

Effect of Crowdfunding and Angel Investment on the Performance of Small and Medium Enterprises (SMEs) in North Central Nigeria

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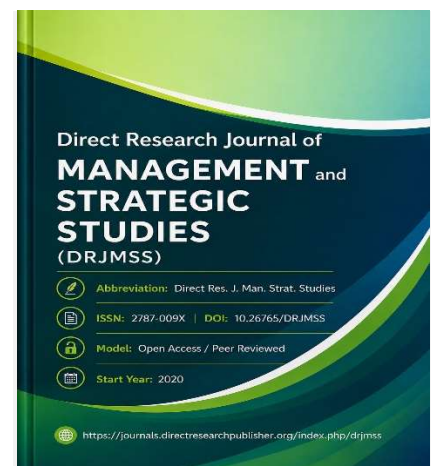
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ABSTRACT

Despite the increasing recognition of Small and Medium Enterprises (SMEs) as vital contributors to economic growth and employment in Nigeria, the extent to which emerging alternative financing mechanisms such as crowdfunding and angel investment influence their performance in North Central Nigeria remains unclear. This study therefore investigated the effect of crowdfunding and angel investment on the performance of SMEs in the region. A survey research design was adopted with a sample size of 398 SME owners and managers, and data were collected using a structured five-point Likert scale questionnaire. The data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The results revealed that both crowdfunding and angel investment exerted significant positive effects on SME performance, though crowdfunding demonstrated a stronger influence. The study concludes that alternative financing mechanisms play a crucial role in enhancing SME growth, innovation, and sustainability in North Central Nigeria. It recommends that policymakers and financial stakeholders strengthen the regulatory and awareness framework for crowdfunding while promoting angel investment networks through incentives and capacity-building initiatives to improve SME access to finance and long-term performance.

Keywords: Crowdfunding, Angel Investment, SMEs Performance.



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INTRODUCTION

Small and medium enterprises (SMEs) remain central to Nigeria's growth and jobs agenda, yet financing frictions

continue to suppress productivity and scale-up potential. Recent evidence shows SMEs account for ~46% of GDP

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and over 80% of employment, but operators still struggle to access affordable credit, navigate multiple taxes, and absorb energy shocks (PwC, 2024). Financial inclusion has improved nationally, but significant regional gaps persist especially across Northern zones limiting formal finance uptake by many micro and small firms (EFInA, 2024). These constraints heighten the search for alternative, flexible risk capital that better fits young and growth-oriented ventures than collateralized bank lending. Within the North-Central region (Benue, Kogi, Kwara, Nasarawa, Niger, Plateau and the FCT), SMEs face the same macro headwinds but also sub-national frictions in market access, capabilities, and knowledge transfer that shape performance outcomes. Empirical work on the zone highlights how management practices (e.g., knowledge application and sharing) affect SME performance, underscoring that finance must be complemented by non-financial value to unlock results (Fom, Pwot, & Ogaji, 2023). Broader Nigerian studies on entrepreneurial financing similarly report mixed access and high cost of funds as binding constraints to growth, even for otherwise viable firms (Obot, et al., 2023). Against this backdrop, equity-like instruments that pair capital with mentoring and networks such as crowdfunding and angel investment are increasingly salient for SMEs in North-Central Nigeria. Policy shifts since 2021 have opened the door for regulated crowdfunding as a mainstream SME financing channel. The Securities and Exchange Commission (SEC) issued binding rules effective 21 January 2021, setting eligibility criteria for MSME fundraisers, licensing obligations for crowdfunding intermediaries, investor protection thresholds, and permissible instruments (e.g., ordinary shares, plain-vanilla bonds, simple investment contracts) (SEC Nigeria, 2021; Olaniwun Ajayi, 2021). Clarificatory circulars and practitioner guidance emphasize retail investor caps and portal governance to curb fraud while enabling compliant capital formation online (CISI Nigeria, 2021; Aarn-Dale Law, 2024). These rules matter for North-Central SMEs because they lower geographic barriers: ventures in Abuja, Nasarawa or Kwara can now legally raise from nationwide (and diaspora) crowds via licensed portals without relocating to coastal hubs. Emerging scholarship and reviews also link crowdfunding to improved venture performance pathways capital access, market validation, and learning effects. A 2024 systematic review finds crowdfunding can bridge early-stage finance gaps, aggregate customer feedback, and signal quality to later investors, though outcomes vary with campaign design and institutional context (Hoque, 2024). Nigeria-focused evidence such as recent work on Lagos tech startups—reports positive associations between crowdfunding participation and growth metrics where campaigns convert community traction into working capital (Ogazi & Eneji, 2025). For North-Central SMEs, regulated equity/loan crowdfunding could therefore finance product trials, inventory cycles, or expansion while simultaneously building local market legitimacy that bank lending alone

