Just-In-Time Practices and the Operational Performance of Micro, Small, and Medium Enterprises in Taraba State, Nigeria

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Abstract
This study examines the effects of Just-in-Time (JIT) purchasing, production, and selling on cost reduction, product quality, and responsiveness among micro, small, and medium enterprises (MSMEs) in Taraba State, Nigeria. Grounded in the Resource-Based View, the study addresses two gaps in the JIT literature: the near-absence of MSME-focused evidence and the tendency to treat JIT and firm performance as aggregate rather than disaggregated constructs. Using a quantitative survey design, structured questionnaires were administered to 400 MSME employees across five Local Government Areas selected through stratified systematic sampling; 380 valid responses (95% response rate) were analysed using descriptive statistics and simple linear regression in SPSS 25. JIT purchasing had a strong, statistically and practically significant positive effect on cost reduction ($\beta = 0.653$, $R^2 = 0.426$, $p < .001$). JIT selling had a moderate positive effect on responsiveness ($\beta = 0.387$, $R^2 = 0.150$, $p < .001$). JIT production had a statistically significant but practically negligible effect on product quality ($\beta = 0.173$, $R^2 = 0.030$, $p = .001$). Limited financial resources (33%) and adverse economic/policy conditions (30%) were the most frequently cited implementation barriers. The findings indicate that relational JIT capabilities (purchasing and selling) generate stronger performance advantages than internal production capabilities among resource-constrained MSMEs, extending the boundary conditions of the Resource-Based View to a developing-economy MSME context. The study recommends that MSMEs prioritise supplier relationships and demand-responsive selling, while policymakers target financing and infrastructure constraints that limit the returns to JIT production investment.

Keywords: *Just-in-Time; MSME performance; Resource-Based View;Taraba State; Nigeria*

1. Introduction

1.1 Background of the Study

Just-in-Time (JIT) management has evolved from a production technique into an integrated operations philosophy that aligns purchasing, production, and delivery with demand while minimising inventory, waste, and non-value-adding activities. Empirical and meta-analytic evidence generally links JIT practices with improved operational efficiency and financial performance (Lara et al., 2022; García-Cutrín & Rodríguez-García, 2024; Prashar, 2025). Supplier coordination, production synchronisation, and customer integration can further enhance cost efficiency, delivery speed, and overall business performance (Agyabeng-Mensah et al., 2021; Shou et al., 2023).

However, JIT does not produce uniform benefits across contexts. Its effectiveness depends partly on supply-chain stability, infrastructure, financial resources, technology, and supplier capabilities (Choi et al., 2023; Yu et al., 2024; Lima et al., 2025). These contingencies are particularly relevant to micro, small, and medium-sized enterprises (MSMEs), which face resource constraints that simultaneously increase the need for waste reduction and limit their ability to implement highly synchronised operations.

Despite growing international evidence, empirical research on JIT among Nigerian MSMEs remains limited, particularly outside formal manufacturing settings. Evidence from Taraba State is especially scarce. Moreover, many studies examine JIT and performance as aggregate constructs, providing limited insight into the distinct contributions of purchasing, production, and selling/delivery practices to specific performance outcomes.

This study therefore examines the effects of JIT purchasing, JIT production, and JIT selling/delivery on cost reduction, product quality, and responsiveness among MSMEs in Taraba State, Nigeria. By disaggregating JIT practices and performance outcomes, the study provides a more granular assessment of how JIT creates value within a resource-constrained MSME context.

1.2 Statement of the Problem

MSMEs are central to Nigeria's economy, accounting for 48% of GDP, 96% of businesses, and 84% of employment (SMEDAN & NBS, 2021). In Taraba State, they provide livelihoods for approximately 953,821 workers across agro-processing, trading, and artisan activities. However, persistent constraints relating to infrastructure, finance, technology, suppliers, and logistics can undermine operational efficiency and hinder the synchronisation of purchasing, production, and delivery. Although JIT is widely associated with improved efficiency and performance, it remains uncertain whether these benefits extend to resource-constrained MSMEs operating under such conditions. Existing evidence is concentrated largely in formal manufacturing and relatively structured organisational settings, leaving a contextual gap concerning JIT implementation among Nigerian MSMEs, particularly those in Taraba State.

A further measurement and managerial gap arise from the tendency to treat JIT and firm performance as aggregate constructs. Such an approach may obscure differences in the contribution of individual JIT practices to specific performance outcomes. Consequently, limited evidence exists on whether purchasing, production, and selling/delivery practices contribute differently to cost reduction, product quality, and responsiveness.

This evidence gap makes it difficult to determine whether established JIT–performance relationships are transferable to the Nigerian MSME context. Accordingly, this study investigates the effects of JIT purchasing, JIT production, and JIT selling/delivery on cost reduction, product quality, and responsiveness among MSMEs in Taraba State, Nigeria, thereby addressing the contextual and disaggregation gaps in the JIT literature.

