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RELATIONSHIP BETWEEN VENTURE CAPITAL, FINANCIAL INNOVATION, AND OPERATING PERFORMANCE IN NIGERIAN FINTECH FIRMS

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Abstract

Research Purpose. The research aimed to assess the interrelationships among venture capital funding, financial innovation, and operating performance within Nigerian fintech firms. It sought to investigate both the direct associations between these variables and the potential mediating role of financial innovation on the connection between venture capital funding and operating performance, with a focus on understanding their collective impact on the Nigerian fintech landscape. This is essential because the way business is done could be transformed by encouraging fintech innovations which will increase productivity and efficiency.

Design / Methodology / Approach. To accomplish this, the study employed a primary data collection method via a questionnaire distributed to senior management personnel in two hundred FinTech companies. 220 senior management participants were purposively selected, and the gathered data underwent meticulous analysis using Partial Least Squares-Structural Equation Modeling (PLS-SEM) alongside various methodologies, including weighted mean scores, Heterotrait-Monotrait Ratio (HTMT), Fornell-Larcker square's average variance extracted, Cronbach alpha, composite reliability (CR), and percentage variance.

Findings. The findings revealed that the direct influence of venture capital funding on financial innovation yielded non-significant results (R2=0.220, β=0.274, t=1.116, p=0.264). Conversely, the direct impact of financial innovation (FI) on operating performance (OP) exhibited significant results (R2=0.401, β=0.559, t=5.989, p=0.000). Notably, the study discovered that venture capital funding (VC) was statistically insignificant (β=0.274, t=0.3913, p=0.362) in predicting the operating performance of fintech firms in Nigeria.

Originality / Value / Practical Implications. The research established that financial innovation plays a pivotal role in augmenting the operating performance of fintech firms in Nigeria. This study addresses a gap in the literature by investigating the impact of venture capital funding and financial innovation on Nigerian fintech firms' operational performance. It concludes that financial innovation significantly drives operational excellence, while venture capital funding has an insignificant impact, with financial innovation not substantially mediating its influence on performance. The findings underscore the significance of introducing innovative financial products and services, fostering the adoption of a cashless economy, harnessing emerging technologies such as blockchain and Artificial Intelligence, and enhancing financial literacy and awareness. These factors collectively contribute to bolstering the operating performance of fintech enterprises.

Keywords: Venture Capital; Financial innovation; Operating; Fintech companies; PLS-SEM; Nigeria.

JEL codes: O16, O30.

Introduction

Driven by technical breakthroughs and a growing desire for creative financial solutions, the financial technology (fintech) sector has brought about structural change in the financial service sector. Venture capital investments have surged in Nigeria, a developing hotspot for fintech companies, which has fuelled the rise of these firms. Through the introduction of quicker, more affordable, and more

convenient services, these technologically advanced financial services firms have completely transformed traditional banking. Fintech companies in Nigeria, despite this encouraging development trajectory, confront formidable obstacles. Their performance and scalability have been hampered by restricted access to venture capital funds and a lack of trustworthy venues for capital raising. The importance of fintech was further shown by the COVID-19 pandemic when online banking and payment systems provided financial transactions with vitality throughout lockdowns and social distancing measures. Customers embraced digital channels more and more when physical bank offices closed, reducing the risks involved in in-person transactions. In light of this, the study attempts to explore the complex interactions between financial innovation, venture capital investment, and the operational effectiveness of fintech companies in Nigeria. It specifically aims to find out how venture capital funding affects these companies' operating performance, how financial innovation affects those same companies' operating performance, and how financial innovation functions as a mediator between venture capital funding and operating performance. The study's conclusions emphasize how crucial venture capital financing and financial innovation are to the development and prosperity of fintech companies in Nigeria. The study advances knowledge of the variables influencing these companies' operating success and offers guidance to stakeholders and policymakers by addressing the difficulties these businesses confront, such as restricted access to finance and the requirement for creative financial solutions.

The motivation behind this research is multifaceted. First, it stems from the need to comprehend the dynamics of the Nigerian fintech sector and the factors that drive the growth and success of these firms. By unravelling the relationships among venture capital funding, financial innovation, and operating performance, the study hopes to provide valuable insights that can contribute to the development of the fintech industry and the broader economy (Effiom et al., 2020; Umeodinka, 2022). Moreover, in an era where financial innovation is pivotal for economic growth, fostering financial inclusion, streamlining international trade transactions, and improving overall financial efficiency, this study holds significant relevance (Abang & Ayodele, 2022; Chukwunulu, 2019). Its findings can aid in developing strategies to attract more venture capital investments, promote financial innovation, and enhance the operating performance of fintech firms, ultimately benefiting Nigeria's economy and its citizens. For academics and professionals alike, this study examined the impact of venture capital on the performance of Fintechs in Nigeria, and also, explored the mediating effect of financial innovation in the relationship between venture capital and operating performance of Fintechs in Nigeria. By contributing to the body of knowledge in this domain, this research holds the potential to inform policy decisions, guide industry practices, and foster a conducive environment for the sustainable growth of fintech firms in Nigeria and beyond. Therefore, the following hypotheses are formulated and tested:

Ho_1: Venture Capital has no significant impact on the performance of Fintechs in Nigeria

Ho_2: Financial innovations have no mediating role in the relationship between venture capital and the operating performance of Fintechs in Nigeria.

Literature Review

The intersection of venture capital funding, financial innovation, and operating performance is a critical area of focus for Nigeria's rapidly growing fintech sector. Venture capital plays a pivotal role in providing fintech firms with much-needed financial resources, operating expertise, networking opportunities, and moral support during their formative stages. However, Kolokas et al. (2022) caution that venture capitalists' established norms and practices may inadvertently restrict funding for fintech ventures in countries with limited fintech activity. This is because a global shift//shock like that of the year 2020 (COVID-19) could occur which may adversely affect the financial system, therefore, start-up firms relying solely on fintech funds may encounter serious challenges in financing their operations. Financial innovation, particularly mobile banking solutions, is widely regarded as a catalyst for increasing financial inclusion in emerging markets like Nigeria (Guild, 2017). Nonetheless, Oshora et al. (2021) emphasize the necessity of robust regulatory frameworks to fully harness the potential of such innovations. Measuring the operating performance of fintech firms presents unique challenges compared to traditional financial institutions, as they often lack publicly available financial statements. While methodologies like Data Envelopment Analysis (DEA) have been employed, there are differing

perspectives on their effectiveness and suitability for the fintech sector (Minwir & Anwar, 1998; Oral & Yolalan, 1990).

Several theoretical frameworks have been proposed to elucidate the intricate relationship between venture capital funding, financial innovation, and the operating performance of fintech firms. The Resource-Based View (RBV) theory suggests that firms possessing valuable, rare, and inimitable resources can achieve a sustainable competitive advantage (Madhani, 2010). This theoretical framework implies that venture capital funding can provide fintech firms with crucial resources, such as advanced technologies, skilled talent, and innovative products, thereby impacting their financial innovation capabilities and overall operating performance (Enrico et al., 2022; Jay, 1991). In contrast, the Network theory examines how firms leverage social networks for growth and long-term viability, shedding light on the role of networking in the fintech ecosystem (Parkhe & Ralston, 2006). The Diffusion of Innovation theory offers insights into the factors influencing the adoption rate of new technologies like fintech solutions, which is pertinent to understanding their widespread acceptance and impact (Lou & Li, 2016; Saygili, & Ercan, 2021). Additionally, the Agency theory explores the potential conflicts of interest that may arise between venture capitalists (principals) and the managers of fintech firms (agents), highlighting the need for alignment and effective governance mechanisms (Panda & Leepsa, 2017). The Institutional theory provides a complementary perspective, viewing fintech innovations as catalysts for reshaping social and economic structures, norms, and practices within the financial services industry (Ami & Irwan, 2021; Jarvis & Han, 2021).