rarely delivers. In parallel, angel investment has matured across Africa and Nigeria, with growing evidence that angels add performance-enhancing “smart capital” through expertise, governance, and networks. Recent studies show angel funding is associated with higher survival and revenue growth, with brand-name angels particularly amplifying post-investment performance (Lange, 2024; Blaseg, Koenig, & Vanacker, 2024; Lodefalk, 2023). Ecosystem signals in Nigeria remain constructive despite macro volatility: policy and regulatory updates, plus active investor communities, are supporting early-stage deals (PEVCA, 2024). Importantly for the North-Central zone, the Abuja Angel Network (AAN) operates from the FCT and syndicates across sectors (agribusiness, healthtech, manufacturing, etc.), offering local pipelines for mentorship and capital (VC4A, 2025). Bringing these strands together, the combined effect of crowdfunding and angel investment has high potential to improve SME performance in North-Central Nigeria through complementary mechanisms. Crowdfunding can mobilize broad-based capital and demand validation at relatively low transaction cost within SEC’s investor-protection guardrails, while angels can supply post-financing stewardship, governance discipline, and strategic connections that professionalize SMEs and de-risk subsequent financing rounds. With persistent credit constraints documented among Nigerian MSMEs (Ajayi, et al., 2021) and persistent inclusion gaps in the North (EFInA, 2024), a blended alternative-finance pathway crowd first, angels next offer a pragmatic route to raise growth capital, build capabilities, and translate financing into measurable improvements in sales growth, productivity, and survival for SMEs across the North-Central corridor.

The performance of Small and Medium Enterprises (SMEs) in North Central Nigeria is critical to regional economic development, employment generation, and innovation. However, despite their economic significance, many SMEs in this region face persistent challenges in accessing crowd funding and angel investment an essential factor for startup, growth, and sustainability. Barriers such as inadequate financial literacy, high interest rates, and restrictive lending conditions limit their ability to secure funding from formal financial institutions. This financial exclusion often results in underinvestment in key operational areas like technology, marketing, and workforce development, ultimately hindering business performance and growth (Aremu & Adeyemi, 2011; Olawale & Garwe, 2010). While previous studies have established a general link between entrepreneurial finance and SME performance, there is a significant research gap regarding the specific financial challenges faced by SMEs in North Central Nigeria and the extent to which these constraints impact their operational success. Additionally, the region’s socio-economic instability marked by political unrest, infrastructural deficiencies, and economic volatility further complicates access to and the effectiveness of

entrepreneurial finance (Nwankwo & Gbadamosi, 2016). This study aims to address this gap by examining the relationship between entrepreneurial finance and SME performance in the region, providing evidence-based insights to guide policy formulation and improve financing mechanisms tailored to the local context.

Research Hypotheses

For this study, the following hypotheses were tested:

H₀₁: Crowdfunding has no significant effect on the performance of SMEs in North Central Nigeria.

H₀₂: Angel investment has no significant effect on the performance of SMEs in North Central Nigeria.

Literature Review

Crowdfunding

Crowdfunding is a modern financing mechanism through which entrepreneurs and innovators raise small financial contributions from a large, dispersed audience primarily via digital platforms. Mollick (2014) defines it as a process that bypasses traditional financial intermediaries by leveraging the internet to aggregate modest contributions from numerous individuals. Similarly, Baumgardner et al. (2017) describe it as a collective effort facilitated by online networks, where supporters and investors pool resources to fund new ventures such as technology startups or creative projects. Unlike conventional financing models that rely on centralized institutional approval, crowdfunding operates through decentralized, community-driven participation. Bessière et al. (2019) highlight the diversity of contributors, emphasizing that backers may include customers, enthusiasts, or socially motivated investors, while Sharma et al. (2021) note that this inclusivity across geographic and demographic lines strengthens its potential impact. The digital infrastructure underpinning crowdfunding is its defining feature, enabling direct and real-time interactions between entrepreneurs and potential funders. Tan and Reddy (2021) identify it as an online method that connects fund seekers with investors through social networks, allowing campaigns to achieve virality and scale rapidly. Bafera et al. (2020) further explain that crowdfunding platforms serve as digital marketplaces that reduce barriers to entry for both creators and contributors, while Ryu and Kim (2017) underscore the internet's role in promoting mass participation across global audiences. Aladejebi (2020) adds that this digital evolution has transformed traditional fundraising, disintermediating banks and formal financial gatekeepers while enabling grassroots innovation. This connectivity not only facilitates capital formation but also fosters community engagement, turning contributors into brand advocates and long-term stakeholders. Beyond its financial functionality, crowdfunding represents a democratization of access to capital and entrepreneurial opportunity. Aladejebi (2020)

emphasizes its importance in empowering marginalized or unconventional entrepreneurs who are often excluded from traditional funding sources. Petru and Tomášková (2020) describe it as a flexible financial model that accommodates diverse needs through multiple structures such as rewards-based, equity-based, debt-based, and donation-based models making it applicable to both profit-oriented ventures and social enterprises. This adaptability allows niche markets, such as eco-friendly innovations or creative industries, to attract funding from audiences who share their vision and values. As a result, crowdfunding not only fills financing gaps but also strengthens inclusivity, innovation, and social engagement in modern entrepreneurship.