1.3 Objectives of the Study

The main objective of this study is to examine the effect of Just-in-Time practices on the performance of MSMEs in Taraba State, Nigeria. The specific objectives are to:

i. determines the level of Just-in-Time implementation among MSME firms in Taraba State;
ii. examine the effect of Just-in-Time purchasing on cost reduction of MSMEs in Taraba State;
iii. assess the effect of Just-in-Time production on product quality of MSMEs in Taraba State;
iv. evaluate the effect of Just-in-Time selling on responsiveness of MSMEs in Taraba State; and
v. identifies the challenges affecting Just-in-Time implementation among MSMEs in Taraba State.

1.4 Hypotheses

The study tests the following null hypotheses:

H01: Just-in-Time purchasing does not have a significant effect on cost reduction of MSMEs in Taraba State, Nigeria.

H02: Just-in-Time production does not have a significant effect on product quality of MSMEs in Taraba State, Nigeria.

H03: Just-in-Time selling does not have a significant effect on responsiveness of MSMEs in Taraba State, Nigeria.

2. Review of Related Literature

2.1 Just-in-Time (JIT)

The Just-in-Time (JIT) philosophy emerged in the 1950s through the work of Taiichi Ohno and was formalised within Toyota's operations as a core component of the Toyota Production System during the 1960s (Ohno, 1988). Its central objective is to minimise inventory and systematically eliminate waste from production processes. By the late 1970s and early 1980s, JIT had gained international recognition, particularly in the United States, where it was often characterised as a "zero-inventory" strategy (Hall, 1983).

JIT is broadly defined as an integrated production and logistics philosophy that synchronises the flow of materials, components, and finished goods with actual demand, thereby reducing inventory and waste while improving efficiency, quality, and operational responsiveness (Inman & Mehra, 1990; Thomopoulos, 2015; Tsioumas et al., 2026). Mackelprang and Nair (2010) further conceptualise JIT as a multidimensional approach encompassing inventory reduction, quality improvement, production speed, and operational flexibility.

Thus, JIT extends beyond inventory control to an integrated system of operational and supply-chain practices. Its effective implementation requires coordination across organisational processes and external partners, increasingly enabled by digital technologies that enhance information sharing and supply-chain visibility (Choi et al., 2023). These practices include pull-based production, continuous flow, setup-time reduction, supplier integration, and employee involvement in continuous improvement (Cua et al., 2001; Shah & Ward, 2007).

2.2 Just-in-Time Practices

JIT practices focus on reducing setup times, ensuring timely supplier deliveries, and maintaining close customer coordination to align production with actual demand (Phan et al., 2019). JIT is commonly viewed as a multidimensional construct comprising purchasing, production, and selling (Alfi et al., 2025; Bond et al., 2020; Green et al., 2014). JIT supplier delivery and customer linkage enhance efficiency by lowering costs and improving responsiveness (Shou et al., 2023), while digital technologies and real-time information systems strengthen JIT effectiveness, especially during supply-chain disruptions (Choi et al., 2023; Yu et al., 2024).

JIT Purchasing. JIT purchasing is a procurement strategy in which materials are ordered and delivered in the exact quantities needed and precisely when required for production, aiming to minimise inventory, reduce waste, and lower carrying costs by aligning purchasing with production through close supplier relationships and effective information sharing (Thomopoulos, 2015). Its success depends on strong buyer–supplier coordination that enhances delivery reliability and production efficiency (De Toni & Nassimbeni, 2000).

JIT Production. JIT production is an operational system in which goods are produced only when needed and in the exact quantities required, aligning production with actual demand through a pull-based system that promotes smooth workflow and optimal resource utilisation (Thomopoulos, 2015). As the manufacturing component of Total JIT, it relies on pull production, continuous flow, small batch sizes, reduced setup times, and high equipment reliability (Bond et al., 2020; Alfi et al., 2025); its effectiveness depends on stable processes, supportive infrastructure, and competent employees (Fullerton et al., 2003).

JIT Selling. JIT selling is the customer-focused component of Total JIT that aligns production and delivery with actual demand, emphasising demand responsiveness, flexible delivery, reduced finished-goods inventory, and close customer coordination (Alfi et al., 2025; Bond et al., 2020). By fostering long-term buyer–seller relationships and supply-chain integration, JIT selling enhances service quality, operational reliability, and customer trust (Green & Inman, 2005; Green et al., 2008).

2.3 Micro, Small and Medium Enterprises (MSMEs)

MSME definitions vary across countries based on economic context and policy priorities. In Nigeria, classification is based on employee size and asset value (SMEDAN & NBS, 2021): nano (1–2 employees; turnover < ₦3m), micro (3–9; ₦3–25m), small (10–49; ₦25–100m), and medium enterprises (50–199; ₦100m–1bn). Collectively, MSMEs contribute over 48% of GDP, represent about 96% of businesses, and account for 84% of employment in Nigeria (SMEDAN & NBS, 2021).

