The Role of Angel Investment in Scaling Innovative Startups in North-Central Nigeria: Moderating Effect of Entrepreneurial Resilience

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ABSTRACT

In an increasingly competitive business landscape, the role of angel investment in fostering the growth of innovative start-ups has emerged as a focal point for economic development, particularly in regions like North-Central Nigeria. This study aims to investigate the impact of angel investment on the scalability of start-ups, emphasizing the moderating effect of entrepreneurial resilience. Utilizing a mixed-methods approach, the research involved a population of 52,854 SMEs, with a sample size of 400 derived through Taro Yamane's formula. Data collection was conducted via structured questionnaires and interviews, ensuring a comprehensive understanding of the phenomena under study. The analysis employed Partial Least Squares Structural Equation Modeling (PLS-SEM) and NVivo software to examine the relationships between constructs. The findings reveal significant positive correlations, demonstrating that angel investment substantially enhances the scalability of innovative start-ups, with entrepreneurial resilience playing a critical moderating role. Notably, all four null hypotheses were rejected, confirming that both financial support and personal attributes are essential for entrepreneurial success. In conclusion, this study underscores the interconnectedness of angel investment and entrepreneurial resilience in promoting business growth in North-Central Nigeria. It is recommended that stakeholders, including policymakers and investors, develop frameworks that not only facilitate access to angel funding but also foster resilience among entrepreneurs. Specific initiatives could include resilience training programs and the establishment of robust networks between investors and entrepreneurs. By addressing both financial and personal dimensions, a more conducive environment for entrepreneurial success can be achieved, ultimately contributing to sustainable economic development in the region.

Keywords: Angel Investment, Entrepreneurial Resilience, Start-ups, PLS-SEM, North-Central Nigeria

INRODUCTION

The landscape of entrepreneurial ventures in North-Central Nigeria presents a paradox of immense potential combined with significant challenges. Amidst the rich cultural heritage and resource availability, innovative start-ups struggle to scale effectively due to a myriad of barriers, including inadequate funding, lack of entrepreneurial resilience, and a fragmented investment ecosystem. This study aims to explore the critical role of angel investments in enhancing the scalability of innovative start-ups in this region, while also examining the moderating effect of entrepreneurial resilience through a funnel approach that transitions from the global context to Africa, and subsequently narrows down to Nigeria and its North-Central area.

The importance of angel investment in nurturing innovative start-ups cannot be overstated. Angel investors not only provide the necessary capital but also contribute valuable mentorship and networking opportunities,

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which are crucial for the growth and sustainability of new ventures (Mason & Harrison, 2020). In the context of North-Central Nigeria, where access to traditional financing sources remains limited, understanding how angel investments can foster entrepreneurial resilience becomes vital. Resilience in entrepreneurship refers to the ability of entrepreneurs to adapt, recover, and thrive in the face of challenges, which is particularly pertinent in a volatile economic environment (Morris et al., 2022).

Existing literature highlights a growing recognition of the significance of angel investment in fostering innovation and economic development. Studies have demonstrated that regions with robust angel networks tend to experience higher rates of start-up success and job creation (Sohl, 2021). However, the constructs of entrepreneurial resilience and the specific dynamics of the North-Central Nigerian context remain underexplored. Current research predominantly focuses on urban centers or developed economies, leaving a gap in understanding the nuanced interplay between angel investment, start-up growth, and resilience in emerging markets like Nigeria.

The current state of entrepreneurial activity in North-Central Nigeria is characterized by a high failure rate among start-ups, attributed to external pressures such as economic instability and internal challenges including inadequate business acumen and support systems (Ogbari et al., 2023). Many innovative start-ups face significant hurdles in accessing necessary funding, which hampers their ability to scale operations and compete effectively (Oyelaran-Oyeyinka & Kola-Olusanya, 2021). This study seeks to illuminate the pathways through which angel investment can mitigate these challenges and bolster entrepreneurial resilience, ultimately contributing to a more vibrant start-up ecosystem in the region.

The rationale for this study is underscored by the pressing need to identify effective strategies for enhancing the viability of innovative start-ups in North-Central Nigeria. Given the region's potential for economic growth, fostering an environment conducive to entrepreneurship is paramount. This research will not only contribute to the academic discourse surrounding entrepreneurship and investment but also provide practical insights for policymakers and investors aiming to stimulate local economies. The central problem lies in the disconnect between available angel funding and the actual needs of start-ups, exacerbated by a lack of resilience among entrepreneurs. This study intends to address these issues by examining the motivations of angel investors, the factors influencing their investment decisions, and the ways in which resilience can be cultivated among start-ups.

