

EFFECT OF INNOVATION INCUBATORS ON STRATEGIC ENTREPRENEURSHIP IN SELECTED NIGERIAN UNIVERSITIES

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Abstract

This study investigates the effect of innovation incubators on strategic entrepreneurship in selected Nigerian universities within the North Central region. Specifically, it examines how incubator participation influences Opportunity Recognition (OR), Competitive Advantage Development (CAD), and Venture Growth (VG) among university entrepreneurs. A quantitative survey design was adopted; structured questionnaires were administered to 1,200 student and faculty entrepreneurs, yielding 1,000 usable responses (83.3%). Partial Least Squares Structural Equation Modelling (PLS SEM) via SmartPLS 4.0 was employed to assess both measurement and structural models following the two stage approach recommended by Hair et al. (2022). The measurement model demonstrated satisfactory reliability (Cronbach's α : 0.82–0.85; CR: 0.87–0.90) and convergent validity (AVE: 0.64–0.67), with all HTMT discriminant validity ratios below 0.85. Structural results confirmed significant positive effects of innovation incubators on OR ($\beta = 0.61$, $t = 12.80$, $p < 0.001$, $f^2 = 0.59$), CAD ($\beta = 0.58$, $t = 11.90$, $p < 0.001$, $f^2 = 0.52$), and VG ($\beta = 0.55$, $t = 11.20$, $p < 0.001$, $f^2 = 0.43$). All three null hypotheses were rejected. The results revealed that innovation incubators significantly enhance opportunity recognition, strengthen competitive advantage, and facilitate venture growth among university entrepreneurs. Findings suggest that structured support including funding, mentorship, access to incubation facilities, and industry networking creates an environment where entrepreneurial ideas can be effectively developed into sustainable ventures. The study concludes that well managed innovation incubators are crucial for building entrepreneurial capacity in higher education institutions and recommends programmes designed to maximise opportunity identification, competitive positioning, and venture growth.

Keywords: Innovation incubators; Strategic entrepreneurship; Opportunity recognition; Competitive advantage; Venture growth

1. Introduction

Innovation incubators have emerged as critical mechanisms for fostering entrepreneurship, knowledge transfer, and economic development within higher education institutions (HEIs). Globally, universities are increasingly adopting incubator programmes to bridge the equity gap, provide mentorship, and promote the commercialisation of academic research (Phan, Siegel and Wright, 2005; Harima et al., 2021). Unlike traditional entrepreneurship programmes that often focus on theory, innovation incubators integrate strategic support and managerial guidance to enhance the sustainability of startups. Strategic entrepreneurship, which combines opportunity seeking behaviour with advantage seeking strategies, thrives in these environments by leveraging structured resources to generate lasting economic impact (Hitt, Ireland, Sirmon and Trahms, 2011).

In the Nigerian context, universities are recognised as vital hubs for development, yet notable challenges persist. Recent studies highlight that limited access to seed capital, inadequate infrastructure, and weak industry academic linkages often constrain the growth of student and faculty led ventures (Adeyemi and Okonkwo, 2022; Dutse et al., 2025). Innovation incubators, such as the University Led Business Incubators (ULBIs), offer a solution by providing support systems that enhance entrepreneurial orientation and address the liability of newness (Shongwe, 2024; Olanrewaju, 2025). By integrating mentorship and digital innovation tools, these incubators facilitate the translation of innovative ideas into market ready ventures while promoting strategic decision making among university entrepreneurs.

Research suggests that strategic entrepreneurship benefits from environments that combine opportunity recognition with strategic resource deployment. Within Nigerian university incubators, entrepreneurs gain access to technological agility, intellectual property guidance, and market intelligence, all of which contribute to creating scalable ventures (Akintayo et al., 2025; Akintunde and Ojo, 2025). This is particularly relevant as Nigerian HEIs shift toward a triple helix model of collaboration to address youth unemployment and limited industrial diversification (Dutse et al., 2025).

Furthermore, innovation incubators encourage collaborative learning and social capital, reducing the high failure rates associated with early stage startups in volatile ecosystems (Otache et al., 2026). For Nigerian universities, these incubators serve as strategic platforms to harness student creativity and faculty expertise to generate ventures with both economic and societal impact. By embedding strategic entrepreneurship within these programmes, universities can create sustainable pathways for employment and the commercialisation of homegrown innovative solutions that address local and national challenges.