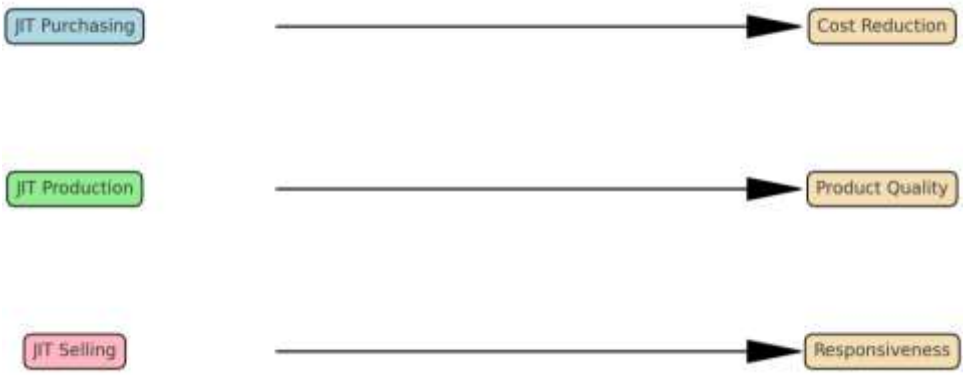
2.4 Operational Performance

Performance is the ability of an individual or organisation to achieve predetermined goals effectively and efficiently, reflected in productivity, quality, innovation, and financial outcomes (Richard et al., 2009; Armstrong, 2020). Operational performance focuses on the efficiency and effectiveness of core processes — quality, delivery, flexibility, cost, and responsiveness — and how well resources are utilised to meet customer and strategic objectives (Inman et al., 2011; Li et al., 2006; Vickery et al., 2003). This study adopts the performance indicators established in Li et al. (2006) and Vickery et al. (2003): cost reduction, product quality, and responsiveness.

Cost reduction refers to minimising operational and service-delivery expenses through efficiency improvements and process optimisation without compromising quality (Ma et al., 2026), closely linked to practices that reduce procurement, inventory, transportation, and warehousing costs through improved coordination (Pettersson & Segerstedt, 2013). **Product quality** refers to the degree to which a product meets specified requirements, performs reliably, and satisfies customer expectations, associated with conformance to standards, defect reduction, and continuous improvement (Psarommatis et al., 2020; Evans & Lindsay, 2020).
Responsiveness refers to an organisation's ability to rapidly adapt its processes, products, and supply-chain activities to meet changing customer demands and market conditions (Vickery et

al., 2003), including the capacity to adjust output, reconfigure resources, and modify delivery schedules without significant cost or time penalties (Upton, 1994).

2.5 Conceptual Model



Source: Study Model 2026

Guided by the Resource-Based View and the reviewed literature, the study proposes a conceptual model linking three JIT practices — JIT purchasing, JIT production, and JIT selling — to three corresponding operational performance outcomes of MSMEs: cost reduction, product quality, and responsiveness, respectively. The model posits that JIT practices function as firm-specific capabilities that enable MSMEs to deploy resources more efficiently and achieve superior performance.

2.6 Theoretical Review

The Resource-Based View (RBV), introduced by Wernerfelt (1984) and developed by Barney (1991), argues that firms achieve competitive advantage by acquiring, developing, and effectively deploying resources and capabilities that are valuable, rare, difficult to imitate, and non-substitutable (VRIN). These resources extend beyond physical assets to include organisational knowledge, employee skills, managerial competencies, routines, and processes that enhance efficiency and performance. RBV is therefore appropriate for explaining JIT implementation because its effectiveness depends substantially on firm-specific capabilities and the strategic deployment of internal resources.

From an RBV perspective, JIT practices represent organisational capabilities that can improve operational performance when embedded in firm processes (Peng et al., 2008). Effective JIT implementation requires capabilities such as supplier integration, process coordination, employee competence, information sharing, and continuous improvement. Over time, these capabilities become embedded in organisational routines and may be difficult for competitors to replicate (Barney & Clark, 2007; Grant, 1991).

For Ha1, JIT purchasing develops procurement capabilities through close supplier relationships, synchronised material flows, and reduced inventory, enabling MSMEs to minimise holding costs and improve resource utilisation (Dyer & Singh, 1998; Fullerton & McWatters, 2001). For Ha2, JIT production strengthens organisational routines through process standardisation, continuous improvement, and employee learning, thereby supporting defect prevention and production efficiency (Cua et al., 2001; Lippman & Rumelt, 1982). For Ha3, JIT selling reflects the firm's ability to deploy and reconfigure resources in response to changing customer demand, enhancing market responsiveness and operational flexibility (Eisenhardt & Martin, 2000; Teece, 2007).

RBV also explains why JIT outcomes may vary across MSMEs. Differences in financial resources, technological infrastructure, employee expertise, and organisational capabilities can

influence firms' ability to implement and sustain JIT practices effectively (Cohen & Levinthal, 1990; Zahra & George, 2002). Thus, RBV provides a suitable theoretical foundation for explaining how JIT purchasing, production, and selling contribute to cost reduction, product quality, and operational responsiveness among MSMEs in Taraba State, Nigeria.