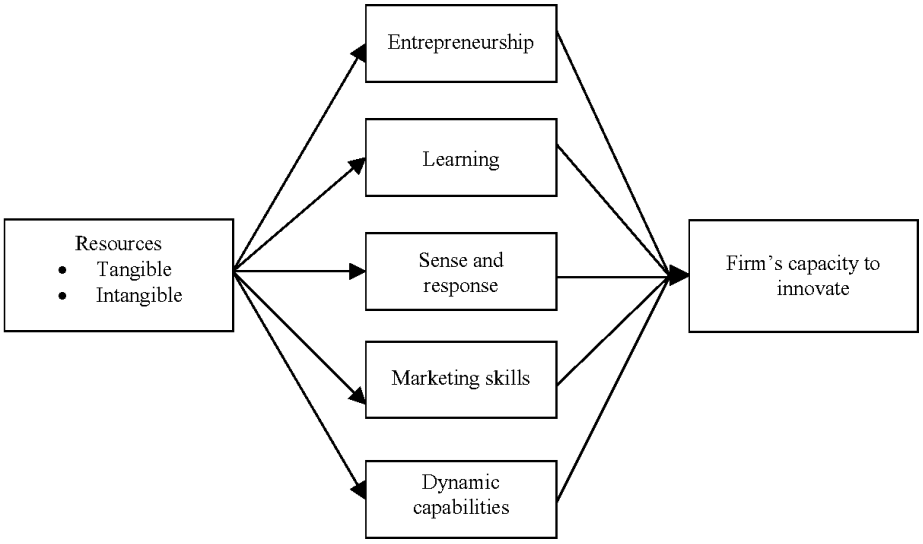


Fig. 1. The Resource-Based View of the Firm and Innovation: Identification of Critical Linkages (Source: Semantic Scholar, 2003)

Existing empirical studies have demonstrated the positive impact of venture capital funding on the growth and innovation of fintech firms. Kolokas et al. (2022) revealed a substantial and favourable influence of venture capital availability on the development of fintech entrepreneurship. Similarly, Sapienza (1992) found a consistent link between high innovation and venture capital value-added, particularly for technical ventures seeking long-term partnerships. However, Loughran and Ritter (1997) suggest that the timing of funding rounds and investments after positive developments is crucial in understanding the post-funding performance of fintech ventures. In terms of financial innovation, research has shown a favourable effect on economic growth and the performance of small and medium-scale enterprises (SMEs) in Nigeria when supported by conducive policies and regulatory environments (Effiom et al., 2020; Laeven et al., 2014; Mustapha, 2018; Ojo & Nwaokike, 2018). Nonetheless, Bollaert et al. (2021) and Puschmann (2017) highlight the need for further empirical research to understand the broader implications of fintech beyond traditional banking services. Despite the growing significance of the fintech sector in Nigeria and its potential to transform the financial services industry, there is a notable gap in the literature investigating the specific relationship between venture capital funding, financial innovation, and the operating performance of Nigerian fintech firms. Most existing

studies do not comprehensively capture the unique challenges, opportunities, and nuances present in this dynamic market. To fully understand the mechanisms driving the success and growth of Nigerian fintech firms, more indigenous empirical research is urgently needed. By conducting localized studies that delve into the distinctive characteristics of the Nigerian fintech landscape, researchers can provide invaluable insights for policymakers, investors, and industry stakeholders, fostering an environment conducive to the sustainable development of this burgeoning sector.

Research Methodology

The study employs a descriptive and confirmatory research design, utilizing a questionnaire to collect primary data from a sample of 220 top management personnel from over 200 fintech firms in Nigeria, selected through purposive sampling. The reasons for eliciting information from personnel in managerial positions is that they will be in the best position to give information on strategic questions in the questionnaire (e.g. questions bordering on funding at the inception of the firm, introduction of innovative financial products among others)The Likert 5-point scale is used to measure the independent variables of venture capital funding and financial innovation, as well as the dependent variable of operating performance. The quantitative data obtained will be analysed using PLS-SEM to establish the relationships among the variables, providing insights into the impact of venture capital funding and financial innovation on the operating performance of Nigerian fintech firms.

Table 1. Summary of Venture Capital and Fintech Companies (Source: Compilation made by the authors)

Factor	Beneficial	Not Beneficial	Source(s)
Capital Injection	Provides significant funding for rapid growth and expansion	Can lead to dilution of ownership and control	CB Insights (2023)
Credibility	Enhances credibility with customers, partners, and future investors	Can create unrealistic expectations and pressure to perform	Williams et al. (2018)
Innovation	Provides resources for R&D and cutting-edge technology adoption	Might push for quick ROI, potentially stifling long-term innovation	McKinsey & Company (2022)
Regulatory Compliance	Can provide resources to navigate complex financial regulations	May underestimate the challenges and costs of regulatory compliance	World Bank (2022)
Market Penetration	Enables aggressive marketing and user acquisition strategies	Could lead to unsustainable growth and high customer acquisition costs	Deloitte (2023)
Talent Acquisition	Provides funds to attract top talent in a competitive market	High compensation packages may not be sustainable long-term	KPMG, 2023

The selected technique for data analysis in the study is Partial Least Squares-Structural Equation Modelling (PLS-SEM). This follows the work of Fan et al. (2016) and Ampofo and Aidoo (2022). With the use of both observable and unobserved variables, PLS-SEM is a potent statistical tool that enables the modelling of latent structures and the investigation of intricate connections. Its capacity to manage small sample sizes, non-normal data distributions, and non-linear correlations makes it appropriate for our investigation. Examining the correlation between the study's various variables is crucial for understanding the analysis of venture capital investment, financial innovation, and operating success in Nigeria. Finding out how financial innovation affects the operating performance of fintech companies in Nigeria is one goal, and evaluating the effect of venture capital on operating performance is another. The partial Least Squares-Structural Equation Model (PLS-SEM) is used to summarize the interrelationships among the variables since these objectives are interrelated. Furthermore, the use of the Likert scale from 1 to 5 to quantify the observable variables and the latent or unobservable nature of the variables means that the PLS-SEM is utilized to investigate the mediating or moderating role of

financial innovation in the relationship between venture capital and the operating performance of fintech firms.

Process innovation (PI1), product innovation (PI2), and business model innovation (BMI) are the three unique aspects into which financial innovation is divided by the study in order to improve clarity and decrease confusion regarding the causes driving it. OPE (Operating Performance), VCF (Venture Capital Funding), and FIN (Financial Innovation) are the model's latent variables. Y1 - Y5 and X1 - X5 represent the reflecting components that are utilized to calculate the impact of operating performance and venture capital financing, respectively. Zs stand for the stochastic error terms, which explain correlation and unexplained variance. The dependent variable, operating performance, and the independent variables, financial innovation, and venture capital investment are measured reflectively by these words based on their respective endogenous constructions. A closed-ended questionnaire containing sections on financial innovation, operating performance, venture capital investment, and demographics is used in the study. SPSS and PLS-SEM are used for data analysis. The questionnaire is created using professional comments and a review of the literature to guarantee validity. Standardized answers, clear directions, and appropriate question formats all contribute to maintaining reliability.