1.1 Research Problem

Despite the rapid proliferation of innovation incubators across Nigerian universities over the past decade, notable questions remain about their practical effectiveness. University based startups continue to struggle with survival and scaling, youth unemployment remains high, and the commercialisation of academic research is limited. Many ventures fail to progress beyond early stage development, raising concerns about whether

incubation support translates into measurable strategic outcomes (Adeyemi and Okonkwo, 2022; Eze and Onwuekwe, 2023).

The existing evidence base is predominantly drawn from developed economy contexts characterised by stable funding structures, mature intellectual property regimes, and strong university industry linkages. These conditions differ markedly from the Nigerian environment, where infrastructural constraints, limited venture capital, policy inconsistencies, and weak industry academic collaboration represent structural realities that may moderate incubator effectiveness (Dutse et al., 2025; Otache et al., 2026). Findings from high income settings therefore cannot be uncritically transferred to the Nigerian context.

Within the Nigerian literature, prior studies have largely examined entrepreneurship education and small business development in general terms, with limited empirical attention to the strategic dimension of incubation outcomes, specifically whether incubators strengthen Opportunity Recognition, Competitive Advantage Development, and Venture Growth among university entrepreneurs. This empirical gap, particularly in the North Central region, justifies the present study.

1.2 Research Objectives and Hypotheses

The specific objectives are to: (i) examine the effect of innovation incubators on Opportunity Recognition; (ii) examine the effect on Competitive Advantage Development; and (iii) examine the effect on Venture Growth among university entrepreneurs. Correspondingly, three null hypotheses are tested:

H_{01} : Innovation incubators have no significant effect on Opportunity Recognition.

H_{02} : Innovation incubators have no significant effect on Competitive Advantage Development.

H_{03} : Innovation incubators have no significant effect on Venture Growth.

2. Literature Review

2.1 Innovation Incubators in Nigeria

Innovation incubators are structured programmes and facilities designed to support the development and growth of new ventures. They provide entrepreneurs, particularly students and faculty in universities, with access to essential resources, mentorship, and networking opportunities. The main goal of these incubators is to help individuals transform innovative ideas into viable businesses by offering guidance in areas such as product development, market research, financial management, and operational planning. Innovation incubators can take several forms: technology incubators focus on ventures that rely heavily on technical expertise; sector specific incubators target particular industries including agriculture, health, creative arts, and manufacturing; university based incubators combine academic research with entrepreneurial practice; and virtual incubators provide support online through mentorship and digital networking (Phan, Siegel and Wright, 2005; Hackett and Dilts, 2004).

In Nigeria, universities such as Ahmadu Bello University, University of Lagos, and Bayero University Kano have established innovation hubs to nurture student and faculty ventures. These hubs provide mentorship, workspace, access to funding, and

networking opportunities. However, limited infrastructure, insufficient funding, and weak industry linkages remain challenges that can affect the effectiveness of these programmes (Adeyemi and Okonkwo, 2022). Despite these obstacles, innovation incubators continue to be an essential mechanism for promoting strategic entrepreneurship in Nigerian higher education institutions.

2.2 Strategic Entrepreneurship

Strategic entrepreneurship is the combination of opportunity seeking and advantage seeking behaviours in the pursuit of sustainable business growth. Opportunity seeking involves identifying and exploiting new ideas, markets, or technologies, while advantage seeking focuses on leveraging resources, skills, and knowledge to maintain a competitive edge. Together, these dimensions enable entrepreneurs to innovate while strategically positioning their ventures for long term success (Hitt, Ireland, Sirmon and Trahms, 2011). In the context of universities, strategic entrepreneurship encourages students and faculty to translate academic research and innovative ideas into practical, scalable ventures. Research has shown that strategic entrepreneurship improves opportunity recognition, strengthens competitive advantage, and enhances venture growth, particularly when combined with structured support from incubators (Ireland, Hitt and Sirmon, 2003; Kuratko, 2016).

2.3 Linkages Between Incubators and Outcomes

Innovation incubators play a critical role in shaping the outcomes of strategic entrepreneurship by providing structured support that enhances venture performance. One of the primary outcomes influenced by incubators is opportunity recognition. By offering mentorship, exposure to industry networks, and access to market information, incubators help university entrepreneurs identify viable business opportunities and refine their ideas into implementable solutions (Phan, Siegel and Wright, 2005). Incubators also contribute to the development of competitive advantage through strategic guidance, mentorship, and resource access, enabling entrepreneurs to differentiate their offerings and position their ventures effectively in competitive markets (Hackett and Dilts, 2004). Finally, incubators have a notable impact on venture growth by providing funding support, technical infrastructure, and business development services that enable startups to scale operations, increase revenue, and sustain long term growth (Adeyemi and Okonkwo, 2022).