Angel Investment

Angel investment plays a crucial role in the entrepreneurial ecosystem by providing essential funding to early-stage startups that often lack access to conventional financing sources. NS and Saleem (2022) define angel investment as the provision of capital by high-net-worth individuals commonly referred to as angels in exchange for equity ownership, typically a minority stake. These investors step in during the earliest and riskiest phases of a startup's development, when banks and other traditional financial institutions are unwilling to lend due to high uncertainty. Beyond financial gain, many angels are motivated by the satisfaction of nurturing innovative ventures and contributing to economic growth through job creation and technological advancement. Corea et al. (2021) further describe angel investment as a form of early-stage venture capital where individuals use their personal wealth and industry expertise to support nascent businesses, distinguishing them from institutional venture capitalists who invest pooled funds on behalf of others. In addition to capital provision, angel investors contribute significant non-financial value to startups. Genc et al. (2023) highlight that angel investing is often belief-driven, with investors backing entrepreneurs based on confidence in their vision, leadership, and market potential rather than solely on quantitative metrics. This dynamic introduces critical value-added elements such as mentorship, strategic guidance, and access to extensive professional networks. Such support can be instrumental in refining business models, strengthening governance, and attracting subsequent investment rounds. Angel investors therefore function not only as financiers but also as advisors and partners, helping to improve startups' operational capacity and market readiness. Gutterman (2023) reinforces this by describing angel investment as the injection of personal funds into startups at very early stages often when the venture has only a concept and a committed founder reflecting both the speculative and developmental nature of angel financing. Angel investors also play a bridging role within the broader entrepreneurial finance continuum. Horotan (2012) conceptualizes angel investment as the

provision of funds in exchange for equity or convertible debt, allowing startups to access capital without incurring immediate repayment obligations thus preserving cash flow during formative stages. Li (2023) adds that angel investment serves as a transitional financing mechanism between informal funding sources, such as family and friends, and more formal venture capital. This strategic positioning enables startups to build credibility, achieve early milestones, and prepare for institutional funding. By combining financial support, mentorship, and strategic networks, angel investors significantly enhance the survival and performance prospects of early-stage ventures, making them an indispensable pillar of sustainable entrepreneurship and innovation development.

SMEs Performance

SME performance is a multifaceted concept that reflects the extent to which small and medium enterprises achieve their business objectives while efficiently utilizing limited resources. Mohamed (2021) defines SME performance as an enterprise's capacity to align strategic goals with available resources to generate sustainable outcomes. This balance between goal attainment and resource optimization is particularly vital for SMEs, which often operate under constraints related to finance, technology, and skilled labor. Kareem et al. (2021) further describe SME performance as the consistent achievement of objectives in an effective and efficient manner where effectiveness focuses on selecting the right strategic tasks and efficiency ensures those tasks are executed with minimal waste. Together, these definitions underscore the importance of strategic alignment and resource management as dual pillars of SME success.

From an operational perspective, SME performance can also be viewed through the lens of production and management efficiency. Pramono et al. (2021) define it as the degree to which SMEs effectively manage key production inputs such as labor, materials, and capital to achieve both short-term profitability and long-term sustainability. This perspective highlights that successful SMEs must simultaneously optimize daily operations and plan for future growth, emphasizing productivity, innovation, and adaptability. Park and Byun (2022) extend this goal-oriented view by defining performance simply as the ability to achieve predefined business objectives, measured through indicators such as profitability, market share, customer satisfaction, and innovation output. These metrics provide tangible evidence of how well an SME converts strategy into measurable results. Broader interpretations of SME performance incorporate not only financial metrics but also relational, strategic, and ethical dimensions. Hanson et al. (2016) emphasize that performance should capture a firm's ability to deliver value to stakeholders through transparency, trust, and profitability, while Fazlollahi and Franke (2018) describe it

as the extent to which outcomes align with strategic targets. Agburu et al. (2017) synthesize these viewpoints by defining SME performance as the successful attainment of both immediate and long-term objectives, including innovation, competitiveness, and market relevance. This holistic approach recognizes that true SME performance goes beyond financial returns to encompass sustainability, strategic positioning, and the firm's adaptive capacity to thrive in dynamic environments.