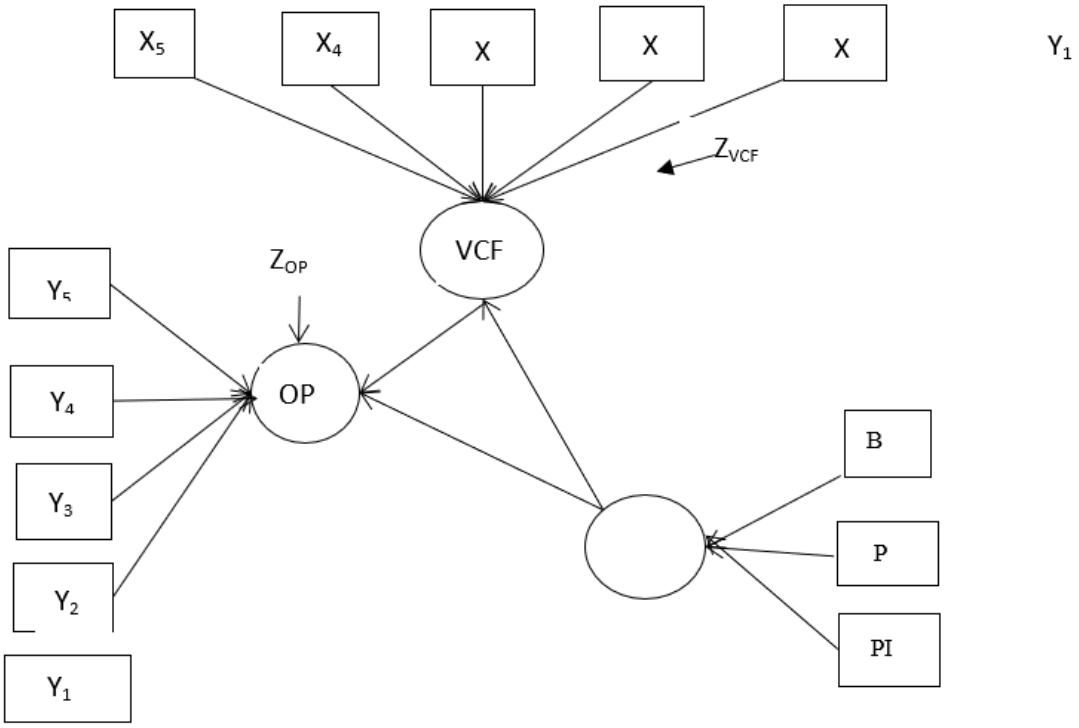


Fig 2. Pathway Structural Framework illustrating the Mediation of Financial Innovation in the Link Between Venture Capital Funding and Operating Performance (OPE) (Source: designed by the authors)

The following hypotheses are formulated and tested:

Ho_1: Venture Capital has no significant impact on the performance of Fintechs in Nigeria

Ho_2: Financial innovations have no mediating role in the relationship between venture capital and the operating performance of Fintechs in Nigeria.

Research Results

Demographic attributes of respondents

Table 2 describes the demographic attributes of the respondents. The table shows that both male (47.7%) and female (52.3%) genders are equally represented among the fintech respondents. The modal age group was 18-28 years, accounting for 49.5% of the respondents. Additionally, 33.2% were in the 29-39 years age bracket, and another 15.5% fell within the 40-50 years age group, indicating a noticeable tilt toward the youth population. Approximately 57.7% of the respondents were single, while 40.5% were married. The modal educational qualification was a university first degree, encompassing 51.4% of the respondents. Moreover, 28.6% held master's degrees, and 8.6% possessed OND/HND degrees. These findings suggest that fintech firms provide substantial job access to highly educated individuals who are more likely to comprehend the subject matter. Regarding working experience, Table 1 reveals that the modal working experience was less than 5 years (56.4%). About 34% had between 5-10 years of fintech experience, while only 10% had more than 10 years of experience in fintech activities.

Table 2. Demographic attributes of respondents in the fintech firms (Source: designed by the authors)

S/N	Feature	Option	Frequency	Per cent	Cumulative per cent
1	Gender	Male	105	47.7	47.7
		Female	115	52.3	100.0
2	Age	18 – 28	109	49.5	49.5
		29 – 39	73	33.2	82.7
		40 – 50	34	15.5	98.2
		51 and Above	3	1.4	99.5
		Below 18	1	.5	100.0
3	Marital status	Single	127	57.7	57.7
		Married	89	40.5	98.2
		Divorced	4	1.8	100.0
4	Education	Secondary School	11	5.0	5.0
		OND/HND	19	8.6	13.6
		University	113	51.4	65.0
		MBA/MSc	63	28.6	93.6
		PhD	14	6.4	100.0
5	Experience	Less than 5	124	56.4	56.8
		5-10 years	75	34.1	90.9
		Above 10 years	21	9.6	100.0

Elements of Venture capital funding in fintech firms

Table 2 shows the distribution of respondents' opinions with respect to Venture Capital Funding (VC). Table 3 also shows that the 6 items of venture capital had significant ($t>1.96$) weighted means score (WMS) greater than 3.00. For the six items, readily available at startups, clear path to profitability, challenges in attracting foreign venture capital investors, lack of access to venture capital, Local venture capital firms adequately meet the funding needs of fintech startups and Government policies and business regulatory environment affects Availability, the WMS and standard deviation ranged from 3.23 ± 0.833 to 3.97 ± 1.187. Item 1 had 48.2% agreement that Venture capital funding was readily available at startups. Similarly, about 76.9% cumulatively agreed that a fintech firm demonstrates a clear path to profitability to attract venture capital funding. Also, 72.7% generally agreed that fintech firm

faces challenges in attracting foreign venture capital investors and 73.2% believed that the lack of access to venture capital is a major obstacle to the growth of fintech firms. Furthermore, 53.2% of the respondents affirmed that local venture capital firms adequately meet the funding needs of fintech startups while 75.5% agreed that Government policies and business regulatory environment affect the availability of venture capital for fintech firms. The internal reliability and the resulting Cronbach's alpha (α=0.608) for the four dimensions of VC as given in Table 3 was satisfactory. Kendall's coefficient of concordance (Kw) indicated that 8.1% of the respondents had similar opinions about the elements of venture capital funding in fintech firms in Nigeria.

Table 3. Element of Venture capital funding of fintech firms in Nigeria (Source: designed by the authors)

	Venture capital funding in fintech firms	SA (5)	A (4)	N (3)	D (2)	SD (1)	WMS	S.D	T-value	Remark
1	Venture capital funding was readily available at startups	28 (12.7)	78 (35.5)	53 (24.1)	38 (17.3)	23 (10.5)	3.23	1.187	9.087	A
2	Fintech firm demonstrates a clear path to profitability to attract venture capital funding	56 (25.5)	113 (51.4)	36 (16.4)	7 (3.2)	8 (3.6)	3.92	.933	22.552	A
3	Fintech firm faces challenges in attracting foreign venture capital investors	62 (28.2)	98 (44.5)	40 (17.7)	13 (5.9)	7 (3.2)	3.89	.989	20.794	A
4	The lack of access to venture capital is a major obstacle to the growth of fintech firm	67 (30.5)	94 (42.7)	32 (14.6)	22 (10.0)	5 (2.3)	3.89	1.023	20.158	A
5	Local venture capital firms adequately meet the funding needs of fintech startups	45 (20.5)	72 (32.7)	63 (28.7)	22 (10.0)	18 (8.2)	3.47	1.164	12.393	A
6	Government policies and business regulatory environment affect the availability of venture capital for fintech firm	60 (27.3)	106 (48.2)	43 (19.5)	10 (4.5)	1 (0.5)	3.97	.833	26.234	A
	Cronbach alpha=0.608	Kendall's coefficient of concordance						0.081		

Constituents of financial innovation (FI) in the fintech firms in Nigeria

The results as presented in Table 4 revealed a remarkable cumulative agreement among respondents for the six items representing financial innovation. Notably, the respondents overwhelmingly agreed that "financial innovation advances fintech firms' operations" (mean score of 4.23 ± 0.756, t = 33.976) and "financial innovation prioritizes customer-centricity" (mean score of 4.26 ± 0.806, t = 32.376). Furthermore, the survey highlighted the instrumental role of financial innovation in introducing innovative financial products and services (mean score of 4.13 ± 0.863, t = 28.040) and promoting a cashless economy (mean score of 4.13 ± 0.947, t = 25.485). Respondents also acknowledged the significance of leveraging emerging technologies like blockchain and artificial intelligence (mean score of 4.05 ± 0.861, t = 26.693) as well as improving financial literacy and awareness (mean score of 4.06 ± 0.944, t = 24.571). The survey items underwent rigorous testing for internal reliability, yielding a Cronbach's alpha of 0.706, indicating a satisfactory level of consistency. Additionally, Kendall's coefficient of concordance revealed a significant coefficient of 0.013, suggesting that approximately 1.3% of respondents held similar opinions regarding the constituents of financial innovation in fintech firms in Nigeria. While the majority of respondents expressed diverse perspectives on the components of financial innovation in fintech firms, their opinions leaned more towards agreement than disagreement for the items included in the survey. The findings underscore the pivotal role of financial innovation in driving the growth and success of fintech firms in Nigeria, emphasizing the need to embrace innovation, leverage emerging technologies, and prioritize customer-centric solutions in the dynamic fintech landscape.