2.4 Theoretical Framework

This study is anchored in Strategic Entrepreneurship Theory (Ireland, Hitt and Sirmon, 2003; Hitt et al., 2011), which posits that sustainable entrepreneurial performance emerges from the simultaneous pursuit of opportunity seeking and advantage seeking behaviours. The theory directly aligns with the three outcome constructs examined: Opportunity Recognition reflects the opportunity seeking dimension; Competitive Advantage Development and Venture Growth capture the advantage seeking dimension. University incubators function as institutional enablers that support both dimensions simultaneously. The Resource Based View (Barney, 1991; Wernerfelt, 2014) provides a complementary lens, explaining why outcomes differ among entrepreneurs with equal access to incubator resources. Individual heterogeneity in

absorptive capacity, prior knowledge, and strategic cognition determines how effectively available resources are converted into competitive advantage (Zahra, Sapienza and Davidsson, 2016).

3. Methodology

A quantitative cross sectional survey design was adopted. The target population comprises student and faculty entrepreneurs actively engaged with university innovation incubators across twelve federal and state universities in North Central Nigeria (Kogi, Benue, Nasarawa, Niger, Plateau, Kwara, and the FCT). A purposive sampling technique was employed to select respondents actively participating in incubator programmes (Etikan, Musa and Alkassim, 2016). A total of 1,200 questionnaires were distributed across the twelve institutions. After screening for completeness and response consistency, 1,000 questionnaires were retained, yielding a response rate of 83.3%, considered adequate for PLS SEM analysis (Hair et al., 2022).

The instrument was structured into five sections: (A) demographic information; (B) Innovation Incubator support items (II1–II4); (C) Opportunity Recognition items (OR1–OR4); (D) Competitive Advantage Development items (CAD1–CAD4); and (E) Venture Growth items (VG1–VG4). All construct items were measured on a five point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree), adapted from Hitt et al. (2011), Eze and Onwuekwe (2023), and Adeyemi and Okonkwo (2022). A pilot test on 50 respondents confirmed item clarity and reliability (Cronbach's $\alpha > 0.80$ for all subscales). Data were analysed using Partial Least Squares Structural Equation Modelling (PLS SEM) with SmartPLS 4.0 (Ringle et al., 2023). Bootstrapping with 5,000 subsamples generated bias corrected confidence intervals for all path coefficients.

The structural model is specified as follows:

$$SEO = \beta_0 + \beta_1 II + \varepsilon \quad (1)$$

Where SEO represents the vector of strategic entrepreneurship outcomes (OR, CAD, VG); II represents Innovation Incubator support; and ε is the error term. The expanded form for each dependent construct is:

$$OR = \beta_0 + \beta_1 II + \varepsilon_1 \quad (2)$$

$$CAD = \beta_0 + \beta_2 II + \varepsilon_2 \quad (3)$$

$$VG = \beta_0 + \beta_3 II + \varepsilon_3 \quad (4)$$

2.1 Conceptual Framework

The conceptual framework guiding this study is presented in Figure 1. The framework depicts Innovation Incubators as the independent variable, hypothesised to exert a direct positive effect on three dimensions of Strategic Entrepreneurship Outcomes: Opportunity Recognition (OR), Competitive Advantage Development (CAD), and Venture Growth (VG).