2.7 Empirical Review

Research on JIT management has expanded considerably in recent years, spanning maritime transport, construction, banking, manufacturing, and, more recently, sustainability and digital transformation. This review synthesises empirical and meta-analytic studies to establish the current state of knowledge on the JIT–performance relationship and the boundary conditions under which it holds.

JIT and firm performance. Meta-analytic evidence provides the strongest support for a positive JIT–performance relationship. Lara et al. (2022), synthesising 41 studies and 12,708 observations, found a positive, statistically significant, medium-sized effect of JIT on operational performance, though no direct relationship with organisational performance measured via Triple Bottom Line dimensions. Prashar (2025) corroborates this at the operational level while showing the relationship is moderated by national culture. García-Cutrín and Rodríguez-García (2024) demonstrate that JIT is also associated with improved financial outcomes — return on investment, return on sales, and profit margins — supporting JIT as a strategic rather than purely operational practice.

Firm-level survey evidence reinforces these conclusions. Bashar et al. (2026), using PLS-SEM on 463 banking professionals in Bangladesh, found JIT practices significantly predict operational performance ($\beta = 0.33$, $p < .01$) and, in turn, business performance. Shou et al. (2023) found JIT supplier delivery improves cost performance and JIT customer linkages improve speed-to-market, with IT integration strengthening these effects. Agyabeng-Mensah et al. (2021), studying 140 manufacturing firms in Ghana, found JIT contributes to operational and business performance, particularly combined with Total Quality Management and green supply-chain practices — the closest developing-economy analogue to the present study, though confined to formal manufacturing.

JIT under disruption. A parallel literature examines JIT resilience under supply-chain disruption. Potiker (2026) documents a structural shift from JIT to Just-in-Case (JIC) logistics in the San Diego–Tijuana region, driven by trade-law volatility and supply-chain disruption. Yu et al. (2024) formalise this empirically, showing that upstream supply-chain shocks negatively affect operational performance and that JIC becomes more valuable as disruption severity rises, while JIT remains preferable under low-disruption conditions. Choi et al. (2023) advocate selective, segment-level JIT configuration rather than a wholesale JIT-to-JIC shift. Karatuğ (2026) found optimised-speed JIT reduced bulk-carrier fuel consumption by 6.21%, though complementary measures were needed to sustain gains, implying JIT benefits are context-fragile.

Sectoral applications. Several studies document JIT implementation in specific contexts: JIT berth-allocation reducing waiting time and emissions at a Portuguese seaport (Carvalho et al., 2026); a blockchain-based JIT system for construction supply chains (Wang et al., 2026); JIT pharmaceutical inventory management balancing holding costs against stockout risk (Herjuno et al., 2026); and JIT as a mechanism for waste reduction in coal production (Prostański et al., 2026). Using structured questionnaires with 324 construction professionals in Edo and Delta States, Nigeria, Albert et al. (2026) identified material logistics, supply-chain coordination, and

project conditions as principal barriers to JIT implementation in the Nigerian construction sector.

Technology and sustainability integration. Lima et al. (2025) found the performance consequences of combining JIT with digital technologies are contingent on alignment with existing JIT practices rather than uniformly positive. Singhal et al. (2025) reviewed the intersection of JIT, environmental sustainability, and Industry 4.0, concluding that Green-JIT remains comparatively underdeveloped relative to lean and quality-management research.

2.8 Research Gap

The literature indicates that JIT practices generally enhance operational and financial performance (Lara et al., 2022; Prashar, 2025; García-Cutrín & Rodríguez-García, 2024; Bashar et al., 2026; Shou et al., 2023; Agyabeng-Mensah et al., 2021). However, their effectiveness appears contingent on supply-chain disruption, with JIC or hybrid approaches becoming more suitable under severe disruptions (Yu et al., 2024; Choi et al., 2023; Potiker, 2026; Karatuğ, 2026). Importantly, existing studies have focused predominantly on large and formally structured organisations in manufacturing, banking, healthcare, seaports, and construction, with limited evidence from MSMEs in developing economies.

A key gap, therefore, is the absence of empirical evidence on JIT practices among MSMEs in North-East Nigeria, particularly Taraba State. MSMEs operate under distinctive constraints, including limited financial resources, weak supplier networks, informal systems, and infrastructural deficiencies, which may influence JIT implementation and its performance outcomes. These conditions are particularly relevant in Taraba State, where unreliable electricity, inadequate infrastructure, and security-related disruptions may affect the effectiveness of conventional JIT practices.

Thus, this study addresses the contextual and empirical gap by examining the implementation and performance implications of JIT practices among MSMEs in Taraba State, Nigeria.

3. Methodology

This study adopted a quantitative survey design to examine the relationship between Just-in-Time practices and MSME performance in Taraba State, Nigeria. The state, with a population of 2,294,800 (National Population Commission, 2006), was selected because of its concentration of MSMEs. The target population consisted of 953,821 MSME employees in Taraba State (SMEDAN & NBS, 2021).

