is a sharper theoretical problem and a correspondingly more falsifiable meaning of catalytic influence. Digital entrepreneurship is often described as a catalyst rhetorically, implying direct and uniformly positive effects. The present framework defines catalysis as conditional acceleration or improvement in capability conversion. The claim can therefore be tested through transition time, conversion probability, persistence and quality relative to a counterfactual rather than inferred from course participation or technology use.

The second contribution is the dual-pathway and feedback architecture. Existing work commonly moves from entrepreneurship education to intention, venture creation or broad empowerment. The framework distinguishes participant employment from venture growth and then specifies the conditions under which growth may create employment for others. This resolves conceptual double counting and permits theoretically important divergence, including improved employability without venture launch, revenue growth without job creation and founder self-employment without firm growth.

The third contribution is level-specific capability conversion. Human capital explains the productive stock created through education. Individual employment-enactment capabilities explain how a person turns that stock into work, whereas venture dynamic capabilities explain how a team or firm turns it into adaptive

organisational performance. This separation preserves the microfoundations insight of dynamic-capability theory without treating every personal skill as a firm-level capability.

The fourth contribution is a relational account of ecosystems. Rather than describing infrastructure, finance, mentoring and market access as a favourable environment, the framework specifies the precise relationships that ecosystem accessibility strengthens. This transforms context from a list of background conditions into a source of testable heterogeneity and clarifies why institutions with similar curricula may produce different outcomes.

The fifth contribution is contextual and evaluative. Nigerian labour-market informality, infrastructure constraints, digital inequality and platform dependence are located inside the explanatory architecture, not appended as limitations (Welter, 2011). At the same time, decent-work and agency criteria prevent any job, any venture or any digital activity from being counted automatically as development. The framework can therefore accommodate positive, null and adverse outcomes.

IX. RESEARCH AGENDA AND EMPIRICAL STRATEGY

Design for temporal and causal identification

Testing the framework requires designs that move beyond single-source, cross-sectional surveys. At least four measurement points are desirable: before participation; immediately after capability formation; during the employment or venture transition; and after sufficient time for persistence and growth. Follow-up windows of 6, 12, 24 and 36 months would allow researchers to distinguish early behaviour from durable outcomes. Event-history models can estimate time to employment, first sale, formalisation or first hire.

Where randomisation is feasible, institutions can compare classroom-only provision with experiential or ecosystem-integrated formats. Where it is not, phased implementation, eligibility thresholds, matched comparison groups and difference-in-differences designs can strengthen causal inference. Pre-registration and clearly specified primary outcomes would reduce selective reporting. Qualitative process tracing should complement quantitative estimates by revealing how participants interpret barriers, mobilise resources and adapt after failure.

Multilevel and mechanism-aligned measurement

Participants are nested within programmes, departments and institutions, which are embedded in regional ecosystems. Multilevel models are therefore required. Individual-level measures should cover baseline resources, human capital, employment-enactment capabilities, employment transitions and work quality. Venture-level measures should cover dynamic capabilities, survival, revenue, customers, productivity, market reach, formalisation and workforce change. Institution-level measures should capture pedagogical intensity, digital infrastructure, mentor density, incubation access, employer and market linkages and continuity of support. Regional measures

should capture connectivity, power reliability, finance, demand and policy implementation.

Measurement must follow the causal sequence. Programme quality should be represented by observed design features rather than general satisfaction. Human capital should include knowledge tests and applied tasks. Individual employment-enactment capabilities should be measured through search, applications, pitches, portfolio changes and work-market experiments. Venture dynamic capabilities should be measured through customer discovery, channel and pricing changes, partner mobilisation and resource/routine reconfiguration. Outcomes should combine validated self-report instruments with administrative, employer, financial, tax, platform or bank evidence where consent and governance permit.