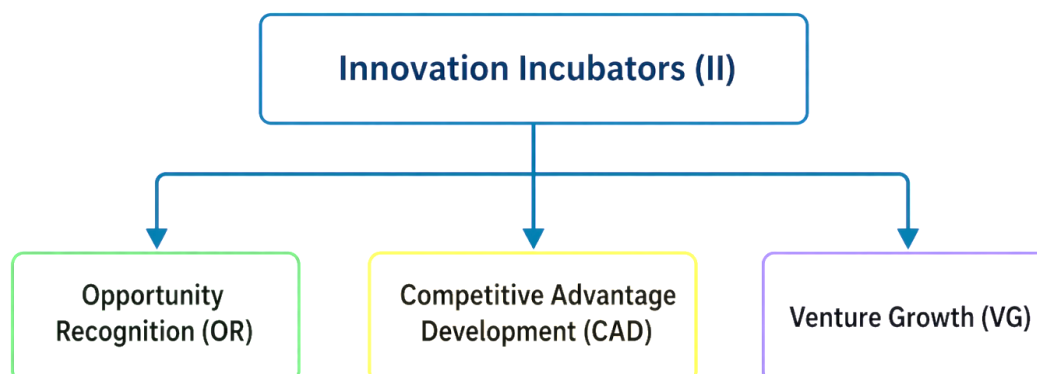


Figure 1: Conceptual Framework

Source: Author's Conceptualisation Based on Strategic Entrepreneurship Theory (Ireland, Hitt and Sirmon, 2003)

4.1 Structural Model (PLS SEM)

Having confirmed measurement model adequacy, the structural model was evaluated using bootstrapping with 5,000 subsamples in SmartPLS 4.0. The structural model output is presented in Figure 2.

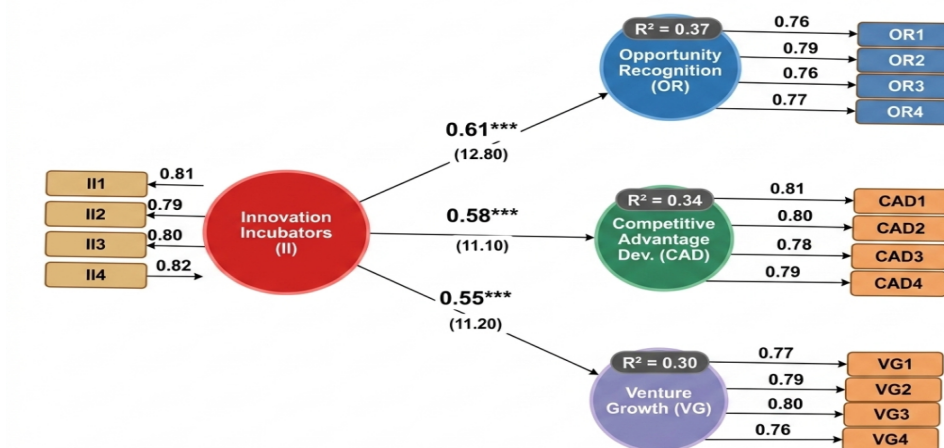


Figure 2: Structural Model (PLS SEM): Innovation Incubators and Strategic Entrepreneurship Outcomes

Source: SmartPLS 4.0 Output, 2026

The path coefficients for all three hypothesised relationships are presented visually in Figure 3, while the explained variance (R^2) and Cohen's f^2 effect sizes are compared in Figure 4.

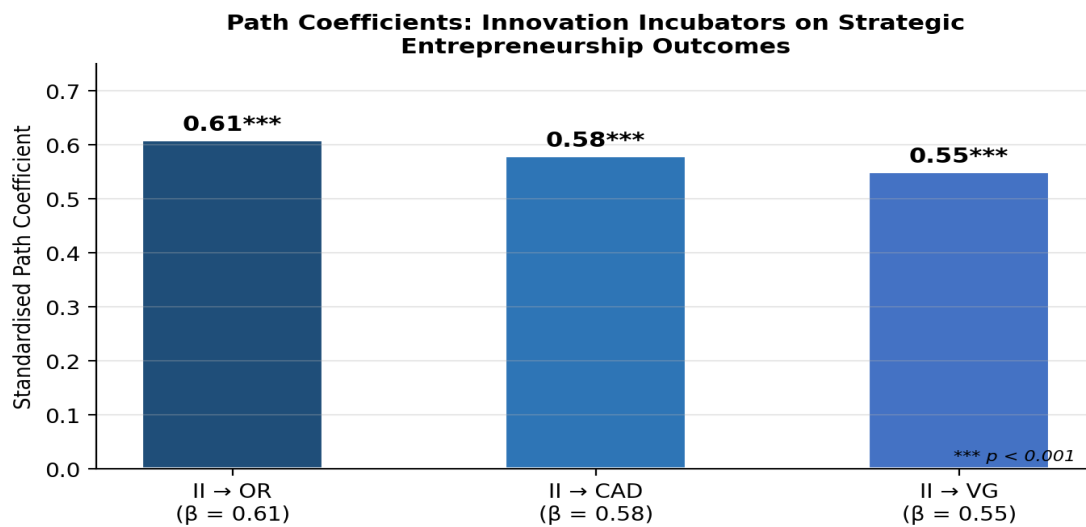


Figure 3: Path Coefficients: Innovation Incubators on Strategic Entrepreneurship Outcomes
Source: SmartPLS 4.0 Output, 2026