Empirical Review

Crowdfunding and SMEs Performance

Ajibola, et al. (2024) examined the effect of Crowdfunding and growth of small and medium enterprises in Nigeria surveyed 50 SME owners in Ibadan, Nigeria and found that crowdfunding had a positive and significant effect on performance growth. Using a regression analysis, they determined that improvements in financial performance and innovation attributable to crowdfunding significantly spurred SME growth. The only aspect not significantly affected was direct job creation, but overall firm growth was clearly enhanced by crowdfunding support. Ajibola et al. recommended greater government support and awareness campaigns for crowdfunding to increase SME participation. However, the study was carried out in Ibadan the findings may not apply to North Central region which comprises six state and the Federal Capital Territory. Olafusi et al. (2022) investigated the impact of crowdfunding on SME development in Africa, acknowledging the significant challenges faced by SMEs globally, especially in Africa where traditional funding sources like banks often favor established firms over smaller enterprises. This bias, coupled with limited technology adoption, education levels, and a preference for foreign platforms, hinders the competitiveness of African SMEs. Crowdfunding has emerged as a solution to these issues by diversifying funding sources and decentralizing finance to fundraisers.

The study, employing an exploratory research design, revealed that crowdfunding adoption among African SMEs is still in its early stages, representing less than 0.1% of the global crowdfunding market with only 25 active platforms. The research underscores the pivotal role of SMEs in economic development and highlights how crowdfunding can streamline funding processes, eliminate geographic barriers, and reduce reliance on individual investors. The study concludes by recommending initiatives such as stakeholder sensitization and enhanced technology education for SME owners to promote crowdfunding awareness and adoption in Africa. This does not have a specific finding; it only captures the key points of the study while addressing the need for improvement in crowdfunding adoption among African SMEs. It emphasizes the potential benefits of crowdfunding while suggesting practical steps for stakeholders to facilitate its

growth in the region. This study was carried out in a different context, the findings may not apply to SMEs in North Central region, it does not also show the effect of crowd funding on SMEs performance hence the need for the present study. Agwu and Emeti (2022) examined the effect of crowdfunding on the performance of Nigerian SMEs and reported that crowdfunding platforms have substantially increased SMEs' access to capital by bypassing conventional collateral requirements. Their findings indicate that by circumventing the traditional banking constraints, Nigerian SMEs were able to secure the necessary funds to grow and expand their market opportunities. The study emphasizes that crowdfunding not only provides the much-needed capital but also empowers SMEs to undertake expansion projects that could significantly enhance their operational output and employment generation. Ekpe (2023) provided additional evidence on the positive influence of crowdfunding, particularly among women-owned SMEs in Nigeria. The study highlighted that crowdfunding played a critical role in overcoming traditional gender-based barriers in access to finance. Women entrepreneurs who utilized crowdfunding platforms reported marked improvements in their firms' performance, indicating that such alternative financing mechanisms can be instrumental in bridging the gender gap in entrepreneurship. Overall, Ekpe's findings further reinforce the notion that crowdfunding is a powerful tool for promoting SME growth and fostering inclusive economic development.

Angel Investment and SMEs Performance

Lange et al. (2023) examined the role of business angels in early-stage financing of startups and concluded that these investors play a largely positive role in supporting new ventures. Their study emphasized that business angels not only provide critical capital injections but also offer valuable mentorship and strategic advice. This dual support structure enhances startups' prospects for growth and long-term success by addressing both financial and managerial gaps during the early phases of business development. Marques et al. (2020) contributed further evidence by demonstrating that receiving angel funding significantly increases a startup's probability of survival and expansion during the first five years. Their research, which accounted for factors such as firm age and business model, revealed that angel-backed firms are better positioned to overcome early-stage challenges. The findings suggest that angel investment acts as a catalyst for both immediate operational improvements and sustained expansion, reinforcing the importance of early external funding in a startup's developmental trajectory. Croce, et al (2021) investigated whether the individual attributes and investment approaches of business angels affect the growth of funded companies by distinguishing between two firm types: gazelles and ponies. The study draws upon an original data set comprising 265 small

Italian firms (49 that received business angels financing and 216 in the propensity score matched control group). Building on insights drawn from the resource-based view and absorptive capacity theory, they found that BAs with entrepreneurial experience positively affect the sales growth of gazelles only. Moreover, the role of business angels' investment experience and coaching in the growth rates of both gazelles and ponies is insignificant. Nevertheless, this study was carried out in a different context in Italian region, the study findings cannot apply to SMEs in North Central region of Nigeria due to contextual and regional difference. Lerner, et al (2018) examined the role of investments by angel groups across a heterogeneous set of 21 countries with varying entrepreneurship ecosystems. Exploiting quasi-random assignment of deals around the groups' funding thresholds.