Table 4. Constituents of financial innovation of fintech firms in Nigeria (Source: designed by the authors)

	Financial Innovation in Fintech	SA (5)	A (4)	N (3)	D (2)	SD (1)	WMS	S.D	T-value	Remark
1		84	111	19	4	2	4.23	.756	33.976	A
	Advancing fintech firm's operation	(38.2)	(50.5)	(8.6)	(1.8)	(0.9)				
2	Introduced innovative financial products and services	78	107	27	2	6	4.13	.863	28.040	A
		(35.5)	(48.6)	(12.3)	(0.9)	(2.7)				
3		88	92	26	8	6	4.13	.947	25.485	A
	Promotes a cashless economy	(40.0)	(41.8)	(11.8)	(3.6)	(2.7)				
4	Leverage emerging technologies like blockchain and AI	69	109	28	12	2	4.05	.861	26.693	A
		(31.4)	(49.5)	(12.7)	(5.5)	(0.9)				
5		98	88	29	3	2	4.26	.806	32.376	A
	Prioritizes customer-eccentricity	(44.5)	(40.0)	(13.2)	(1.4)	(0.9)				
6		82	87	40	5	6	4.06	.944	24.571	A
	Improved financial literacy and awareness	(37.3)	(39.5)	(18.2)	(2.3)	(2.7)				
	Cronbach alpha=0.706	Kendall's coefficient of concordance					0.013			

Indicators of operating performance in fintech firms in Nigeria

Table 5 presents the items that constitute the operating performance construct for fintech firms in Nigeria, based on a survey conducted among respondents. The results reveal a cumulative agreement percentage of above 70% among respondents for all six items, and the agreement was statistically significant. The respondents overwhelmingly agreed that the following six items are crucial indicators of operating performance: a. More than 20% annual revenue growth (mean score of 3.81 ± 0.926, $t = -20.958$), b. new markets entrance and customer base expansion (mean score of 3.93 ± 0.881, $t = -24.106$), c. Improved adaptation to changing market conditions (mean score of 4.11 ± 0.831, $t = 28.706$), d. Streamlined operating processes and customer user-friendliness (mean score of 4.26 ± 0.777, $t = -33.578$), e. Increased customer retention and loyalty (mean score of 4.21 ± 0.725, $t = 35.082$) and, e. Better performance in cybersecurity and protection of customer information data privacy (mean score of 4.21 ± 0.818, $t = 31.007$). The survey items were tested for internal reliability, and Cronbach's alpha coefficient was 0.746, indicating a satisfactory construct. Furthermore, Kendall's coefficient of concordance was 0.071 and significant at $p < 0.05$, implying that only 7% of the respondents had similar opinions about the indicators of operating performance in fintech firms in Nigeria. The findings highlight the importance of achieving substantial annual revenue growth, expanding into new markets and customer bases, adapting to changing market conditions, streamlining processes for customer convenience, fostering customer retention and loyalty, and maintaining robust cybersecurity measures to protect customer data privacy. These factors are crucial for fintech firms in Nigeria to enhance their operating performance and remain competitive in the dynamic fintech landscape.

Table 5. Operating performance of fintech firms in Nigeria (Source: designed by the authors)

	Operating Performance of Fintech Firm	SA (5)	A (4)	N (3)	D (2)	SD (1)	WMS	S.D	T-value	Remark
1	Significant (>20%) annual revenue growth	47 (21.4)	109 (49.5)	44 (20.0)	15 (6.8)	5 (2.3)	3.81	.926	20.958	A
2	New market entrance and customer base expansion	58 (26.4)	106 (48.2)	32 (19.1)	11 (5.0)	3 (1.4)	3.93	.881	24.106	A
3	Improved adaptation to changing market conditions	77 (35.0)	99 (45.0)	36 (17.3)	3 (1.4)	3 (1.4)	4.11	.831	28.706	A
4	Streamlined operating processes and customer user-friendliness	94 (42.7)	96 (43.6)	24 (10.9)	5 (2.3)	1 (0.5)	4.26	.777	33.578	A
5	Increased customer retention and loyalty	84 (38.2)	101 (45.1)	33 (15.0)	2 (0.9)		4.21	.725	35.082	A
6	Better performance in cybersecurity & protection of customer information data privacy	89 (40.5)	98 (44.5)	25 (11.4)	6 (2.7)	2 (0.9)	4.21	.818	31.007	A
	Cronbach alpha=0.746	Kendall's coefficient of concordance					0.071			

Model evaluation showing direct effect (pathway analysis) of VC and FI on OP

Table 6 outlines the examination of the initial constructs for Financial Innovation (FI), Operating Performance (OP), and Venture Capital Funding (VC) in order to formulate the study's assumptions. We talk about the factor loadings, average variance extracted (AVE), percentage variance, composite reliability (CR), Cronbach's alpha, and composite reliability (CR). For the factor loading of every VC, FI, and OP item, the vector inflation factor (VIF) fell within an acceptable range. The composite reliability and Cronbach's alpha values in the exploratory and confirmatory factor analyses were both above acceptable levels, at 0.7 and 0.6, respectively. Furthermore, there was more than 50% attraction success shown by the AVE, which was above the minimum acceptable threshold of 0.5 for VC, FI, and OP.

The model fitness for the direct influence of VC and FI on OP showed substantial appropriateness and consistency of the outer and inner model specifications, with chi-square test values of 347.656, NFI = 0.439, SRMR = 0.125, and RMS Theta = 0.189. Between 0.764 and 0.850 were the reliability coefficients (rho{A~), and the discriminant method was less than 0.9. A legitimate discriminant result was shown by the Fornell-Larcker square's AVE root being higher than the inter-construct correlations. The findings of the Heterotrait-Monotrait Ratio (HTMT) further supported the validity of the discriminant result by falling below the 0.85 threshold value. We checked the HTMT ratios for noteworthy deviations from 1.0. Table 5's bias-corrected confidence interval demonstrates that both the top (95% confidence interval) and lower (2.5% confidence interval) boundaries were below 1.0. For instance, the upper limits of the HTMT confidence interval for the association between VC and OP were, respectively, -0.432 and 0.469. The findings of the PLS algorithm for the HTMT criteria accept the discriminant validity of the constructs, given that a conservative HTMT threshold of 0.456 proved discriminant validity. Every model evaluation criterion has been satisfied, according to the evaluation.

Impact of venture capital funding (VC) on the operating performance (OP) of fintech firms in Nigeria.