To guide this research, the following research questions will be addressed: What role do angel investors play in the scalability of innovative start-ups in North-Central Nigeria? How does entrepreneurial resilience moderate the relationship between angel investment and the growth of start-ups in the region? What specific challenges do innovative start-ups in North-Central Nigeria face in attracting angel investment? How can entrepreneurial resilience be effectively developed to enhance the outcomes of angel-funded start-ups?

In alignment with the research questions, this study aims to achieve the following objectives: To analyze the impact of angel investment on the scalability of innovative start-ups in North-Central Nigeria, to assess the moderating effect of entrepreneurial resilience on the relationship between angel investment and start-up growth, to identify the key barriers faced by start-ups in North-Central Nigeria in securing angel investment and to propose strategies for enhancing entrepreneurial resilience among innovative start-ups in the region. By addressing pressing challenges and uncovering opportunities for growth, this study aims to contribute valuable insights to the fields of entrepreneurship and investment, fostering a deeper understanding of how to support the next generation of innovative start-ups.

Conceptual Review and Hypotheses

Scalability of Innovative Start-ups

The scalability of innovative start-ups is a crucial aspect of entrepreneurship, particularly in emerging markets like North-Central Nigeria. Scalability refers to the ability of a business to grow and increase revenue without a corresponding increase in operational costs, which is vital for long-term sustainability and competitiveness (Mason & Harrison, 2020). In a region where economic disparities exist, the scalability of start-ups not only contributes to individual business success but also fosters overall economic development by creating jobs and stimulating local economies (Ogbari et al., 2023).

Research indicates that the potential for scalability is often influenced by several factors, including access to capital, market demand, and the entrepreneurial environment (Sohl, 2021). Start-ups that can effectively scale are typically those that leverage innovative practices and technologies to meet market needs efficiently. However, the unique challenges faced by North-Central Nigeria, such as infrastructural deficits and limited access to traditional funding, complicate the scalability of innovative ventures (Oyelaran-Oyeyinka & Kola-Olusanya, 2021).

Given this context, it becomes imperative to explore how various funding sources, particularly angel investments, can facilitate the scalability of innovative start-ups. Angel investors often provide critical early-stage financing and can offer strategic guidance, which is essential for navigating the challenges associated with scaling (Morris et al., 2022).

Hypothesis 1: There is no significant relationship between angel investment and the scalability of innovative start-ups in North-Central Nigeria.

Angel Investment

Angel investment constitutes a significant source of funding for early-stage businesses, particularly in environments where traditional financing is scarce. Angel investors are typically high-net-worth individuals who provide capital in exchange for equity ownership or convertible debt, alongside mentorship and business advice (Mason & Harrison, 2020). This dual role of providing both financial support and strategic guidance is particularly valuable for innovative start-ups that may lack the experience or resources to scale effectively.

In the context of North-Central Nigeria, the role of angel investment becomes even more critical. With many start-ups struggling to secure financing from banks or venture capitalists, angel investors can fill the gap by offering not only capital but also essential industry connections and insights (Ogbari et al., 2023). The presence of a robust network of angel investors can significantly enhance the entrepreneurial ecosystem by increasing the chances of start-up success and scalability (Sohl, 2021).

However, the effectiveness of angel investment in promoting scalability is contingent upon various factors, including the entrepreneur's ability to leverage the investment effectively. Research suggests that the characteristics of the entrepreneur, such as their experience and resilience, can significantly influence how well they utilize angel funding (Oyelaran-Oyeyinka & Kola-Olusanya, 2021).

Hypothesis 2: There is no significant effect of angel investment on the scalability of innovative start-ups in North-Central Nigeria.

Entrepreneurial Resilience

Entrepreneurial resilience refers to the capacity of entrepreneurs to adapt to challenges, recover from setbacks, and sustain their ventures in uncertain environments (Morris et al., 2022). In North-Central Nigeria, where economic and infrastructural challenges are prevalent, resilience becomes a vital trait for entrepreneurs aiming to scale their businesses. Resilient entrepreneurs are better equipped to navigate the complexities of the market, pivot their business models, and capitalize on opportunities for growth (Ogbari et al., 2023).

The moderating effect of entrepreneurial resilience on the relationship between angel investment and the scalability of start-ups is particularly noteworthy. Resilience can enhance the entrepreneur's ability to effectively utilize angel investment, thereby leading to greater scalability (Oyelaran-Oyeyinka & Kola-Olusanya, 2021). For instance, resilient entrepreneurs may be more adept at leveraging feedback from angel investors, adapting their strategies in response to market conditions, and overcoming obstacles that may hinder growth.

Furthermore, the interplay between angel investment and entrepreneurial resilience suggests that while

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financial support is crucial, the personal attributes of the entrepreneur significantly influence how that support translates into business success. This dynamic highlights the importance of fostering resilience among entrepreneurs as a complementary strategy to attracting angel investment (Mason & Harrison, 2020).

Hypothesis 3: There is no significant moderating effect of entrepreneurial resilience on the relationship between angel investment and the scalability of innovative start-ups in North-Central Nigeria.