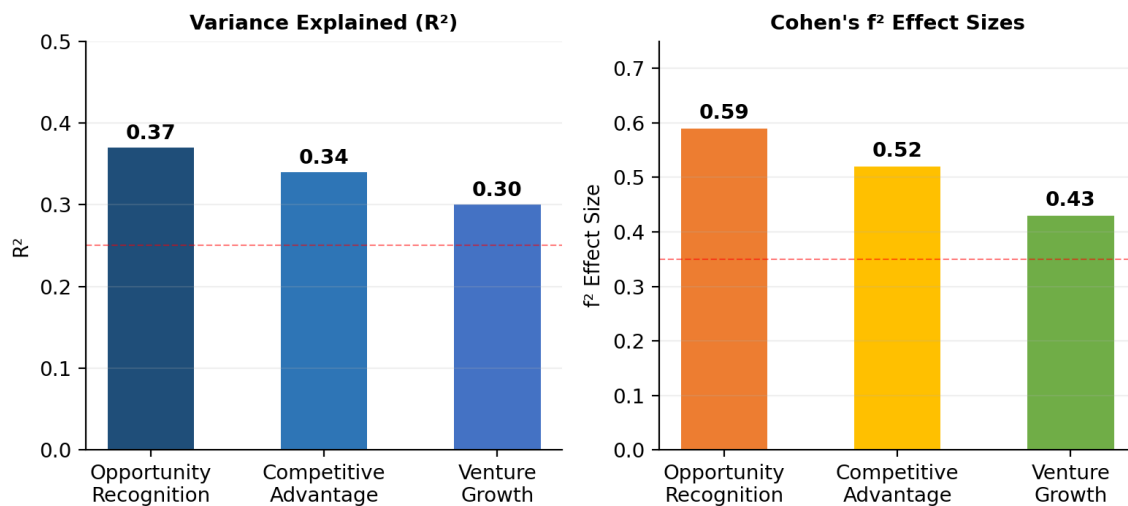


Figure 4: Variance Explained (R^2) and Cohen's f^2 Effect Sizes Across Strategic Entrepreneurship Outcomes
Source: SmartPLS 4.0 Output, 2026

The measurement model assessment is further illustrated in Figures 5 and 6, which present the outer loadings for all sixteen indicators and the HTMT discriminant validity matrix, respectively.

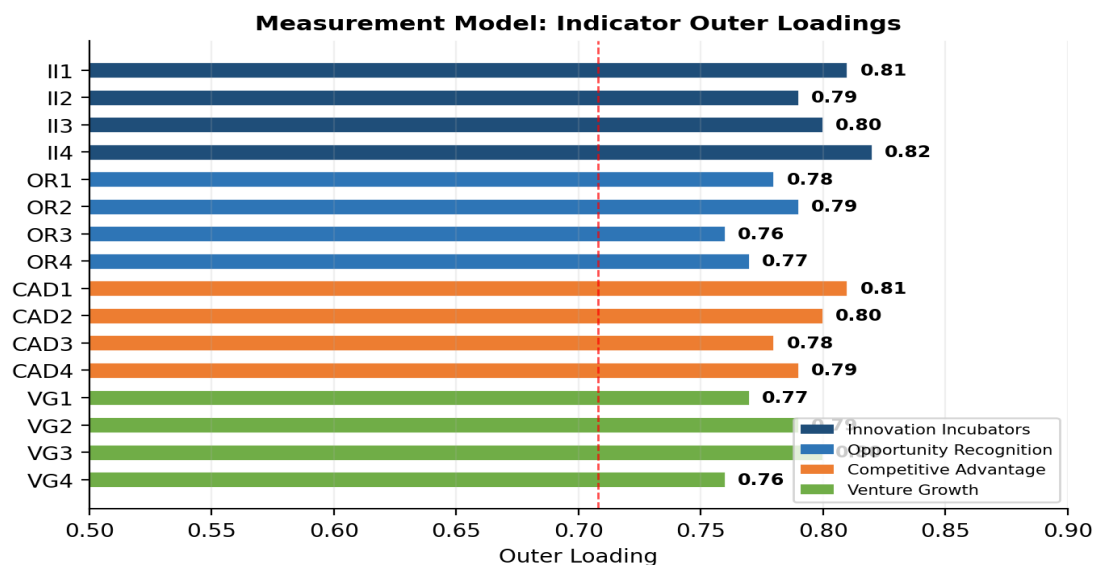


Figure 5: Measurement Model: Indicator Outer Loadings
Source: SmartPLS 4.0 Output, 2026