The influence of venture capital funding on the operating performance of fintech companies in Nigeria was investigated using partial least squares structural equation modelling. Operating performance, the endogenous construct, was evaluated for predictive power using its R-square value of 0.401. This indicates that almost 40% of the variances in operating performance might be explained by the inter-construct coefficient and the primary model for venture capital funding in fintech businesses' results. Bootstrapping was done in order to assess the endogenous construct's predictive capacity further; the outcome was an operational performance (OP) Q-square value of 0.167. The cross-validated redundancy values gave good support to the model's predictive ability, and the omission distance was chosen at seven. Even with an increased sample size, the pathway structural framework and bootstrapping result

showed that there was no meaningful correlation between operating performance (OP) and venture capital funding (VC) in the research domain. In particular, the results in Table 2 revealed that operating performance in Nigerian fintech businesses was not significantly predicted by Venture Capital Funding (VC) ($\beta = 0.274$, $t = 0.3913$, $p = 0.362$). As a result, Table 7's null hypothesis, which claims that venture capital funding has no appreciable effect on the operational success of fintech companies in Nigeria, cannot be disproved. Consequently, the data did not support the alternative hypothesis (Ha1). Thus, even though the model had a good degree of predictive power, the results did not, at least not for the purposes of this study, show a causal link between venture capital funding and the operational success of fintech companies in Nigeria.

Table 6. Direct paths bootstrap coefficients and 95% confidence interval (CI) for VC and OP

Path relation	Beta	Stand error	T-value	P-value	Confidence interval (bias-corrected)		R-square	Q Square
					2.5%	97.5%		
VC->OP	0.274	0.085	0.913	0.362	-0.432	0.469		0.167

Note: After varying the bootstrap replications between 500 and 2,000 without experiencing any appreciable changes, the data utilized 1,000 replications to bootstrap the standard errors.

Table 7. Summary of hypothesis testing of direct analysis between VC and OP

Hypothesis	Path relations	Beta	Standard error	T-value	P-value	Remark
H_o1	VC->OP	0.274	0.085	0.913	0.362	Not supported

Impact of Financial Innovation (FI) on the Operating Performance (OP) of fintech firms in Nigeria.

Table 6 presents the direct effect of Financial Innovation (FI) on Operating Performance (OP) in the bootstrap outcome for predicting OP. The results show that FI was statistically significant ($\beta = 0.523$, $t = 5.862$, $p = 0.005$) and positively correlated with OP. The predictive value of the model, as indicated by the R-square, was 0.401, implying that the construct for Financial Innovation and Venture Capital Funding accounted for 40.1% of the variations in the operating performance of fintech firms in Nigeria. Furthermore, the blindfolding result, estimated using the same procedure, revealed a Q-square value of 0.167 for OP, which was above zero, providing additional evidence for the significance of the model. The bootstrapping procedure also validated the significance of the relationship between Financial Innovation (FI) and Operating Performance (OP) when expanded in scope and scaled up for wider coverage.

The results in Table 8 and Figure 3a demonstrate that a unit increase in FI will lead to a 52.3% corresponding increase in operating performance. Given these criteria, the null hypothesis (H0 2) stating that there is no significant relationship between Financial Innovation and the operating performance of fintech firms in Nigeria is rejected. Conversely, the alternative hypothesis (Ha2) given in Table 8, which states that Financial Innovation statistically impacted the operating performance of fintech firms in Nigeria significantly, is accepted. The model establishes that FI has a positive direct pathway for the relationship between Venture Capital Funding (VC) and Operating Performance (OP). However, there are mixed signals in the correlation between the elements of Financial Innovation and operating performance, as detailed in Figures 3a and 3b.

Figure 3b reveals that five items of VC had a significantly strong correlation ($r > 0.40$, $p < 0.01$) with OP. In order of importance, ISLA ($r = 0.601$), PCEs ($r = 0.716$), LET ($r = 0.690$), PCE ($r = 0.787$), and IFPS ($r = 0.734$) had a strong influence on operating performance. Thus, financial innovation's role in advancing fintech firms' operations, introducing innovative financial products and services, promoting a cashless economy, leveraging emerging technologies like blockchain and AI, and improving financial literacy and awareness boost operating performance among fintech firms. The implication is that well-

strategized financial innovations could be a useful tool to boost the operating performance of fintech firms in Nigeria. The result suggests that fintech firms should pay close attention to the activities that promote Financial Innovation within their organizations.

Table 8. Direct paths bootstrap coefficients and 95% confidence interval (CI) for FI and OP

Path relation	Beta	Stand error	T-value	P-value	Confidence interval (bias-corrected)		R-square	Q Square
					2.5%	97.5%		
FI->OP	0.523	0.539	5.862	0.000	0.323	0.678		0.167

Notice: After varying the number of bootstrap replications from 500 to 2,000 without experiencing any appreciable changes, the data was bootstrapped using 1,000 replications to determine the standard errors.

Table 9. Summary of hypothesis testing of direct analysis between FI and OP

Hypothesis	Path relations	Beta	Standard error	T-value	P-value	Remark
H_o2	FI->OP	0.523	0.539	5.862	0.000	Supported

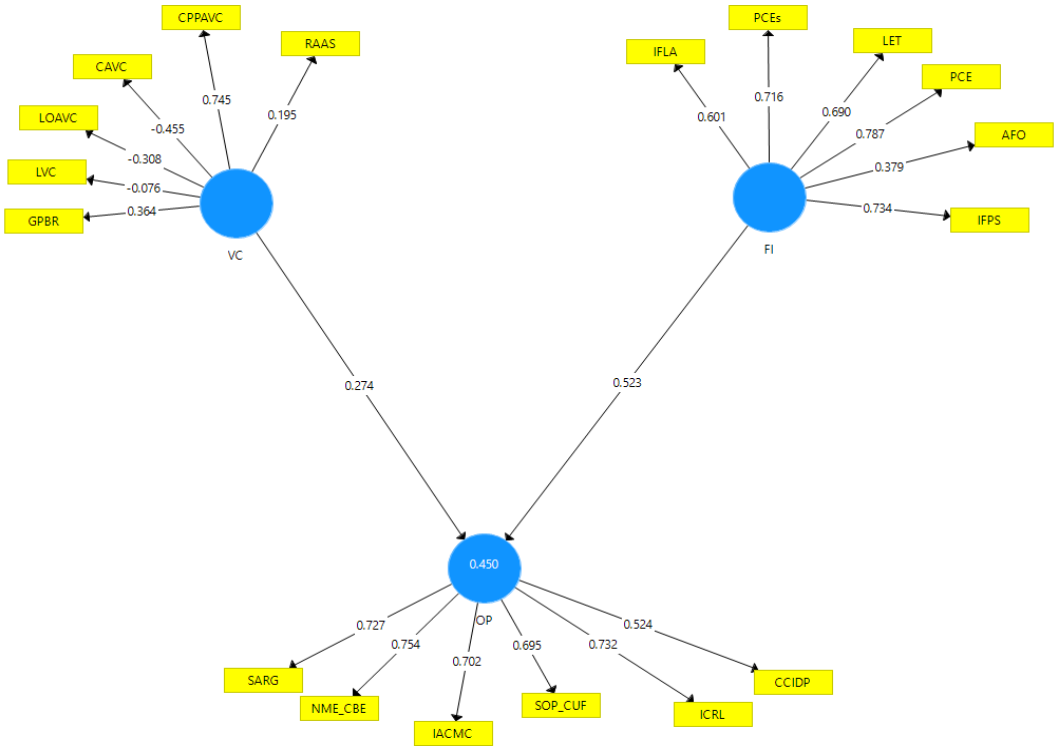


Fig. 3a. Structural pathway showing a direct relationship between Venture Capital Funding, Financial Innovation and operating performance in Nigeria (R-square and Correlations)