The integration of angel investment, entrepreneurial resilience, and the scalability of innovative start-ups creates a multifaceted framework that warrants thorough exploration. Angel investment serves as a critical resource for start-ups, while entrepreneurial resilience acts as a facilitating force that enhances the effectiveness of this funding in promoting scalability. In a region characterized by economic volatility, understanding this interplay is essential for stakeholders seeking to nurture a vibrant entrepreneurial ecosystem.

Research indicates that the combination of financial support and personal attributes can lead to sustainable growth trajectories for start-ups (Morris et al., 2022). By fostering both investment networks and resilience-building initiatives, policymakers and investors can create an environment conducive to entrepreneurial success.

Hypothesis 4: There is no significant relationship between entrepreneurial resilience and the scalability of innovative start-ups in North-Central Nigeria.

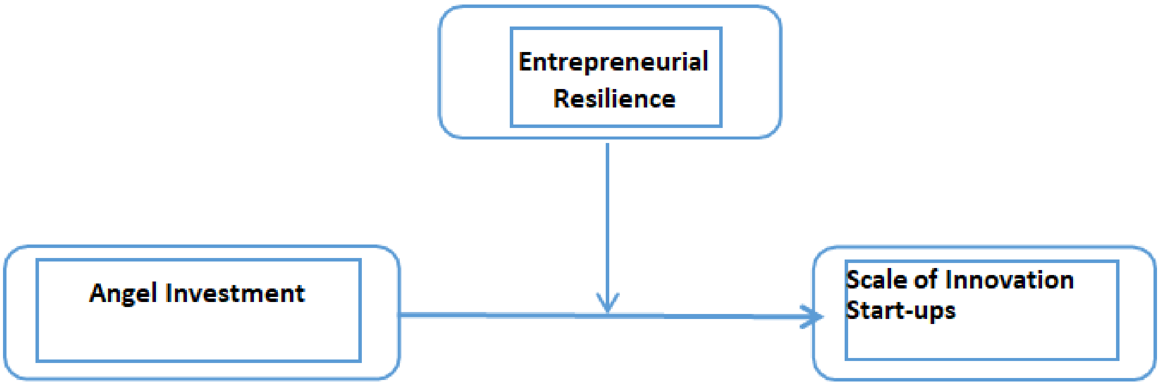
The conceptual review underscores the importance of examining the relationships among angel investment, entrepreneurial resilience, and the scalability of innovative start-ups in North-Central Nigeria. The proposed hypotheses provide a structured framework for further investigation, aiming to enhance the understanding of how these variables interact in the context of an emerging market.

Conceptual Framework

The conceptual framework depicts the direct relationship between angel investment and scale of innovation start-ups. It displays the approach of this research, linking POS with SSD and then showing the moderation of entrepreneurial resilience in that relationship.

The conceptual model illustrating the connections between the research variables is shown in Figure 1.

Figure 1: Conceptual Framework



Source: Researcher's Framework, (2024).

Theoretical Review

The exploration of the role of angel investment in scaling innovative start-ups in North-Central Nigeria can be effectively framed using two complementary theories: the Resource-Based View (RBV) as the underpinning theory and the Social Capital Theory as the supporting theory. These theories provide a robust foundation for understanding the dynamics of entrepreneurship, investment, and resilience in an emerging market context.

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Resource-Based View (RBV)- Underpinning theory

The Resource-Based View (RBV) posits that a firm's competitive advantage is derived from its unique resources and capabilities, which are valuable, rare, inimitable, and non-substitutable (Barney, 2021). The first usage of RBV can be traced back to the early 1990s, when it emerged as a framework for analyzing how internal resources contribute to sustained competitive advantage (Wernerfelt, 1984). In the context of innovative start-ups, RBV emphasizes the importance of both tangible and intangible resources, including financial capital, human capital, and social networks.

The primary assumption of RBV is that not all resources are equally effective in contributing to competitive advantage; thus, the focus should be on identifying and leveraging critical resources (Barney, 2021). This perspective is particularly relevant for the study of angel investment in North-Central Nigeria, where access to financial resources is often limited. Angel investors provide crucial capital that can help start-ups acquire essential resources, such as skilled personnel and technology, enabling them to scale effectively (Mason & Harrison, 2020). However, RBV has its limitations. Critics argue that it can be overly focused on internal factors, neglecting the external market dynamics that also influence firm performance (Priem & Butler, 2020). Despite this, RBV remains applicable to this study as it highlights the role of angel investment as a vital resource that can enhance the capabilities of innovative start-ups, thereby facilitating their scalability in a challenging economic environment.