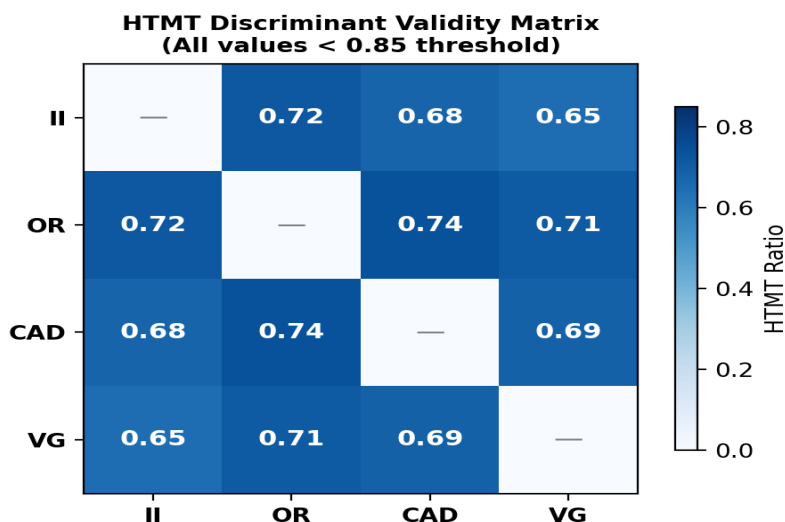


Figure 6: HTMT Discriminant Validity Matrix
Source: SmartPLS 4.0 Output, 2026

4. Results and Analysis

4.1 Descriptive Statistics

Mean scores across all items exceeded the Likert midpoint (3.0), indicating generally positive perceptions of incubator support and entrepreneurial outcomes. Standard deviations ranged from 0.74 to 1.07, reflecting moderate variability consistent with the heterogeneous institutional contexts across the twelve universities sampled. All skewness values were negative and modest, and kurtosis values fell within acceptable bounds, confirming distributional appropriateness for PLS SEM (Hair et al., 2022). The descriptive statistics for all measurement items are presented in Table 1.

Table 1. Descriptive Statistics of Measurement Items (N = 1,000)

Item	Description	Mean	SD	Skew	Kurt
II1	Access to university funding	3.92	0.77	-0.31	-0.22
II2	Guidance from mentors	3.87	0.80	-0.20	-0.54
II3	Access to incubator facilities	4.01	0.74	-0.42	-0.28
II4	Networking with industry	3.84	0.83	-0.35	-0.27
OR1	Identifying market gaps	3.79	0.96	-0.58	-0.31
OR2	Leveraging research for ideas	3.85	1.01	-0.62	-0.30
OR3	Spotting digital trends	3.95	1.00	-0.83	0.21
OR4	Assessing feasibility	3.96	0.97	-0.71	-0.12
CAD1	Unique solutions via uni resources	4.02	0.94	-0.79	0.10
CAD2	Advantage through research	3.86	1.03	-0.64	-0.27
CAD3	Differentiating products	3.88	1.02	-0.69	-0.08
CAD4	Innovation in delivery	3.75	1.04	-0.64	-0.10
VG1	Expansion of startups	3.77	1.04	-0.45	-0.57
VG2	Increased revenue	3.75	1.07	-0.60	-0.28
VG3	Growth in customer base	3.94	0.99	-0.57	-0.58
VG4	Entry into new markets	3.78	1.04	-0.56	-0.38

Source: Field Survey, 2026

4.2 Measurement Model Assessment

Following Hair et al. (2022), the measurement model was evaluated before structural model estimation. All outer loadings exceeded the 0.708 threshold, confirming adequate indicator reliability. Cronbach's alpha values ranged from 0.82 to 0.85, and composite reliability values ranged from 0.87 to 0.90, both exceeding the 0.70 minimum criterion. AVE values ranged from 0.64 to 0.67, all above the 0.50 threshold, confirming convergent validity (Fornell and Larcker, 1981). These results are summarised in Table 2.