The study presents a descriptive statistic for the final sample of 1682 deals that resulted from the data collected from a total of 295 funded and 1287 non-funded companies, findings show a positive impact of angel funding on firm growth, performance, survival, and follow-on fundraising, which is independent of the level of venture activity and entrepreneur-friendliness in the country. However, the study findings were stated based on comparison, as such it will be interpreted based on diverse opinion and may not apply to SMEs in North Central region. Capizzi, et al (2017) explore the post-investment performance and survivorship profile of angel-backed companies. Using a database of 111 angel-backed companies that received angel investments between 2008 and 2012 and at least 3 years of post-investment financial data, the study found that both the performance and the probability of survival of investee companies, are positively affected by the presence of: 1) angel syndicates and 2) by the hands-on involvement of business angels. Differently, the lack of angel experience and the structure of equity provision negatively affect the development of new ventures.

The study results provide insights on the contribution of angel investors to the development of new ventures. However, this study was carried out in a different context, the study findings may not apply to SMEs in North Central region of Nigeria. A study by Bergström et al. (2023) provided additional insights by using population-level data and a matching estimator to assess the performance of angel-backed firms compared to similar non-angel-backed controls. Their analysis found that business angels, especially those who are "active" and experienced entrepreneurs, tend to invest in firms that are already above-average performers. After the investment, these firms exhibited positive growth in both employment and sales. However, the study noted that while angel investment accelerated growth, it did not have a statistically significant impact on firm survival rates possibly because the survival rate among control firms was already high in that context.

Table 1: Number of SMEs per state and FCT

S/N	State	Number of SMEs	Sample size
1	Kwara	25,356	$25,356 \times 398 / 130,862 = 76$
2	Kogi	12,517	$12,517 \times 398 / 130,862 = 38$
3	Benue	14,851	$14,851 \times 398 / 130,862 = 45$
4	Federal Capital Territory (FCT)	22,861	$22,861 \times 398 / 130,862 = 70$
5	Niger	23,197	$23,197 \times 398 / 130,862 = 71$
6	Plateau	21,352	$21,352 \times 398 / 130,862 = 65$
7	Nasarawa	10,728	$10,728 \times 398 / 130,862 = 33$
8	Total	130,862	398

Source: NBS/SMEDAN Survey Report, 2021

Theoretical Framework

Financial Life Cycle Theory

The Financial Life Cycle Theory is often traced to the work of Berger and Udell (1998), who formalized how firms' financing patterns evolve over time as they grow, mature, and face varying constraints. The core insight is that as a firm moves through stages of its life (from startup, growth, maturity to possible decline or renewal), its internal financial resources, risk profile, information asymmetries, and access to external capital change systematically. In the earliest stage, young firms typically rely heavily on owner equity, informal finance, or very short-term credit, because they lack track record, collateral, or credible financial statements. As they age and build credibility, they gradually gain access to more formal debt, longer-term loans, and equity markets. Thus, the mix between internal and external financing, and between debt and equity, is posited to shift in predictable ways across a firm's life cycle. Many subsequent authors have extended, tested, and critiqued the life cycle model. For example, Mac an Bhaird and Lucey (2011) empirically examined SMEs in Ireland and showed that financing preferences change with age categories, though younger firms sometimes use debt more than theory predicts (reflecting personal collateral). Their findings suggest the model needs nuance in how personal assets and owner guarantees intervene (Mac an Bhaird & Lucey, 2011). More recently, La Rocca, Staglianò & Deloof (2025) analyze European SMEs, confirming that firm age significantly influences capital structure choices and that crises distort the life-cycle trajectory (e.g. firms revert to internal financing in stress periods). Kochen (2022) likewise reinforces that in theory, early firms must depend heavily on external funding because internal funds are scarce, and that over time reliance shifts toward internal finance as solvent firms accumulate retained earnings and reduce asymmetric information concerns. Critics, however, point out rigidities: the model assumes smooth, linear transitions, but real firms often face nonlinear shocks, regime shifts, institutional constraints, or external crises. Also, some SMEs intentionally maintain conservative financing regardless of age (Lefebvre, 2021), challenging the strict life cycle progression. Others note that life - cycle theory

often understates the role of entrepreneurial heterogeneity, sectoral dynamics, and context-specific institutional constraints. In the context of SME in North-Central Nigeria, the Financial Life Cycle Theory offers a useful lens for interpreting how financing behavior may affect outcomes over time. For SMEs in that region, early-stage ventures are likely deprived of external finance due to weak institutional environments, opacity, and distrust, forcing them to rely heavily on owner capital or informal sources. As they mature if they survive, they may gradually access crowdfunding, angel investment, or more formal debt, improving their ability to invest in growth, technology, and competitive positioning. The life cycle framework suggests that the impact of crowdfunding or angel finance on performance should vary by firm age or stage: younger SMEs may benefit more from grant-like or flexible equity injections (angel / crowd) to breach initial capital constraints, whereas more mature SMEs might leverage debt or blended finance more efficiently. However, local constraints weak regulatory support, infrastructure deficits, and limited financial literacy may distort the life cycle transitions in North-Central Nigeria, so the standard model must be adapted or moderated when applying it in this context. Thus, this theory provides both a scaffold for forming hypotheses and a caution that empirical verification is essential in this specific region.