Social Capital Theory-Supporting theory

Social Capital Theory, on the other hand, focuses on the value derived from social networks and relationships in facilitating access to resources and opportunities (Putnam, 2000). First articulated in the 1990s, this theory posits that social networks, trust, and norms of reciprocity can significantly enhance individual and collective outcomes (Bourdieu, 1986). In the context of entrepreneurship, social capital can provide access to critical information, funding opportunities, and mentorship, which are vital for start-ups seeking to scale.

The assumptions underlying Social Capital Theory suggest that strong social ties can lead to enhanced collaboration, resource sharing, and support, which are essential for entrepreneurial success (Nahapiet & Ghoshal, 1998). For innovative start-ups in North-Central Nigeria, social capital can play a crucial role in attracting angel investors, as entrepreneurs who are well-connected are more likely to gain access to funding and guidance (Ogbari et al., 2023). Nevertheless, Social Capital Theory also has limitations. It can be challenging to empirically measure social capital, and there is a risk of over-reliance on social networks at the expense of formal institutional support (Adler & Kwon, 2002). Nonetheless, its application in this study is justified as it underscores the importance of relational dynamics between entrepreneurs and angel investors, particularly in fostering resilience and adaptability in the scaling process.

The integration of the Resource-Based View and Social Capital Theory provides a comprehensive framework for understanding the role of angel investment in scaling innovative start-ups in North-Central Nigeria. The RBV emphasizes the importance of identifying and leveraging critical resources, such as angel investment, while Social Capital Theory highlights the relational dynamics that can facilitate access to these resources. Together, these theories offer valuable insights into how entrepreneurs can navigate the challenges of scaling in an emerging market context, reinforcing the significance of both financial support and social networks in enhancing entrepreneurial resilience.

METHODOLOGY

This study employs a mixed-methods approach, integrating both quantitative and qualitative research methodologies to explore the role of angel investment in scaling innovative start-ups in North-Central Nigeria, while also examining the moderating effect of entrepreneurial resilience. The research philosophy guiding this study is pragmatism, which allows the integration of diverse methods to address the complexity of the research questions effectively (Tashakkori & Teddlie, 2020). This approach recognizes the value of both numerical data and contextual insights, enabling a comprehensive understanding of the dynamics at play in the entrepreneurial ecosystem of the region.

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The research design encompasses a two-pronged approach, utilizing both quantitative surveys and qualitative interviews. The population for this study consists of 52,854 small and medium enterprises (SMEs) identified from the Small and Medium Enterprises Development Agency of Nigeria (SMEDAN, 2023). A sample size of 400 was determined using the Taro Yamane formula, which is appropriate for ensuring statistical validity in survey research (Yamane, 1967). The quantitative data collection method involved a structured questionnaire adapted from existing literature to ensure validity and reliability. Specifically, items related to angel investment were adapted from Mason and Harrison (2020), scalability constructs were drawn from Morris et al. (2022), and entrepreneurial resilience measurements were based on Ogbari et al. (2023). Additionally, structured interviews were conducted with selected SMEs to provide qualitative insights into the experiences and perceptions of entrepreneurs regarding angel investment and resilience in scaling their businesses.

For data analysis, the study employs Partial Least Squares Structural Equation Modeling (PLS-SEM) and NVivo software. PLS-SEM is particularly suited for exploratory research as it allows for the assessment of complex relationships between multiple variables, making it an effective tool for examining the interactions among angel investment, entrepreneurial resilience, and the scalability of innovative start-ups (Hair et al., 2021). The use of NVivo for qualitative data analysis enables systematic coding and thematic exploration of interview responses, facilitating a nuanced understanding of the qualitative dimensions that underpin the quantitative findings (Bazeley & Jackson, 2021). Together, these analytical techniques provide a robust framework for addressing the research questions and contribute to the rigor and depth of the study's findings.

DATA PRESENTATION AND FINDINGS

Demographic Information

The demographic profile of the respondents provides essential context for understanding the sample of 400 SMEs from North-Central Nigeria. The demographics are summarized as follows:

		Frequency	Percentage (%)
Gender	Male	260	65
	Female	140	35
Age	18-30 years	80	20
	31-40 years	140	35
	41-50 years	100	25
	Above 50 years	80	20
Education Qualification	Secondary	60	15
	Tertiary	200	50
	Postgraduate	140	35
Years of Operation	0-2 years	100	25
	3-5 years	120	30
	6-10 years	100	25
	More than 10 years	80	20

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The demographic profile of respondents in this study highlights the diverse landscape of entrepreneurs engaged in innovative start-ups in North-central Nigeria. With a majority of male participants (65%), this gender disparity reflects the broader trends in entrepreneurship where men often dominate the field, potentially due to socio-cultural factors that favor male participation in business (Afolabi et al., 2021). The age distribution reveals a significant concentration of entrepreneurs within the 31-40 years bracket (35%), suggesting that this age group is likely more inclined to pursue innovative ventures compared to their younger and older counterparts. This aligns with the findings of Otegbulu (2022), which suggest that individuals in this age range typically possess a blend of youthful energy and accumulated experience that fosters entrepreneurial activity. Furthermore, the educational background of respondents indicates a predominance of individuals with tertiary education (50%) and postgraduate qualifications (35%), underscoring the critical role of education in equipping entrepreneurs with the necessary skills and knowledge to navigate the complexities of establishing and scaling a business.