The sample size was determined using the Yamane (1967) formula:

$n = N / (1 + N(e^2))$

where N = population size (953,821) and e = margin of error (0.05). This yielded n = 953,821 / (1 + 953,821 × 0.0025) = 953,821 / 2,385.55 ≈ 400 respondents.

Stratified systematic sampling was applied across five MSME-concentrated Local Government Areas — Jalingo, Wukari, Bali, Gembu, and Takum — selected to capture geographic diversity. MSME clusters were identified, and systematic sampling selected every k^{th} enterprise, with substitutes as needed. Of 400 questionnaires administered, 380 were valid (95% response rate), including 42% micro-enterprises, reflecting firm-size diversity.

Data were collected using a structured questionnaire on a five-point Likert scale ranging from "strongly disagree" to "strongly agree." The instrument included JIT awareness (5 items); three JIT sub-scales — purchasing, production, and selling (5 items each); and three performance sub-scales — cost reduction, product quality, and responsiveness (4 items each). A panel of five experts in operations management and MSME performance rated items for relevance on a 4-point scale. Item-level content validity indices (I-CVIs) were calculated as the proportion of experts rating items "3" or "4," and the scale-level CVI (S-CVI), averaged across all I-CVIs,

was 0.89, above the 0.80 benchmark (Lynn, 1986). Face validity was confirmed through MSME managers' feedback, with minor revisions made for clarity.

Reliability was assessed via an independent pilot study of 30 MSME employees, yielding Cronbach's alpha values between 0.791 and 0.889 across all constructs, above the 0.70 threshold and indicating satisfactory internal consistency (Nunnally & Bernstein, 1994).

Data analysis was conducted using SPSS (version 25), applying descriptive statistics to summarise responses and simple linear regression to test the study hypotheses. This study followed ethical research principles: informed consent was obtained from all participants, and anonymity and confidentiality were ensured through non-collection of personal identifiers and data aggregation.

4. Results and Discussion

4.1 Response Rate and Demographic Characteristics

Of 400 administered questionnaires, 380 were returned, representing a response rate of 95%. Table 1 presents the distribution of respondents' personal characteristics.

Characteristic	Category	Frequency	Percentage (%)
Gender	Male	206	54
	Female	174	46
Age	Less than 30 years	92	24
	30–40 years	171	45
	More than 40 years	117	31
Educational qualification	SSCE	100	26
	ND/NCE	173	46
	HND/Degree and above	107	28
Years in operation	Less than 5 years	60	16
	5–9 years	128	34
	10–15 years	119	31
	More than 15 years	73	19
Category of MSME	Furniture and wood processing	83	22
	Printing and publishing	70	18
	Catering and event management	75	20
	Artisan and cottage industries	67	18
	Agro-processing	85	22

Table 1. Distribution of personal characteristics of studied MSMEs (N = 380)
Source: Author's Computation,2026

The sample shows a relatively balanced gender distribution with a slight male majority (54%), suggesting reasonable female participation in MSMEs. Middle-aged entrepreneurs (30–40 years) dominate the sample (45%), consistent with experienced operators in their prime productive years. A majority of respondents hold intermediate-level education (46% ND/NCE), with 54% holding post-secondary qualifications, indicating moderate educational capacity. Most businesses (84%) have more than five years of operation, suggesting established operational stability, and the five MSME categories sampled are fairly evenly represented (18–22% each), supporting the generalizability of the findings across sub-sectors.

4.2 Descriptive Analysis of Key Variables

Table 2 summarises respondents' mean perceptions across seven dimensions: JIT awareness, purchasing, production, selling, cost reduction, product quality, and responsiveness, each measured on a five-point scale.

Construct	Mean	SD	Interpretation
JIT Awareness and Training	4.10	0.71	High — continuous process review rated highest (4.60)
JIT Purchasing (JITP)	4.21	0.66	High — minimal inventory, strong supplier relationships, technology use
JIT Production (JITPr)	4.37	0.64	High — work-in-process minimisation (4.58) and preventive maintenance (4.53) leading
JIT Selling (JITS)	4.42	0.73	High — delivery flexibility highest (4.82)
Cost Reduction	4.16	0.75	High — inventory-related savings highest (4.79); waste elimination lagged (3.51)
Product Quality	4.36	0.61	High — efficiency and quality control items highest (4.45)
Responsiveness	4.27	0.59	High — adaptability to customer preferences highest (4.70)

Table 2. Descriptive statistics of key study constructs (N = 380)
Source: Author's Computation,2026

Organisations demonstrated strong perceived JIT implementation across all dimensions. Purchasing practices were robust, featuring minimal inventory, strong supplier relationships, and effective technology use. Production processes scored highly, led by work-in-process minimisation and preventive maintenance. Selling practices were the most strongly rated dimension overall, driven by delivery-schedule flexibility. Cost reductions were notable, particularly inventory-related savings, although waste elimination lagged behind other cost items. Product quality and responsiveness were both rated highly, with the clearest gains reported in quality control and adaptability to shifting customer preferences.