METHODOLOGY

This study employs a survey research design to systematically collect and describe data, aiming to capture the characteristics and dynamics of a specific population. The target respondents are owner-managers of small and medium enterprises (SMEs), as they are best positioned to provide accurate and relevant insights related to the study variables. The study population includes all registered SMEs in North-Central Nigeria, which, according to the Small and Medium Enterprises Development Agency of Nigeria (SMEDAN) and the National Bureau of Statistics (NBS, 2021), totals approximately 130,862 enterprises, as outlined in Table 1. For this study, the minimum sample size was determined using the Taro Yamane formula as developed by Yamane (1967):

Table 2: Sample of Selected SMEs according to state

S/N	State	Number of SMEs	Sample size
1	Kwara	25,356	25,356*398/130,862= 76
2	Kogi	12,517	12,517*398/130,862= 38
3	Benue	14,851	14,851*398/130,862= 45
4	Federal Capital Territory (FCT)	22,861	22,861*398/130,862= 70
5	Niger	23,197	23,197*398/130,862= 71
6	Plateau	21,352	21,352*398/130,862= 65
7	Nasarawa	10,728	10,728*398/130,862= 33
8	Total	130,862	398

Source: Field Survey, 2026

$$n = \frac{N}{1 + N(e)^2}$$

Where:

n = sample size; N = population; e = degree of error expected.

With a degree of error expected at 0.05 and a population of 130, the sample size is computed below:

$$n = \frac{130,862}{1 + 130,862 (0.05)^2}$$

$$n = \frac{130,862}{1 + 130,862 (0.0025)}$$

$$n = \frac{130,862}{1 + 327.1}$$

$$n = \frac{130,862}{427.1}$$

$$n \approx 306$$

Whilst the calculated sample size using the Taro Yamane formula is estimated as 306, Israel (2013), averred that there is a need to increase such calculated sample size by 30% to account for those who cannot be contacted. Therefore, the sample size is thus = 306 + (30%) = 398. Consequently, 398 questionnaires were distributed, representing the final study sample size. This number is deemed sufficient to provide a reliable representation of the population and to ensure the accuracy of the findings. The study employed purposive sampling to deliberately select participants who met specific criteria. Only SMEs that had been in operation for more than three years and were willing to participate were included in the survey. This

approach ensured that responses came from businesses with adequate operational history and relevant experience. Furthermore, to achieve fair representation across different groups based on their respective population sizes, Bouley's proportional allocation formula was applied. This helped in distributing the sample proportionately across various subgroups within the study population as shown in (Table 2).

$$nk = \frac{nNk}{N}$$

Where:

nk = number allocated category

n = total sample size

Nk = total population of each category

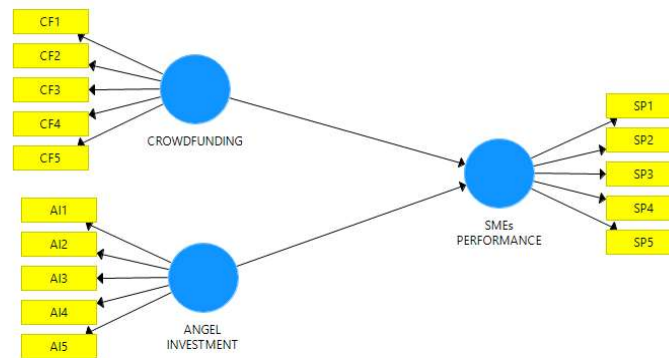
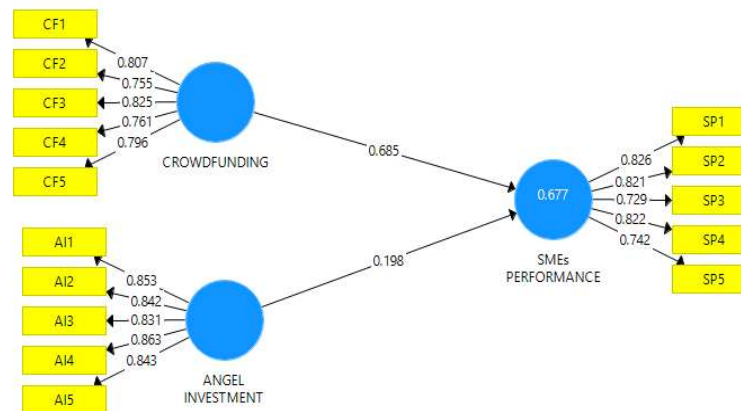
N = overall population