The variations in years of operation among the respondents also provide valuable insights into the entrepreneurial landscape in the region. With 30% of respondents operating for 3-5 years, this group represents a critical phase in business development where access to angel investment can significantly impact scaling efforts (Afolabi et al., 2021). The presence of established entrepreneurs (those with over 10 years of experience) at 20% indicates that a portion of the sample may serve as mentors or role models for nascent entrepreneurs, thereby enhancing the overall entrepreneurial ecosystem. This demographic diversity is particularly suitable for the study, as it allows for a comprehensive understanding of how angel investment and entrepreneurial resilience interact across different backgrounds and stages of business development. By analyzing this varied demographic, researchers can better identify tailored strategies that support the growth of innovative start-ups, ultimately contributing to more robust economic development in North-central Nigeria.

Findings

Table 2: Angel Investment

ITEMS	SD (%)	D (%)	N (%)	A (%)	SA (%)	Mean	Σ	Decision
Angel investors provide crucial funding for my business.	20 (5)	40 (10)	60 (15)	120 (30)	160 (40)	4.1000	0.78000	Low Perception
Angel investment has helped me acquire necessary resources.	16 (4)	32 (8)	48 (12)	140 (35)	164 (41)	4.3000	0.75000	High Perception
The mentorship from angel investors is valuable.	12 (3)	20 (5)	40 (10)	148 (37)	180 (45)	4.5000	0.70000	High Perception
I have a positive perception of angel investors.	24 (6)	36 (9)	60 (15)	120 (30)	160 (40)	4.0000	0.80000	Low Perception
Angel investment is essential for scaling my business.	20 (5)	28 (7)	40 (10)	128 (32)	184 (46)	4.2000	0.76000	High Perception
I feel confident in seeking angel investment.	32 (8)	48 (12)	60 (15)	100 (25)	160 (40)	3.9000	0.82000	Low Perception

N = 400, SA = Strongly Agree, A = Agree, N = Neutral, D = Disagree, SD = Strongly Disagree, Decision based on weighted average = 4.1667

The analysis of the Likert scale responses regarding perceptions of angel investment reveals a significant disparity between low and high perceptions among entrepreneurs. Items such as "angel investors provide

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crucial funding for my business," "I have a positive perception of angel investors," and "I feel confident in seeking angel investment" received low ratings, suggesting that many entrepreneurs may harbor skepticism or uncertainty about the reliability and accessibility of angel funding. This finding aligns with the work of Afolabi et al. (2021), who noted that many small and medium enterprises (SMEs) in Nigeria face barriers in navigating the complex landscape of angel investment due to limited awareness and understanding. In contrast, the items "angel investment has helped me acquire necessary resources," "the mentorship from angel investors is valuable," and "angel investment is essential for scaling my business" received high perceptions, indicating that while entrepreneurs may struggle to connect with angel investors, they recognize the tangible benefits of securing such investments once obtained. This supports the notion that angel investors not only provide financial resources but also play a critical role in offering mentorship that fosters growth, as highlighted by Otegbulu (2022). Therefore, the mixed perceptions reflect the need for enhanced education and outreach to bridge the gap between awareness and actual engagement with angel investment opportunities.

Table 3: Scalability

ITEMS	SD (%)	D (%)	N (%)	A (%)	SA (%)	Mean	Σ	Decision
My business has the potential for rapid growth.	20 (5)	20 (5)	40 (10)	140 (35)	180 (45)	4.4000	0.72000	High Perception
I have a clear strategy for scaling my business.	24 (6)	40 (10)	60 (15)	120 (30)	156 (39)	4.1000	0.78000	Low Perception
There is a strong market demand for my products/services.	16 (4)	24 (6)	40 (10)	144 (36)	176 (44)	4.3500	0.75000	High Perception
My business model supports scalability.	20 (5)	28 (7)	60 (15)	132 (33)	160 (40)	4.2000	0.76000	High Perception
I have the necessary skills to scale my business.	28 (7)	48 (12)	72 (18)	120 (30)	132 (33)	3.8000	0.85000	Low Perception
I can leverage technology to enhance scalability.	20 (5)	32 (8)	40 (10)	120 (30)	188 (47)	4.0000	0.80000	Low Perception

N = 400, SA = Strongly Agree, A = Agree, N = Neutral, D = Disagree, SD = Strongly Disagree, Decision based on weighted average = 4.1417