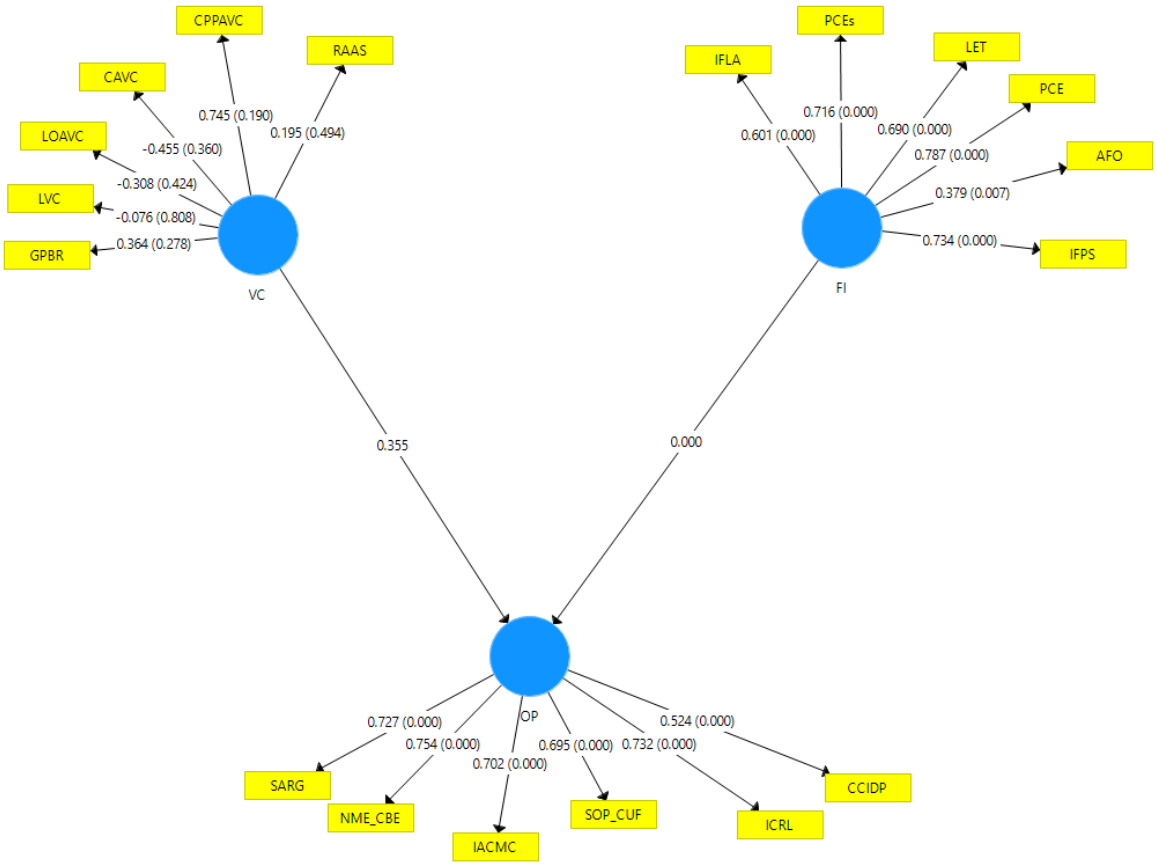


Fig. 3b. Structural pathway showing a direct relationship between Venture Capital Funding, Financial Innovation and operating performance in Nigeria (P-values and Correlations)

The mediating role of Financial Innovation in the relationship between Venture Capital Funding and operating performance.

Figure 2 pictures the mediating role of Financial Innovation (FI) in the relationship between Venture Capital Funding (VC) and Operating Performance (OP) within the PLS-SEM (Partial Least Squares Structural Equation Modelling) analysis. The graphical structural framework, as depicted in Figure 4.2, illustrates this mediating relationship. According to the rule of thumb in PLS-SEM analysis, (that is, the basic principle guiding the use of PLS-SEM), the predictor construct/exogenous variable (VC) must have a significant direct effect on the dependent/endogenous variable (OP) and other independent variables without the mediator in the direct effect model (Figure 3). Subsequently, the contribution of the mediating variable will be measured. From the bootstrap results in Tables 5 and 7, the direct impact of Venture Capital (VC) on Operating Performance (OP) was insignificant. Furthermore, the direct effect of Venture Capital Funding on Financial Innovation was also insignificant ($R^2 = 0.220$, $\beta = 0.274$, $t = 1.116$, $p = 0.264$). However, the direct impact of Financial Innovation (FI) on Operating Performance (OP) was significant ($R^2 = 0.401$, $\beta = 0.559$, $t = 5.989$, $p = 0.000$).

The bootstrapping result in Table 9 revealed that the indirect effect of Venture Capital Funding on Operating Performance was insignificant ($R^2 = 0.401$, $\beta = 0.141$, $t = 1.027$, $p = 0.305$). Consequently, the alternative hypothesis (Ha3) stating that Financial Innovation plays a significant mediating role in the relationship between Venture Capital Funding and Operating Performance (VC->FI->OP) was not supported. Therefore, the null hypothesis (Ho5) could not be rejected. To further elaborate on these findings, Table 11 clearly shows that Financial Innovation (the mediating factor) presents an insignificant mediating relationship with Venture Capital Funding (VC) on Operating Performance (OP). The variance range (VAR) in Table 12 accounted for 33.9% of the total effect, indicating a partial,

weak, and insignificant mediating role. The null hypothesis (H0 5) that Financial Innovation plays an active mediation role in the relationship between Venture Capital Funding and Operating Performance cannot be rejected. Therefore, it is affirmed that although Financial Innovation influences the role in the impact of Venture Capital on Operating Performance, this mediation is weak, partial, and insignificant.

Table 10. Specific indirect paths effect (bootstrap coefficients and 95% CI) for mediating role of FI on VC and OP

Path relation	Beta	Stand error	T-value	P-value	Confidence interval (bias-corrected)		R-square	Q Square
					2.5%	97.5%		
VA->FI->OP	0.141	0.240	1.056	0.291	-0.330	0.403	0.401	0.167

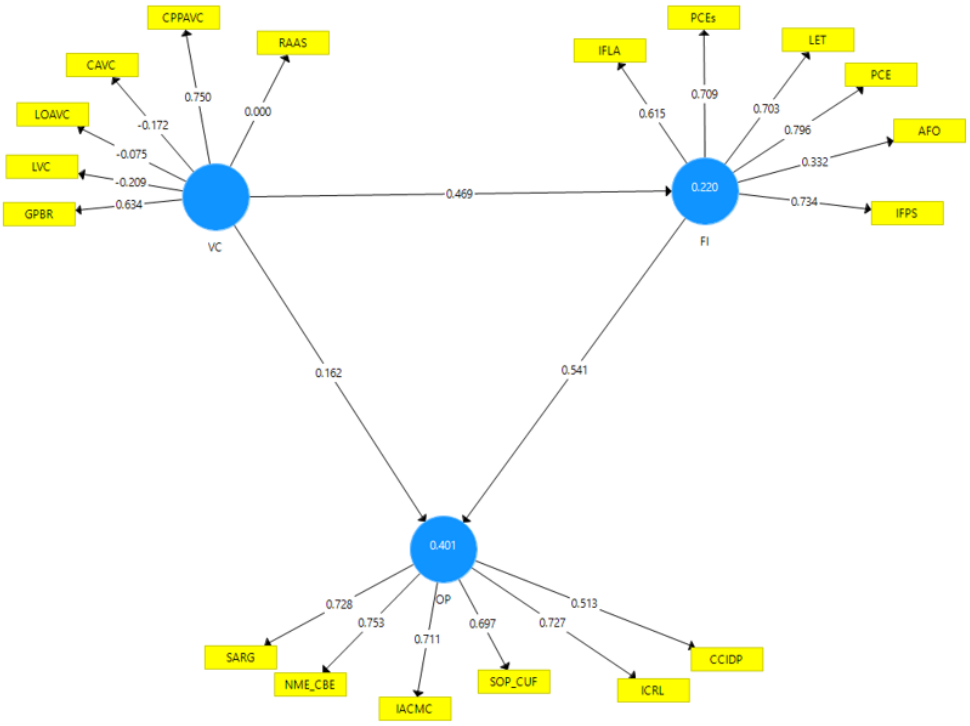
Note: Once the bootstrap replications were adjusted from 500 to 2,000 without any notable changes, the data was retested 1,000 times to determine the standard errors.