4.3 Implementation Challenges

Table 3 presents the major challenges to JIT implementation identified by respondents.

Challenge	Respondents	Percentage (%)
Limited financial resources and credit access	126	33
External economic and policy challenges	115	30
Low technological adoption and digital readiness	52	14
Weak supplier and customer collaboration	32	8
Inadequate employee training and change management	30	8
Demand instability and market uncertainty	25	7

Table 3. Major challenges of JIT implementation in MSMEs (N = 380)
Source: Author's Computation,2026

Limited financial resources (33%) and external economic/policy constraints (30%) were the two dominant barriers, followed by low technological adoption (14%). Inadequate training and weak supplier–customer collaboration was each cited by 8% of respondents, and demand instability by 7%.

4.4 Hypotheses Testing

Simple linear regression was used to test each hypothesis, with results reported in accordance with APA conventions.

4.4.1 JIT Purchasing and Cost Reduction (H1)

Model	R	R^2	Adj. R^2	Std. Error	F (df1, df2)	Sig.	Durbin–Watson
JITP → Cost Reduction	0.653	0.426	0.424	0.572	281.543 (1, 378)	<.001	1.987

Table 4. Model summary — JIT purchasing and cost reduction

Predictor	B	SE	β	t	Sig.	Tolerance	VIF
(Constant)	1.523	0.142		10.725	<.001		
JIT Purchasing	0.612	0.036	0.653	16.779	<.001	0.574	1.742

Table 5. Regression coefficients — JIT purchasing and cost reduction
Source: Author's Computation,2026

JIT purchasing had a strong, positive, and statistically significant effect on cost reduction ($\beta = 0.653$, $t = 16.779$, $p < .001$), explaining 42.6% of the variance ($R^2 = 0.426$; adjusted $R^2 = 0.424$). The large effect size (Cohen's $f^2 = 0.742$) indicates both statistical and practical significance. The model was significant, $F(1, 378) = 281.543$, $p < .001$, and the Durbin–Watson statistic (1.987) indicates no problematic autocorrelation. **H01 is rejected.**

4.4.2 JIT Production and Product Quality (H2)

Model	R	R^2	Adj. R^2	Std. Error	F (df1, df2)	Sig.	Durbin–Watson
JITPr → Product Quality	0.173	0.030	0.027	0.598	11.676 (1, 378)	0.001	1.842

Table 6. Model summary — JIT production and product quality
Source: Author's Computation,2026

Predictor	B	SE	β	t	Sig.	Tolerance	VIF
(Constant)	3.561	0.183		19.459	<.001		
JIT Production	0.107	0.031	0.173	3.417	0.001	0.970	1.031

Table 7. Regression coefficients — JIT production and product quality
Source: Author's Computation,2026

JIT production had a statistically significant but practically weak positive effect on product quality ($\beta = 0.173$, $t = 3.417$, $p = .001$), explaining only 3.0% of the variance ($R^2 = 0.030$), with a small effect size (Cohen's $f^2 = 0.031$). Although the model was statistically significant, $F(1, 378) = 11.676$, $p = .001$, the large sample size ($N = 380$) may have contributed to detecting a trivial effect (Cohen, 1988). **H02 is rejected on statistical grounds, but the practical significance of the relationship is minimal and should be interpreted with caution.**

4.4.3 JIT Selling and Responsiveness (H3)

Model	R	R^2	Adj. R^2	Std. Error	F (df1, df2)	Sig.	Durbin–Watson
JITS → Responsiveness	0.387	0.150	0.147	0.542	66.565 (1, 378)	<.001	2.053

Table 8. Model summary — JIT selling and responsiveness
Source: Author's Computation,2026

Predictor	B	SE	β	t	Sig.	Tolerance	VIF
(Constant)	2.648	0.156		16.974	<.001		
JIT Selling	0.223	0.027	0.387	8.159	<.001	0.850	1.176

Table 9. Regression coefficients — JIT selling and responsiveness
Source: Author's Computation,2026

JIT selling had a moderate, positive, and statistically significant effect on responsiveness ($\beta = 0.387$, $t = 8.159$, $p < .001$), explaining 15.0% of the variance ($R^2 = 0.150$; adjusted $R^2 = 0.147$), with a medium effect size (Cohen's $f^2 = 0.176$). The model was significant, $F(1, 378) = 66.565$, $p < .001$, and the Durbin–Watson statistic (2.053) confirms the absence of autocorrelation. **H03 is rejected.**

4.4.4 Summary of Hypotheses Testing

Hypothesis	Path	β	t	Sig.	Decision
H01	JIT Purchasing → Cost Reduction	0.653	16.779	<.001	Rejected
H02	JIT Production → Product Quality	0.173	3.417	0.001	Rejected (weak practical effect)
H03	JIT Selling → Responsiveness	0.387	8.159	<.001	Rejected

Table 10. Summary of hypotheses testing results (decision rule: reject H0 when p < .05)
Source: Author's Computation,2026

4.5 Discussion of Findings

This study examined the effect of Just-in-Time (JIT) practices on the operational performance of MSMEs in Taraba State, Nigeria, grounded in the Resource-Based View (RBV). The findings reveal differential effects across JIT dimensions, offering insights into both the theoretical validity of RBV in resource-constrained contexts and the practical applicability of JIT systems among MSMEs in developing economies.