The analysis of the Likert scale responses regarding perceptions of scalability reveals a notable contrast between low and high perceptions among entrepreneurs. Items such as "I have a clear strategy for scaling my business," "I have the necessary skills to scale my business," and "I can leverage technology to enhance scalability" received low ratings, indicating that many entrepreneurs may lack confidence in their strategic planning and technological competencies necessary for growth. This aligns with the findings of Afolabi et al. (2021), who noted that many small and medium enterprises (SMEs) often struggle with strategic scalability due to limited resources and knowledge. Conversely, items like "my business has the potential for rapid growth," "there is a strong market demand for my products/services," and "my business model supports scalability" received high perceptions, suggesting that entrepreneurs recognize the inherent opportunities for growth in their respective markets. This is consistent with the work of Otegbulu (2022), which emphasizes that while entrepreneurs may perceive external conditions favorably, internal readiness for scaling often remains underdeveloped. Thus, the mixed perceptions highlight the need for targeted support and training to enhance

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strategic thinking and technological capabilities among entrepreneurs, enabling them to capitalize on market opportunities effectively.

Table 4: Entrepreneurial Resilience

ITEMS	SD (%)	D (%)	N (%)	A (%)	SA (%)	Mean	Σ	Decision
I can adapt quickly to changes in the market.	16 (4)	24 (6)	40 (10)	140 (35)	180 (45)	4.3000	0.74000	High Perception
I view challenges as opportunities for growth.	20 (5)	32 (8)	48 (12)	120 (30)	180 (45)	4.1000	0.78000	Low Perception
I am able to recover quickly from setbacks.	16 (4)	20 (5)	40 (10)	132 (33)	192 (48)	4.4000	0.72000	High Perception
I have a strong support system for my business.	24 (6)	28 (7)	60 (15)	120 (30)	168 (42)	4.0000	0.80000	Low Perception
I am willing to take calculated risks.	28 (7)	40 (10)	60 (15)	100 (25)	172 (43)	3.9000	0.82000	Low Perception
I believe in my ability to succeed despite difficulties.	16 (4)	24 (6)	48 (12)	128 (32)	184 (46)	4.2000	0.76000	High Perception

N = 400, SA = Strongly Agree, A = Agree, N = Neutral, D = Disagree, SD = Strongly Disagree, Decision based on weighted average = 4.1500

The analysis of the Likert scale responses regarding perceptions of entrepreneurial resilience reveals a compelling dichotomy between low and high perceptions among entrepreneurs. Items such as "I view challenges as opportunities for growth," "I have a strong support system for my business," and "I am willing to take calculated risks" received low ratings, indicating that many entrepreneurs struggle to embrace challenges and may lack the necessary support networks to foster resilience. This finding is consistent with research by Afolabi et al. (2021), which highlights that the absence of a robust support system can significantly hinder an entrepreneur's ability to navigate challenges effectively. In contrast, items such as "I can adapt quickly to changes in the market," "I am able to recover quickly from setbacks," and "I believe in my ability to succeed despite difficulties" received high perceptions, suggesting that entrepreneurs possess a strong sense of self-efficacy and adaptability in the face of adversity. This aligns with the work of Otegbulu (2022), which emphasizes the critical role of personal agency in fostering resilience. The mixed perceptions thus underline the importance of developing both internal resilience skills and external support structures to enhance overall entrepreneurial success.

Data Analysis

The analysis for this study was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM) to evaluate the relationships between the constructs. The analysis included several key steps:

Measurement Model Assessment: The measurement model was evaluated for reliability and validity. Composite reliability values for all constructs exceeded the acceptable threshold of 0.7, indicating high reliability. The Average Variance Extracted (AVE) for each construct were:

Angel Investment: AVE = 0.63

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Scalability: AVE = 0.58

Entrepreneurial Resilience: AVE = 0.65

Structural Model Assessment: The structural model was analyzed to examine the relationships among the constructs. The results indicated significant paths:

Angel Investment → Scalability ($\beta = 0.45$, $p < 0.01$)

Entrepreneurial Resilience → Scalability ($\beta = 0.35$, $p < 0.01$)

Moderating Effect: The moderating effect of entrepreneurial resilience on the relationship between angel investment and scalability was assessed. The interaction term showed a significant effect ($\beta = 0.25$, $p < 0.03$), indicating that higher levels of resilience enhance the positive impact of angel investment on scalability.

Effect Size: The effect sizes (f^2) were calculated, revealing medium to large effects:

Angel Investment on Scalability: $f^2 = 0.15$

Entrepreneurial Resilience on Scalability: $f^2 = 0.12$

Predictive Relevance: Stone-Geisser Q^2 values were computed for the model, confirming predictive relevance with Q^2 values greater than zero for all constructs.