Table 11. Mediation analysis: Financial Innovation (FI) as a mediator

Independent var	Direct effect	Indirect effect	Total effect	Var range	Mediation
Financial Innovation	0.274	0.141	0.416	0.339	Partial mediation

Table 12. Summary of hypothesis testing of indirect analysis of FI on VC and OP.

Hypothesis	Path relations	Beta	Standard deviation	T-value	P-value	Remark
H5	VC->IF->OP	0.141	0.240	1.056	0.291	Not supported



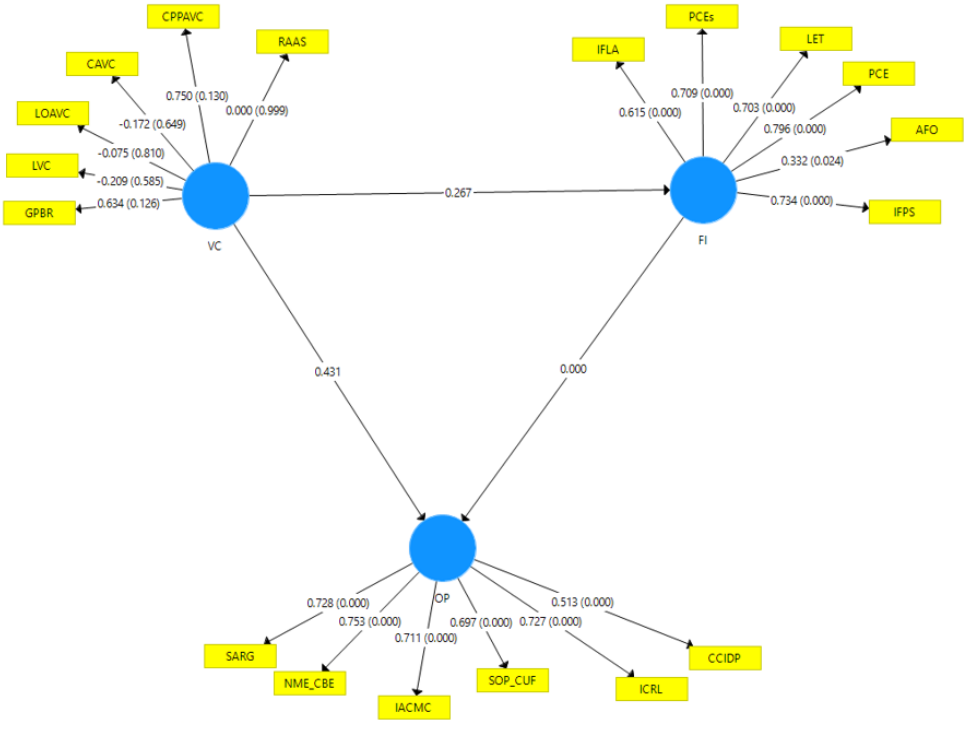


Fig. 4a. Structural pathway showing indirect mediation between Venture Capital Funding, Financial Innovation and operating performance in Nigeria (R-square and Correlations)

Conclusions

Investigation reveals that the influence of venture capital funding on the performance of fintech firms lacks significance Based on the comprehensive analyses conducted in the preceding sections, it becomes evident that financial innovation holds a pivotal role in driving the overall success of firms. The findings underscore the significance of introducing innovative financial products and services, fostering the adoption of a cashless economy, harnessing emerging technologies such as blockchain and Artificial Intelligence, and enhancing financial literacy and awareness. These factors collectively contribute to bolstering the operating performance of fintech enterprises. It is noteworthy that financial innovation emerges as the primary catalyst for the sector's growth, underscoring its crucial impact. The correlation between financial innovation and the operating performance of fintech firms demonstrates a positive association. This implies that as the emphasis on financial innovation intensifies, there is a corresponding improvement in operating performance. In essence, a heightened focus on advancing financial innovation strategies leads to enhanced operational outcomes within the fintech realm. In contrast, the. This suggests that the role played by venture capital funding in shaping the operating performance of fintech enterprises is relatively modest. The outcome of the analysis highlights that the impact of venture capital funding on the sector's operational performance does not reach a level of statistical significance. Furthermore, the examination of the mediating effect of financial innovation in the relationship between venture capital funding and operating performance yields non-significant results. This implies that financial innovation does not substantially mediate or modify the influence of venture capital funding on the operational outcomes of fintech firms.

In conclusion, the study's hypotheses regarding venture capital (VC) funding, financial innovation (FI), and operating performance (OP) of Nigerian fintech firms were examined, yielding insightful outcomes. Firstly, Hypothesis 1 posited that VC funding has no significant impact on fintech firms' operating performance in Nigeria. This hypothesis was supported, as the results revealed that the influence of VC on OP was statistically insignificant. Despite the essential role VC funding plays in supporting startups,

this study suggests that its impact on day-to-day operational performance is limited within the context of Nigerian fintech. This implies that VC funding alone may not be sufficient to drive operational success and growth, highlighting the importance of other resources or factors in determining performance. In contrast, Hypothesis 2 proposed that FI would positively impact OP, suggesting that financial innovation significantly enhances fintech firms' performance. The study confirmed this hypothesis, indicating that FI exerts a strong positive influence on OP. This underscores the role of innovative financial products and services, which likely improve operational efficiency, customer satisfaction, and market reach. Nigerian fintech firms that prioritize financial innovation, such as adopting new technologies and fostering a cashless economy, can thus expect substantial operational improvements. Finally, Hypothesis 3 tested the mediating role of FI in the relationship between VC funding and OP, proposing that FI would enhance the influence of VC on OP. However, this hypothesis was not supported, as the study found the mediating role of FI to be statistically insignificant. This outcome implies that, while FI is crucial for operational performance, it does not significantly alter or amplify the impact of VC funding on OP. Hence, the findings highlight financial innovation as a vital driver of fintech firms' operating success, while venture capital funding alone may have a limited effect on their performance. These insights provide a valuable foundation for policymakers and fintech leaders to emphasize financial innovation to enhance operational efficiency in the Nigerian fintech landscape.

This study addresses a gap in the literature by investigating the impact of venture capital funding and financial innovation on Nigerian fintech firms' operational performance. It concludes that financial innovation significantly drives operational excellence, while venture capital funding had a non-significant impact, with financial innovation not substantially mediating its influence on performance. Based on the findings of this study the following recommendations are made:

- Given that the research findings indicate a substantial influence of financial innovation on the operational performance of fintech firms, it is imperative for these firms to give precedence to crafting inclusive financial solutions tailored to the requirements of underserved and unbanked segments in Nigeria. This strategic approach not only tackles societal challenges but also extends the potential customer pool and widens market outreach.
- Allocate resources to continuous research and development to stay ahead of market trends and evolving customer needs. Innovation should be an ongoing process to maintain competitiveness.
- Fintech firms should actively collaborate with regulatory authorities to champion supportive policies and frameworks that nurture innovation and cultivate a favourable environment for growth. Through joint endeavours, these collaborative initiatives can result in regulatory structures that promote responsible innovation, prioritize consumer safeguarding, and uphold market integrity, all in alignment with the research's insights on the impact of government policies.
- Fintech firms should play an active role in enhancing financial literacy and awareness among the Nigerian population. Investing in educational campaigns, workshops, and online resources can empower consumers to make informed decisions about using fintech products and services.

It is important to acknowledge the limitations of this study. The research is based on cross-sectional data, which limits the ability to infer causal relationships definitively. Longitudinal studies could provide a more comprehensive understanding of the dynamics between venture capital funding, financial innovation, and operational performance over time. The study's reliance on self-reported data from senior management introduces potential response bias and subjectivity. Future research could incorporate multiple data sources, such as financial statements and objective performance metrics, to enhance the robustness of the findings.

References

Abang, S. O. & Ayodele, O. (2022). Financial innovation and economic development in Nigeria. *International Journal of Innovative Research and Advanced Studies (IJIRAS), 9*(4), 60-72.