Distinguishing employment pathways, additional jobs and quality

Research should classify employment transitions rather than aggregate them. Wage employment, self-employment, freelance work and platform-mediated work differ in stability, autonomy, protection and growth potential. Multiple-job holding and transitions between categories are likely, especially in an informal labour market. Longitudinal data should therefore record employment spells, earnings, hours, contract type, benefits, skill use, progression and voluntariness.

For venture-generated employment, the unit should be the additional worker rather than the founder. Studies should document whether jobs are full-time, part-time, temporary, contracted or unpaid; whether workers are young; and whether employment is sustained. This prevents double counting the founder's self-employment as both a youth-employment and job-creation outcome.

Comparative and configurational research

Nigeria's institutional diversity creates opportunities for comparative research across universities, polytechnics and colleges of education; public and private institutions; urban and rural locations; and disciplines with different technical and market requirements. Comparative case studies can identify alternative architectures that achieve similar outcomes, while configurational methods can examine whether combinations of pedagogy, mentoring, infrastructure and finance are sufficient or necessary under different conditions.

Cross-country comparison should not treat Nigeria as a generic emerging economy. It should test which mechanisms travel and which depend on labour-market informality, institutional capacity, platform structure or policy implementation. Such work can refine the boundary conditions of the framework and contribute to broader theory on entrepreneurial universities and digital ecosystems.

Table 4. Priority research questions, recommended designs and measures

Research question	Recommended design	Core measures	Theoretical payoff
Which institutional components create digital entrepreneurial human capital?	Randomised or phased comparison of classroom-only, experiential and ecosystem-integrated formats.	Knowledge tests; applied opportunity tasks; digital portfolio quality; implementation fidelity.	Tests P1 and identifies active programme ingredients.
Do the two conversion mechanisms operate distinctly?	Four-wave longitudinal cohort with individual and venture subsamples; discriminant-validity and mediation tests.	Employment-enactment behaviour; venture dynamic-capability routines; pathway choice; switching between pathways.	Tests P2 and the level-specific mechanism claim.
Do employment-enactment capabilities improve participant employment?	Linked education–employment panel; event-history and competing-risk models.	Time to wage work, self-employment or freelance work; earnings; stability; progression; work quality.	Tests P3 and distinguishes alternative employment routes.
Do venture dynamic capabilities generate durable SME growth?	Founder–firm panel with administrative or financial verification.	Survival; revenue; customers; productivity; market reach; formalisation; resilience.	Tests P4 and separates launch from growth.
When does SME growth create youth jobs?	Linked founder–firm–worker panel; sector comparison and net-job accounting.	Additional workers; worker age; contract and wage quality; labour intensity; automation; supplier effects.	Tests P5 and cross-level feedback.
Which ecosystem resources strengthen conversion?	Multilevel study across institutions and regions; natural experiments in infrastructure or support access.	Connectivity; power; mentor density; finance; employer/customer linkages; transparent access.	Tests P6 and contextual causality.
Who benefits, who is excluded and how durable are outcomes?	Equity-stratified follow-up at 6, 12, 24 and 36 months.	Gender; income; disability; location; digital access; selection; platform dependence; persistence; adverse outcomes.	Refines boundary conditions and tests the quality of catalytic influence.

X. IMPLICATIONS FOR TERTIARY INSTITUTIONS AND POLICY

Build an architecture, not a collection of activities

Institutional leaders should map the complete conversion journey from curriculum to verified outcomes. Entrepreneurship modules, career services, information-technology units, incubation centres and industry partnerships should not operate as separate silos. A visible pathway should allow students to move from problem discovery to applied projects, mentoring, market testing, employment matching, incubation, finance and alumni support. Governance should assign responsibility for the transitions between stages, not only for delivery of activities.

Assessment should reward evidence and adaptation. Students should identify a problem, engage users or employers, construct a digital portfolio or minimum viable offering, test a channel, interpret data and explain how evidence changed their decision. Polished business plans and intention surveys are inadequate proxies for capability deployment.

Design two legitimate exit pathways

Digital entrepreneurship should not imply that every graduate must launch a firm. Institutions should design both an employment pathway and a venture pathway. The employment pathway can include employer projects, internships, freelancing protocols, digital portfolios, career coaching and intrapreneurship.