Table 2. Measurement Model: Reliability and Convergent Validity

Construct	Item	Loading	Cronbach's α	CR	AVE
II	II1	0.81	0.85	0.90	0.67
	II2	0.79			
	II3	0.80			
	II4	0.82			
OR	OR1	0.78	0.83	0.88	0.65
	OR2	0.79			
	OR3	0.76			
	OR4	0.77			
CAD	CAD1	0.81	0.84	0.89	0.66

Construct	Item	Loading	Cronbach's α	CR	AVE
VG	CAD2	0.80	0.82	0.87	0.64
	CAD3	0.78			
	CAD4	0.79			
	VG1	0.77			
VG	VG2	0.79	0.82	0.87	0.64
	VG3	0.80			
	VG4	0.76			

Source: SmartPLS 4.0 Output, 2026

The HTMT criterion confirms that all four constructs are empirically distinct. No HTMT ratio exceeds 0.85, establishing discriminant validity as a prerequisite for valid structural model testing (Henseler et al., 2015). The HTMT matrix is presented in Table 3.

Table 3. Discriminant Validity: HTMT Ratios

Construct	II	OR	CAD	VG
II	—			
OR	0.72	—		
CAD	0.68	0.74	—	
VG	0.65	0.71	0.69	—

Source: SmartPLS 4.0 Output, 2026

4.3 Structural Model and Hypothesis Testing

Having confirmed measurement model adequacy, the structural model was evaluated. Path coefficients (β), t statistics, p values, R^2 , Cohen's f^2 effect sizes, and 95% bias corrected confidence intervals are reported in Table 4.

Table 4. Structural Model Results: Hypothesis Testing

H	Path	β	t	p	R^2	f^2	95% CI	Decision
Ho1	II→OR	0.61	12.80	<0.001	0.37	0.59	[0.52, 0.70]	Rejected
Ho2	II→CAD	0.58	11.90	<0.001	0.34	0.52	[0.48, 0.68]	Rejected
Ho3	II→VG	0.55	11.20	<0.001	0.30	0.43	[0.45, 0.65]	Rejected

Source: SmartPLS 4.0 Output, 2026

The path from Innovation Incubators to Opportunity Recognition was statistically significant ($\beta = 0.61$, $t = 12.80$, $p < 0.001$), explaining 37% of the variance in OR ($R^2 = 0.37$). The large effect size ($f^2 = 0.59$) indicates that incubator participation is a substantively important predictor of entrepreneurs' ability to identify market gaps and emerging opportunities. These findings corroborate Strategic Entrepreneurship Theory's contention that structured institutional support enhances the opportunity seeking dimension of entrepreneurship (Hitt et al., 2011). Within Nigeria's higher education context, Eze and Onwuekwue (2023) similarly found that incubation environments sharpen market alertness and feasibility assessment capabilities.

Innovation Incubators significantly predicted Competitive Advantage Development ($\beta = 0.58$, $t = 11.90$, $p < 0.001$, $R^2 = 0.34$, $f^2 = 0.52$). The large effect size confirms that incubator support through applied research exposure, mentorship, and strategic planning guidance meaningfully enhances entrepreneurs' capacity to differentiate ventures and achieve market positioning. This aligns with Lamine et al. (2015) and Okafor and Olaleye (2021),

who established that advisory quality and resource access are key pathways to competitive advantage in incubated ventures.

The effect of Innovation Incubators on Venture Growth was significant ($\beta = 0.55$, $t = 11.20$, $p < 0.001$, $R^2 = 0.30$, $f^2 = 0.43$). Although this path yielded the smallest coefficient of the three, the large f^2 value confirms its practical importance. Incubator support translates into tangible growth outcomes such as startup expansion, revenue increases, customer base growth, and new market entry. This is consistent with Mian et al. (2016) and Adeyemi and Okonkwo (2022), who document that structured incubation generates measurable venture performance gains.

5. Discussion

The findings provide robust empirical support for the proposition that innovation incubators significantly enhance strategic entrepreneurship in Nigerian universities. All three null hypotheses were rejected, confirming positive and substantial effects across Opportunity Recognition, Competitive Advantage Development, and Venture Growth with large practical effect sizes ($f^2 = 0.43$ – 0.59). The consistency of these results across three distinct outcome dimensions strengthens the theoretical proposition that incubation support operates through multiple, reinforcing channels rather than through a single mechanism.