The study utilized a structured five-point Likert scale questionnaire, incorporating items adapted from Adusei, et al. (2017) to collect data electronically via research assistants. Employing purposive sampling, the approach prioritized accessibility to respondents during the data-gathering phase. The analysis was conducted using Partial Least Square Structural Equation Modeling (PLS-SEM), which evaluated both the measurement and structural models. This methodology enabled a comprehensive assessment of the research hypotheses and the interrelationships within the study framework, ensuring the examination of the theoretical constructs and their connections (Figure 1).

RESULTS

The Measurement Model

When assessing the measurement model, the first step is to evaluate the outer loadings of the indicators. According to Hair et al. (2017), loadings above 0.70 are generally considered acceptable, as they suggest that the construct accounts for more than 50% of the variance in each

Figure 1: Theoretical model of the Study**Figure 2:** Indicator Outer Loadings**Table 3:** Reliability of Study Scale

	Cronbach's Alpha	rho A	Composite Reliability	Average Variance Extracted (AVE)
Angel Investment	0.901	0.902	0.927	0.717
Crowdfunding	0.848	0.850	0.892	0.623
Smes Performance	0.848	0.852	0.892	0.622

Source: SmartPLS Output 2025

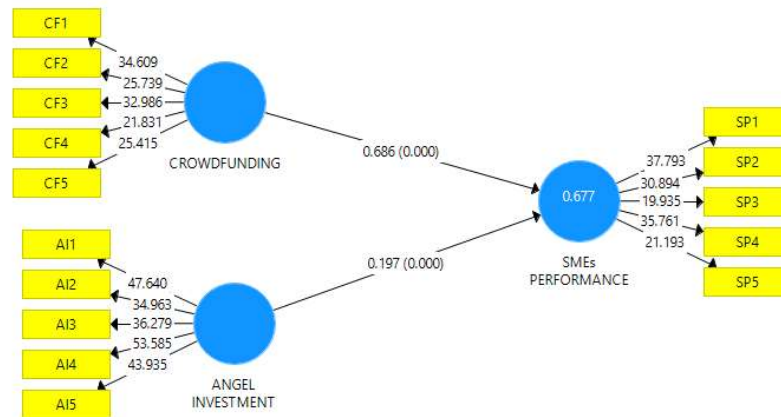
indicator, thereby indicating satisfactory item reliability (Figure 2). The study exhibited strong internal consistency, as evidenced by composite reliability values exceeding the recommended threshold of 0.70 (Table 3), indicating good reliability across all constructs. Cronbach's alpha values also surpassed the minimum accepted standard of 0.70, consistent with the guidelines set by Hair et al. (2017), further affirming the reliability of the measurement instruments. Convergent validity was confirmed through average variance extracted (AVE) values above 0.50 for all variables, demonstrating that each construct explained

at least 50% of the variance in its indicators and effectively captured the intended theoretical concepts. The heterotrait-monotrait (HTMT) ratios shown in (Table 4) indicate the discriminant validity of the three constructs (Angel Investment, Crowdfunding, and SMEs Performance). The HTMT value between Angel Investment and Crowdfunding is 0.710, and between Angel Investment and SMEs Performance is 0.709; both are well below common threshold values (0.85 or 0.90), suggesting these constructs are distinct. The HTMT ratio between Crowdfunding and SMEs Performance is 0.837,

Table 4: Heterotrait-Monotrait Ratio (HTMT)

	Angel Investment	Crowdfunding	Smes Performance
Angel Investment			
Crowdfunding	0.710		
Smes Performance	0.709	0.837	

Source: SmartPLS Output 2026

Figure 3: Estimated Path Model**Table 5:** Path Coefficient

	Path coefficient Beta**	T Statistics	P Values	Decision	F ²
Angel Investment -> SMEs Performance	0.197	3.947	0.000	Rejected	0.074
Crowdfunding -> SMEs Performance	0.686	14.229	0.000	Rejected	0.892

Source: SmartPLS Output 2026

which is closer to but still below the 0.85 threshold indicating acceptable discriminant validity, thus supporting the validity of the measurement model.

The Structural Model

In assessing the structural model, the standard assessment criteria were considered which include the path coefficient, t-values, p-values and coefficient of determination (R^2), the bootstrapping procedure was conducted using a resample of 5000 (Figure 3).