The venture pathway can include customer discovery, incubation, finance readiness, legal and tax guidance, procurement links and post-graduation mentoring. Students should be able to move between pathways as evidence and circumstances change.

This dual design reduces the pressure to present venture creation as the only successful outcome and recognises entrepreneurship education as a source of employability and adaptive capability. It also improves measurement because institutions can track employment transitions separately from firm creation and growth.

Make inclusion, platform resilience and continuity design requirements

Shared devices, reliable connectivity, accessible laboratories, flexible scheduling, transparent selection, disability inclusion and gender-responsive mentoring should be treated as programme infrastructure. Institutions should measure who enters, who completes, who reaches incubation or finance and who is excluded at each stage. Support should continue after graduation through alumni incubation, mentor networks and referral agreements, because capability conversion often occurs after formal institutional access ends.

Platform and cyber-risk capability should be embedded throughout. Learners should understand data ownership, account security, pricing power, platform terms, intellectual property and channel diversification. Such content converts digital participation from tool use into strategic competence.

Replace activity counts with an outcome portfolio

Funding and quality assurance should move beyond counts of students trained, events held or firms registered. A balanced portfolio should report reach, capability, behaviour, participant employment, venture performance, additional jobs, inclusion and outcome quality. Indicators should be disaggregated and followed over time. Independent verification can be introduced progressively through employer confirmation, administrative records, financial evidence and structured alumni tracking.

Government agencies, financial institutions, technology firms and established businesses can provide complementary resources. However, partnerships should be organised around explicit conversion bottlenecks—for example, connectivity, market access, procurement, working capital or mentorship—rather than ceremonial memoranda. Tertiary institutions can serve as trusted coordinators when selection and outcome reporting are transparent.

XI. LIMITATIONS OF THE CONCEPTUAL FRAMEWORK

The framework is deliberately parsimonious and does not include every mechanism that may influence employment or firm growth. Entrepreneurial identity, social capital, psychological resilience, effectuation, institutional legitimacy and family resources may add explanatory value. They should be incorporated as theoretically justified extensions rather than accumulated into an untestable model.

The separation of individual employment-enactment capabilities from venture dynamic capabilities improves level consistency but requires empirical validation. Some participants occupy both levels simultaneously—for example, a founder whose personal search and networking become venture routines. Future work should test when individual action becomes an organisational capability rather than assuming a fixed boundary.

The framework is developed for Nigerian tertiary institutions and for students and recent graduates connected to them. Its mechanisms may travel to comparable settings with informal labour markets and uneven digital infrastructure, but construct meanings, institutional capacity and ecosystem effects may differ across countries, sectors and types of tertiary institution. Comparative evidence is required before broad generalisation.

XII. CONCLUSION

Digital entrepreneurship can act as a catalyst for youth employment and SME growth in Nigerian tertiary institutions, but its effects are neither automatic nor uniform. The causal input is not a course, an incubator or a technology in isolation. It is a coherent institutional architecture that develops usable digital entrepreneurial human capital and connects that capital to credible opportunities and complementary resources.

The dual-pathway framework distinguishes the focal participant's employment from the growth of a venture and from the additional jobs that a growing SME may create. It also separates individual employment-enactment capabilities from venture dynamic capabilities, resolving a level-of-analysis weakness that would otherwise undermine the theory. Accessible ecosystems strengthen capability formation and conversion, while digital inequality, platform dependence, sector, venture stage, time and work quality delimit the conditions under which catalytic influence can be claimed.

The central proposition is therefore conditional: digital entrepreneurship becomes developmental when Nigerian tertiary institutions convert educational exposure into deployable capabilities, sustain access to infrastructure, mentoring, finance and markets, and verify durable employment and firm outcomes rather than participation counts. This shifts both research and policy from asking whether entrepreneurship is taught to asking what is converted, through which mechanism, for whom, at what level and with what quality of outcome.

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