4.5.1 JIT Purchasing and Cost Reduction

The strong, significant effect of JIT purchasing on cost reduction ($\beta = 0.653$, $R^2 = 0.426$, $p < .001$) indicates that timely material procurement, minimal inventory holding, strong supplier relationships, and technology-enabled coordination together account for a substantial share of cost-reduction outcomes among Taraba State MSMEs, with a large effect size ($f^2 = 0.742$) affirming its practical as well as statistical significance.

This result aligns with the empirical literature. Alfi et al. (2025) similarly found JIT purchasing exerted the most pronounced effect among Total JIT components on operational performance in an Indonesian manufacturing firm. Mutua et al. (2021) reported that JIT procurement strategies significantly improved organisational performance in Nairobi's food and beverage sector ($\beta = 0.689$, $p = .001$), consistent in magnitude and direction with the present finding. Alzuod and Al-Odeh (2023) confirmed that supply management — a core component of JIT purchasing — positively influenced cost reduction and operational performance in a Jordanian manufacturing firm, and García-Cutrín and Rodríguez-García (2024) corroborated these findings meta-analytically, showing benefits are particularly pronounced in firms with strong procurement coordination. From an RBV perspective, JIT purchasing as practised in these MSMEs represents a relational capability embedded in buyer–supplier coordination routines that are socially complex and causally ambiguous, rendering them difficult for competitors to imitate (Dyer & Singh, 1998; Fullerton & McWatters, 2001). The high mean scores for supplier reliability and technology-enabled procurement reported in Table 2 corroborate the development of these strategic capabilities, suggesting that even resource-constrained MSMEs

in Taraba State can cultivate firm-specific procurement capabilities that yield tangible cost advantages — extending RBV boundary conditions to developing-economy MSMEs.

4.5.2 JIT Production and Product Quality

The statistically significant but practically weak effect of JIT production on product quality ($\beta = 0.173$, $R^2 = 0.030$, $p = .001$) presents a nuanced departure from prior studies reporting more robust links between JIT production and quality. Prashar's (2025) meta-analysis, spanning 59 studies and 17,008 observations across 18 countries, found JIT improves production efficiency, product quality, and waste reduction; Alzuod and Al-Odeh (2023) similarly found JIT components including material flow positively influenced product quality among Jordanian manufacturing employees. The comparatively weaker effect observed here may partly reflect contextual realities specific to Taraba State MSMEs. As shown in Table 3, limited financial resources (33%), low technological adoption (14%), and inadequate employee training (8%) constrain the effective development of JIT production capabilities, preventing the full realisation of pull-based production, continuous flow, and preventive maintenance practices that underpin quality improvement in more resource-endowed environments. Fullerton et al. (2003) specifically note that JIT production effectiveness depends on supportive infrastructure, process stability, and employee competence — conditions that remain underdeveloped in many Taraba State MSMEs — while Cohen and Levinthal (1990) note that heterogeneity in absorptive capacity may further constrain capability development among micro and small enterprises. Although respondents rated work-in-process minimisation and preventive maintenance highly, these internal operational practices have yet to translate into meaningful quality differentiation, possibly because quality outcomes in MSME contexts are also shaped by raw-material variability, equipment reliability, and customer demand consistency that fall outside production scheduling alone (Cua et al., 2001).

4.5.3 JIT Selling and Responsiveness

The moderate, significant effect of JIT selling on responsiveness ($\beta = 0.387$, $R^2 = 0.150$, $p < .001$) suggests that MSMEs that actively align sales and distribution with real-time customer demand, maintain delivery flexibility, and use order-management technologies achieve meaningfully superior responsiveness outcomes. This is consistent with Alfi et al. (2025), who found JIT selling significantly contributed to operational performance through enhanced demand responsiveness and customer coordination, and with Green and Inman (2005) and Green et al. (2008), who showed JIT selling strengthens long-term buyer–seller relationships and supply-chain integration. The descriptive findings support this pattern: delivery-schedule flexibility recorded the highest mean score across all selling items, and responsiveness to shifting customer preferences was also rated highly, indicating that customer-facing JIT capabilities are relatively well developed among the sampled MSMEs.