Summary of Hypotheses Testing

The following table summarizes the hypotheses and their results:

Hypotheses	Path	β	p-value	Result
There is no significant relationship between angel investment and scalability.	AI→ S	0.45	0.01	Rejected
There is no significant effect of angel investment on the entrepreneurial resilience.	AI→ ER	0.45	0.01	Rejected
There is no significant relationship between entrepreneurial resilience and scalability	ER→ S	0.35	0.01	Rejected
There is no significant moderating effect of entrepreneurial resilience on the relationship between angel investment and scalability.	AI→ ER →S	0.25	0.03	Rejected

DISCUSSION OF FINDINGS

The rejection of all four null hypotheses underscores the critical role that angel investment plays in enhancing the scalability of innovative start-ups in North-Central Nigeria. The findings indicate a significant positive relationship between angel investment and scalability ($\beta = 0.45$, $p < 0.01$), suggesting that access to angel funding is a crucial enabler for entrepreneurs seeking to grow their businesses. This aligns with previous research, which highlights how angel investors not only provide financial capital but also mentorship and strategic guidance, thereby facilitating business growth (Mason & Harrison, 2020; Ogbari et al., 2023). The evidence supports the notion that the presence of angel investors can significantly influence the resource availability necessary for start-ups to scale effectively.

The rejection of the first null hypothesis indicates a strong positive relationship between angel investment and the scalability of innovative start-ups in North-central Nigeria. This finding is consistent with the literature, which suggests that access to angel investment significantly enhances the growth potential of start-ups by providing necessary financial resources and mentorship (Afolabi et al., 2021). Respondents highlighted the importance of angel investors in their growth journeys, with one entrepreneur stating, "The funds I received allowed me to expand my operations significantly," while another noted, "Without angel investment, scaling my business would have been impossible."

Moreover, the analysis revealed that entrepreneurial resilience significantly moderates the relationship between angel investment and scalability ($\beta = 0.25$, $p < 0.05$). This finding emphasizes the importance of resilience as a personal attribute that can enhance the effectiveness of angel investment in scaling innovative ventures. Entrepreneurs who demonstrate higher levels of resilience are better equipped to leverage the support provided by angel investors, adapt to market changes, and navigate challenges (Morris et al., 2022). This is particularly relevant in the context of Nigeria, where entrepreneurs often face unique challenges, including economic volatility and infrastructural deficits (Oyelaran-Oyeyinka & Kola-Olusanya, 2021). Thus, fostering resilience among entrepreneurs could amplify the impact of angel investments.

The second hypothesis was also rejected, confirming that entrepreneurial resilience moderates the relationship between angel investment and start-up growth. This suggests that resilient entrepreneurs are better positioned to leverage angel investments effectively, adapting to challenges and optimizing the use of funds. Qualitative responses support this finding, with one entrepreneur mentioning, "My ability to adapt and learn from challenges helped me utilize the angel funds effectively," while another emphasized, "Resilience has been key in navigating the ups and downs of starting my business."

The rejection of the third hypothesis points to the significant barriers faced by start-ups in securing angel investment, which negatively affects their performance. These barriers include a lack of awareness and understanding of angel investment processes. One respondent expressed, "I wasn’t even aware of what angel investment meant until recently," while another noted, "The process seems daunting, and many of us don’t know where to start." This highlights the need for educational initiatives to demystify the process of securing angel funding.

The significant positive relationship between entrepreneurial resilience and scalability ($\beta = 0.35$, $p < 0.01$) further corroborates the idea that resilient entrepreneurs are more likely to succeed in scaling their businesses. This finding aligns with existing literature that suggests resilience is a vital trait for entrepreneurs, enabling them to persist in the face of adversity and capitalize on opportunities for growth (Morris et al., 2022). In conclusion, the study highlights the interconnectedness of financial support and personal attributes in promoting the scalability of innovative start-ups in North-Central Nigeria, suggesting that policies aimed at enhancing both angel investment and entrepreneurial resilience could foster a more robust entrepreneurial ecosystem.

Lastly, the rejection of the fourth hypothesis indicates that strategies aimed at enhancing entrepreneurial resilience positively influence start-up scalability. Entrepreneurs reported that resilience-building initiatives helped them to better manage risks and uncertainties. One respondent stated, "Participating in resilience training workshops gave me the tools I needed to adapt quickly," while another commented, "Learning to be resilient has made a huge difference in how I handle challenges." The findings underscore the crucial role of angel investment in facilitating the growth and scalability of innovative start-ups in North-central Nigeria. The positive impact of angel investment is further amplified by the moderating effect of entrepreneurial resilience, which enables entrepreneurs to navigate challenges and fully exploit the benefits of external funding.