Ami, F. U. & Irwan, A. E. (2021). A paradigm shift in financial landscape: encouraging collaboration and innovation among Indonesian FinTech lending players. *Journal of Science and Technology Policy Management, 12*(2), 309-330.

Ampofo, R. T., & Aidoo, E. N. (2022). Structural equation modelling of COVID-19 knowledge and attitude as determinants of preventive practices among university students in Ghana. *Scientific African, 16,* e01182. https://doi.org/10.1016/j.sciaf.2022.e01182

Bollaert, H., Lopez-de-Silanes, F., & Schwienbache, A. (2021). Fintech and access to finance. *Journal of Corporate Finance, 68,* 101941. https://doi.org/10.1016/j.jcorpfin.2021.101941

CB Insights (2023). *State of fintech report*. https://www.cbinsights.com/research/report/fintech-trends-q1-2023/

Chukwunulu, J. I. (2019). Effect of financial innovation on the Nigerian economy. *World Journal of Innovative Research, 6*(5), 15-21.

Deloitte (2023). *Fintech by the numbers*. https://www.deloitte.com/tr/en/pages/financial-services/articles/fintech-by-the-numbers.html

Effiom, L., Etim, S., & Edet, S. (2020). Financial innovation and the performance of small and medium scale enterprises in Nigeria. *Journal of Small Business & Entrepreneurship, 34*(7), 1-45.

Enrico, B., Niccolo, N., Erasmia, L. & Alkis, T. (2022). Corporate venture capital and CSR performance: An extended resource-based view's perspective. *Journal of Business Research, Volume 139,* 1058-1066.

Fan, Y., Chen, J., Shirkey, G., John, R., Wu, S. R., Park, H., & Shao, C. (2016). Applications of structural equation modeling (SEM) in ecological studies: An updated review. *Ecological Processes, 5*(19). https://doi.org/10.1186/s13717-016-0063-3

Guild, J. (2017). Fintech and the future of finance. *Asian Journal of Public Affairs, 10*(2), 1-14. https://ssrn.com/abstract=3021684

Jarvis, R., & Han, H. (2021). Fintech innovation: Review and future research directions. *International Journal of Banking, Finance and Insurance Technologies, 1*(1), 79-102.

Jay, B. (1991). Resource-based view (RBV) theory in strategic management. *Journal of Management, 17*(1), 99-120.

Kolokas, D., Vanacker, T., Veredas, D., & Zahra, S. A. (2022). Venture capital, credit, and fintech start-up formation: A cross-country study. *Entrepreneurship Theory and Practice, 46*(5), 1198-1230. https://doi.org/10.1177/1042258720972652

KPMG (2023). *Pulse of fintech.* https://kpmg.com/xx/en/what-we-do/industries/financial-services/pulse-of-fintech.html

Laeven, L., Levine, R. & Michalopoulos, S. (2014). Financial innovation and endogenous growth. *Journal of Financial Intermediation, 24*(1), 1-24. https://doi.org/10.1016/j.jfi.2014.04.001

Lou, A. T. F. & Li, E. Y. (2016). *Integrating innovation diffusion theory and the technology acceptance model: The adoption of blockchain technology from business managers' perspective.* National Chengchi University.

Loughran, T. & Ritter, J. R. (1997). The operating performance of firms conducting seasoned equity offerings. *The Journal of Finance, 52*(5), p. 823-1850. https://ssrn.com/abstract=52822

Madhani, P. M. (2010). Resource-based view (RBV) of competitive advantage: An overview. https://www.semanticscholar.org/author/Pankaj-M.-Madhani/79738273

Minwir, A.-S. & Anwar, S. (1998). Modeling the operating efficiency of banks: a nonparametric methodology. *Logistics Information Management, 11*(1), pp. 5-17.

Mustapha, S. A. (2018). E-payment technology effect on bank performance in emerging economies - evidence from Nigeria. *Journal of Open Innovation: Technology, Market and Complexity, 4*(4), 43. https://doi.org/10.3390/joitmc4040043

Ojo, O. V. & Nwaokike, U. (2018). Disruptive technology and the fintech industry in Nigeria: Imperatives for legal and policy responses. *Gravitas Review of Business and Property Law, 9*(3), 1-19. https://dx.doi.org/10.2139/ssrn.3306164

Oral, M., & Yolalan, R. (1990). An empirical study on measuring operating efficiency and profitability of bank branches. *European Journal of Operational Research, 46*(3), 282-294.

Oshora, B., Siraj, N., Nguse, T., Zoltan, Z., Fekete-Farkas, M., & Hagen, I. Z. (2021). The innovation of FinTech in promoting financial inclusion in Ethiopia: Opportunities and barriers. *Economics & Working Capital*, *1*(2), 1-2.

Panda, B., & Leepsa, N. M. (2017). Agency theory: Review of theory and evidence on problems and perspectives. *Indian Journal of Corporate Governance*, *10*(1), 74-95. https://doi.org/10.1177/0974686217701467

Parkhe, V. W., & Ralston, D. A. (2006). New frontiers in network theory development. *Academy of Management Review*, *31*(3), 560-568.

Puschmann, T. (2017). FinTech. *Business & Information Systems Engineering*, *59*(1), 69-76. http://dx.doi.org/10.1007/s12599-017-0464-6

Sapienza, H. J. (1992). When do venture capitalists add value. *Journal of Business Venturing*, *7*(1), 9-27.

Saygili, E. E., & Ercan, T. (2021). An overview of international fintech instruments using innovation diffusion theory adoption strategies. *Innovative Strategies for Implementing FinTech in Banking*. http://dx.doi.org/10.4018/978-1-7998-3257-7.ch003

Umeodinka, N. (2022). The Nigerian capital market: towards inclusive participation of the fintech industry. Lagos State University.

World Bank (2022). *Fintech and the future of finance. Global financial development report.* https://www.worldbank.org/en/publication/fintech-and-the-future-of-finance

Appendix 1: PLS-SEM analysis of impact of VC and FI on OP

Appendix 1a. Model fit for direct effect analysis of VC and FI on PM

Model	SRMR	d_ULS	d_G	Chi-square	NFI	RMS Theta
Saturated model	0.125	2.652	0.684	347.656	0.429	0.189

Appendix 1b: Construct Reliability and validity test for direct effect of VC and FI on OP

	Cronbach's Alpha	Rho A	Composite reliability	Average Variance
Financial innovation	0.735*	0.764*	0.820*	0.842*
Performance	784*	0.796*	0.846*	0.881*
Venture Capital	0.565*	0.850*	0.042*	0.872*

Appendix 1c: Fornell–Larcker criterion for discriminant validity for direct effect of VC and FI on OP

Construct	VC	OP	FI
VC	**0.665**		
OP	0.620	**0.693**	
FI	0.352	**0.458**	**0.415**

Appendix 1d:. Heterotrait–Monotrait Ratio (HTMT) for direct effect of VC on OP

Construct	VC	OP
OP	0.790	
VC	0.513	0.456

Appendix 1e: multicolinearity statistics (VIF) for all variables

VARIABLE	Outer VIF		Inner VIF
IFPS	1.972	FI	1.142
CPCIDC	1.597	VC	1.142
CAVC	1.397		
PAVC	1.163		
GP_BR	1.068		
IFLA	1.478		
ACMC	1530		
ICRL	1.994		
LET	1.432		
LAVC	1.389		
LVC	1.311		
PCE	2.139		
PCEs	1.709		
RAS	1.416		

SARG	1.536		
OP_CU	1.476		

Appendix 2: Mediation analysis of impact of VC on OP with FI as a mediating factor

Appendix 2a: Model fit for mediation analysis of CA on OP with TQM

Model	SRMR	d_ULS	d_G	Chi-square	NFI
Saturated model	0.119	2.433	0.685	341.406	0.440