Test of Hypotheses

H01: Crowdfunding has no significant effect on the performance of SMEs in North Central Nigeria:

Table 5 reveals that the path coefficient (β) for Crowdfunding → SMEs Performance is 0.686, with a t-statistic of 14.229 and a p-value of 0.000, which is below

the 0.05 significance threshold. This indicates a statistically significant positive relationship between crowdfunding and SME performance. The large effect size ($f^2 = 0.892$) suggests that crowdfunding has a substantial impact on explaining variations in SME performance. Consequently, the null hypothesis (H01) is rejected, confirming that crowdfunding significantly enhances SME performance in North Central Nigeria. This implies that increased participation in crowdfunding platforms, access to community-driven finance, and utilization of digital funding mechanisms contribute meaningfully to SMEs' sales growth, innovation, and operational expansion in the region.

H02: Angel investment has no significant effect on the performance of SMEs in North Central Nigeria:

For the relationship between Angel Investment and SME Performance, the path coefficient (β) is 0.197, with a t-statistic of 3.947 and a p-value of 0.000, also below the

0.05 threshold. This indicates a statistically significant positive effect between angel investment and SME performance. The effect size ($f^2 = 0.074$) suggests that angel investment contributes modestly to explaining variations in SME outcomes compared to crowdfunding. Therefore, the null hypothesis (H02) is also rejected, meaning that angel investment significantly influences SME performance in the study area. However, the lower effect magnitude implies that while angel funding provides essential strategic and financial support, its impact is not as dominant as that of crowdfunding.

Table 6: R² and Predictive Relevance

	R ²	Q ² (=1-SSE/SSO)
SMEs Performance	0.677	0.524

Source: SmartPLS Output 2026

Table 6 presents the R² and Q² values for SMEs performance, indicating the model's explanatory and predictive power. The R² value of 0.677 shows that 67.7% of the variance in SMEs performance is explained by the combined effects of Crowdfunding and Angel Investment, suggesting a substantial level of explanatory power. Additionally, the Q² value of 0.524, which exceeds the threshold of 0, confirms that the model has strong predictive relevance. Together, these results demonstrate that the model not only explains a significant portion of the variance in SMEs performance but also possesses good predictive accuracy.

DISCUSSION

The findings revealed that crowdfunding has a strong and significant positive effect on SME performance. This indicates that crowdfunding substantially enhances SME growth, innovation, and operational expansion in North Central Nigeria. The result aligns with the studies of Ajibola et al. (2024), Agwu and Emeti (2022), and Ekpe (2023), who found that crowdfunding improves access to finance, stimulates innovation, and supports business expansion, particularly for underserved entrepreneurs. However, it differs from Olafusi et al. (2022), who reported limited adoption and insignificant impact of crowdfunding across Africa. The present finding thus confirms that when effectively adopted, crowdfunding serves as a vital alternative financing source that significantly improves SME performance in the region. The study also found that angel investment positively and significantly affects SME performance, prompting the rejection of the second null hypothesis. Although the effect size is moderate, the result demonstrates that angel investors contribute meaningfully to SME growth through both financial and non-financial support such as mentorship and strategic guidance. This finding is consistent with the results of Lange et al. (2023), Marques et al. (2020), and Capizzi et al. (2017), which highlight the positive role of angel investors in enhancing

firm survival and scalability. Nonetheless, it contrasts slightly with Croce et al. (2021) and Bergström et al. (2023), who found mixed outcomes depending on firm type and regional conditions. The findings validate that angel investment remains an important driver of SME performance in North Central Nigeria, complementing crowdfunding as a key alternative financing mechanism.

Conclusion

This study examined the effect of crowdfunding and angel investment on the performance of SMEs in North Central Nigeria. The findings revealed that both financing mechanisms have significant positive effects on SME performance, though crowdfunding exhibited a stronger influence than angel investment. Crowdfunding enhances SME growth by expanding access to finance, encouraging innovation, and reducing dependence on traditional bank loans, while angel investment contributes through mentorship, strategic guidance, and network support that strengthen managerial and operational capacity. The results confirm that alternative financing models are vital tools for improving the sustainability and competitiveness of SMEs in the region. Therefore, promoting access to crowdfunding platforms and angel investor networks can play a transformative role in addressing persistent financing gaps and driving regional economic growth.

Recommendations

Based on the findings, the study recommends:

- i. That government agencies, financial regulators, and development partners should create enabling policies and awareness programs to strengthen crowdfunding adoption and investor confidence in North Central Nigeria. SMEs should also be encouraged to embrace crowdfunding as a strategic financing option by improving their digital literacy, transparency, and business presentation skills to attract funders.
- ii. That angel investor networks should be expanded and supported through tax incentives and training initiatives to encourage more active participation. Strengthening these alternative financing channels will enhance capital accessibility, innovation, and long-term performance among SMEs in the region.

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