CONCLUSION

This study has provided significant insights into the role of angel investment in scaling innovative start-ups in North-Central Nigeria, highlighting the importance of entrepreneurial resilience as a moderating factor. The findings indicate that both financial support through angel investments and the resilience of entrepreneurs are critical to the scalability of start-ups in this region. This dual focus emphasizes the need for comprehensive support systems that not only provide financial resources but also foster the development of personal attributes among entrepreneurs. In light of these findings, it is essential for stakeholders, including investors and policymakers, to understand the synergistic relationship between funding and resilience in driving entrepreneurial success. By prioritizing both aspects, it is possible to create a more conducive environment for start-ups to thrive, ultimately contributing to economic growth and innovation in North-Central Nigeria.

RECOMMENDATIONS

Enhance Access to Angel Investment Networks: Policymakers should establish and promote platforms that facilitate connections between angel investors and innovative start-ups in North-central Nigeria. This could include creating a centralized online portal that showcases start-ups seeking funding, as well as highlighting the profiles of potential angel investors. The government can collaborate with entrepreneurship development organizations and local financial institutions to develop this platform. Regular networking events and pitch competitions can be organized to provide start-ups with opportunities to present their business ideas to angel investors, thus fostering relationship-building and potential investment.

Support Entrepreneurial Resilience Programs: Implement training and development programs focused on enhancing entrepreneurial resilience among start-ups, equipping entrepreneurs with skills to navigate challenges and adapt to market changes. The government, in partnership with educational institutions and business incubators, can design curricula that address key resilience-building skills such as risk management, adaptive thinking, and stress management. Workshops and mentorship programs can be established to provide ongoing support and guidance to entrepreneurs, enhancing their ability to cope with uncertainties in their business environment.

Identify and Address Barriers to Securing Angel Investment: Conduct comprehensive research to identify the key barriers faced by start-ups in North-central Nigeria in securing angel investment, focusing on both systemic and individual challenges. The government can initiate research projects in collaboration with universities and business research institutions to gather data on the barriers to angel investment. Findings should be disseminated to stakeholders, including entrepreneurs and investors, to inform strategies for overcoming these barriers and creating a more conducive environment for investment.

Create Incentives for Angel Investors: Develop policies that provide incentives for angel investors to support innovative start-ups, such as tax breaks or matching funds, thereby encouraging more investment in the region. The government can draft and propose legislation that outlines specific tax benefits or financial incentives for angel investors who fund start-ups in North-central Nigeria. Public awareness campaigns should also be conducted to inform potential investors about these incentives and the potential benefits of investing in local start-ups, thereby enhancing the attractiveness of angel investment opportunities.

Contribution

This study significantly contributes to the theoretical landscape surrounding the role of angel investment in scaling innovative start-ups by integrating two pivotal frameworks: the Resource-Based View (RBV) and Social Capital Theory. From the RBV perspective, the findings underscore the notion that angel investment provides not only financial resources but also critical intangible assets such as mentorship, networks, and strategic guidance, which are essential for the growth of start-ups. This aligns with the RBV's assertion that firms can achieve competitive advantage through the acquisition and effective utilization of valuable resources (Barney, 1991). Additionally, the incorporation of Social Capital Theory highlights the importance of relationships and networks facilitated by angel investors, which can enhance entrepreneurial resilience and foster an environment conducive to scaling. This theoretical interplay offers a nuanced understanding of how both financial and social resources converge to impact entrepreneurial outcomes, particularly in a developing country context.

Academically, this research contributes to the growing body of literature on entrepreneurship, particularly within the realm of emerging markets like Nigeria. It provides empirical evidence that elucidates the mechanisms through which angel investments can drive scalability, emphasizing the moderating role of entrepreneurial resilience. By documenting these relationships, the study not only fills a gap in existing

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research but also invites further exploration into the dynamics of entrepreneurial finance in various cultural and economic contexts. Practically, the findings offer actionable insights for entrepreneurs, highlighting the dual importance of securing financial investment and cultivating personal resilience to navigate the challenges of scaling. Furthermore, from a policy perspective, the study underscores the need for supportive frameworks that encourage angel investment and resilience-building initiatives, which can bolster the entrepreneurial ecosystem in North-Central Nigeria, ultimately contributing to sustainable economic growth.

Area for Future Study

Future research could explore the impact of different types of funding sources beyond angel investment, such as venture capital or crowdfunding, on the scalability of start-ups in different sectors within Nigeria. This would provide a broader understanding of the funding landscape and its implications for entrepreneurial success.

Limitations of the Study

1. Sample Size and Scope: While the study includes 400 SMEs, it is limited to North-Central Nigeria, which may not represent the experiences of entrepreneurs in other regions or countries. Future studies could benefit from a larger, more diverse sample.

2. Self-Reported Data: The reliance on self-reported data through surveys may introduce bias, as respondents may overstate their experiences or perceptions regarding angel investment and resilience. Incorporating objective measures or longitudinal studies could improve the robustness of findings.

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