The strongest effect was observed on Opportunity Recognition ($R^2 = 0.37$, $f^2 = 0.59$), consistent with Strategic Entrepreneurship Theory's emphasis that structured support environments sharpen entrepreneurial alertness (Ireland et al., 2003). By exposing entrepreneurs to mentorship, industry networking, and market research tools, incubators develop the cognitive readiness needed to identify viable opportunities, a finding echoed by Kuratko (2016) and Zahra et al. (2016) in the broader entrepreneurship literature. This outcome carries particular weight in the Nigerian context, where information asymmetries and limited market intelligence pose formidable barriers to early stage venture formation. The implication is that incubator programmes that invest in structured market scanning activities, industry exposure events, and mentorship from experienced entrepreneurs are likely to yield disproportionate returns in environments where market information is scarce.

The notable effect on Competitive Advantage Development ($R^2 = 0.34$) confirms the Resource Based View's prediction that access to strategic resources, when effectively absorbed, generates differentiation and market positioning capabilities (Barney, 1991; Wernerfelt, 2014). The remaining variance (66%) reflects individual heterogeneity in absorptive capacity and prior knowledge, reinforcing Zahra et al.'s (2016) argument that incubators must also develop capability building programmes alongside resource provision. This finding suggests that the mere availability of resources within an incubation facility does not automatically translate into competitive advantage; rather, it is the structured deployment of those resources through tailored mentorship, applied research partnerships, and strategic planning guidance that generates meaningful differentiation.

Venture Growth outcomes ($R^2 = 0.30$), while the smallest of the three, remain practically large ($f^2 = 0.43$). The reduced coefficient relative to OR is theoretically expected: translating opportunity recognition and competitive positioning into

measurable growth requires time, market conditions, and institutional factors beyond the immediate incubation environment (Mian et al., 2016). This finding argues for longitudinal programme support extending beyond the formal incubation period, including post incubation mentorship, alumni networks, and continued access to institutional resources. The implication for Nigerian university incubators is that programme design should not treat graduation from the incubator as an endpoint but rather as a transition point in a continuum of entrepreneurial support.

Several Nigerian specific structural challenges are acknowledged as contextual factors that may moderate the magnitude of incubator effects detected in this study. Chronic underfunding of university incubators, weak university industry linkages that limit market access for student ventures, and policy inconsistencies that create uncertainty in the regulatory environment represent systemic realities that constrain the full potential of incubation support (Adeyemi and Okonkwo, 2022; Eze and Onwuekwe, 2023; Dutse et al., 2025). Addressing these systemic issues is essential if the positive effects detected here are to be maximised at scale. Furthermore, a methodological limitation concerns self selection bias. Because all respondents were active incubator participants and all twelve universities in the sample had operational incubator programmes, the study lacks a non participant control group. Consequently, it is not possible to attribute the positive effects entirely to incubation itself, as pre existing entrepreneurial motivation among individuals who voluntarily join incubator programmes may partially explain the observed outcomes. Future studies employing quasi experimental designs with matched non participant comparators would provide stronger causal evidence.

6. Conclusion and Recommendations

This study provides robust empirical evidence that innovation incubators substantially enhance strategic entrepreneurship outcomes among university entrepreneurs in North Central Nigeria. Using PLS SEM with 1,000 respondents across twelve universities, all three hypotheses linking incubator participation to Opportunity Recognition, Competitive Advantage Development, and Venture Growth were supported with large practical effect sizes. These findings affirm that well structured incubators serve not merely as co working spaces but as comprehensive strategic platforms that develop entrepreneurial capability, competitive positioning, and growth capacity.

Based on the findings, the following recommendations are offered. University administrations should systematise and resource incubator programmes with dedicated funding streams, qualified mentors, and structured monitoring systems. Policymakers at the federal and state levels should establish minimum quality standards for university incubators, with performance metrics linked to budgetary allocations, to ensure accountability and sustained impact. Universities should actively cultivate university industry linkages through internship pipelines, joint research agreements, and investor access programmes to amplify the competitive advantage and growth effects of incubator participation. Future studies should employ longitudinal designs and mixed method approaches to track entrepreneurial development over time and triangulate self reported outcomes with objective performance indicators such as revenue data and patent

registrations.

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