From the RBV perspective, this moderate effect reflects the development of dynamic capabilities enabling rapid adaptation to market fluctuations (Eisenhardt & Martin, 2000; Teece, 2007). Unlike JIT production, which relies heavily on internal infrastructure and technological investment, JIT selling capabilities are grounded in relational routines and market-orientation behaviours that may be more accessible to resource-constrained MSMEs. The finding that relational JIT capabilities — purchasing ($\beta = 0.653$) and selling ($\beta = 0.387$) — outperform the internal operational capability of production ($\beta = 0.173$) extends the theoretical boundaries of RBV to developing-economy MSMEs, suggesting that inter-firm relational assets may constitute a more practically attainable source of competitive advantage than capital-intensive process innovations for such enterprises.

4.5.4 JIT Implementation Challenges

Limited financial resources and credit access (33%) and external economic and policy challenges (30%) were the two dominant barriers to JIT implementation, followed by low technological adoption (14%), inadequate employee training (8%), and weak supplier–customer collaboration (8%). These findings align with the broader literature on JIT adoption challenges in developing-economy MSMEs: Dowlatshahi and Taham (2009) and Sebtaoui et al. (2020) identified management and knowledge-related issues, limited supplier cooperation, insufficient waste-reduction methodologies, inadequate capital, and poor training as recurring barriers, while the Caribbean Development Bank (2021) highlighted outdated infrastructure and unreliable utilities as additional obstacles in developing regions. Balkhi et al. (2022) further caution that resource-constrained lean systems become particularly vulnerable during supply-chain disruptions. Together, these findings suggest that the weak effect of JIT production on quality observed in this study is not merely a measurement artefact but likely reflects genuine implementation constraints that curtail the full realisation of production-oriented JIT benefits among Taraba State MSMEs.

4.6 Theoretical Implications

The findings support RBV, showing that JIT practices function as firm-specific capabilities that enhance cost reduction, quality, and responsiveness (Barney, 1991; Peng et al., 2008). Relational capabilities — JIT purchasing and selling — generate stronger performance advantages than internal production capabilities among resource-constrained MSMEs (Dyer & Singh, 1998), suggesting that relational assets may be a more attainable basis for competitive advantage than capital-intensive process innovation in such contexts. The limited impact of JIT production on quality underscores the need for complementary resources and capabilities before internal process capabilities can be expected to yield quality gains (Grant, 1991; Barney & Clark, 2007).

4.7 Practical Implications

For **MSME managers**, the findings suggest prioritising JIT purchasing for cost savings and JIT selling for responsiveness, while pursuing incremental, rather than wholesale, JIT production improvements given current infrastructural constraints. For **policymakers**, the findings point to a need for targeted financial support, improved infrastructure, and strengthened capacity-building programmes to enable MSMEs to realise the fuller benefits of JIT production specifically. For **development practitioners**, low-cost JIT training, facilitation of supplier–buyer networks, and support for accessible technology adoption would help address the specific barriers identified in Table 3.

5. Conclusion, Recommendations, Limitations and Future Research

5.1 Conclusion

This study examined the effect of JIT practices — purchasing, production, and selling — on MSME operational performance in Taraba State, Nigeria, using a quantitative survey of 380 employees and simple linear regression grounded in the Resource-Based View. Findings reveal differential effects: JIT purchasing strongly improved cost reduction ($\beta = 0.653$, $R^2 = 0.426$, $p < .001$); JIT selling moderately enhanced responsiveness ($\beta = 0.387$, $R^2 = 0.150$, $p < .001$); while JIT production had a statistically significant but practically negligible effect on product quality ($\beta = 0.173$, $R^2 = 0.030$, $p = .001$). Relational JIT capabilities outperformed internal operational capabilities in this resource-constrained context, extending RBV boundary conditions to developing-economy MSMEs. Limited financial resources (33%) and adverse economic conditions (30%) were the dominant implementation barriers. Overall, the findings affirm JIT's relevance for MSME performance while contributing context-specific evidence to

a literature previously dominated by large-firm studies in industrialised and formally structured economies.

5.2 Recommendations

For MSMEs:

• Prioritise supplier relationships to optimise JIT purchasing.
• Implement demand-responsive selling with flexible scheduling and real-time customer information.
• Adopt incremental JIT production improvements focused on waste reduction, standardisation, and preventive maintenance.
• Leverage peer networks and industry clusters for shared learning and capability development.

For government and policymakers:

• Provide targeted financing (low-interest loans, equipment leasing, grants) for JIT investments.
• Improve infrastructure, especially electricity and transport, to support operational efficiency.
• Develop integrated MSME support programmes combining finance, training, and technology access.
• Implement supplier-development initiatives to enhance reliability, quality, and delivery capabilities across the MSME ecosystem.

5.3 Limitations and Future Research

This study has limitations. The use of Small and Medium Enterprises Development Agency of Nigeria registration data may have excluded informal enterprises, and the five selected Local Government Areas do not cover all sixteen LGAs in Taraba State, limiting full state-level generalisation. The cross-sectional design restricts causal inference, and self-reported measures may introduce common method bias. The weak effect of JIT production on quality ($R^2 = 0.030$) suggests other factors, such as equipment and workforce capability, may be more influential than production scheduling alone.

Future research should employ longitudinal and mixed-method designs, examine sector-specific adaptations, explore moderating variables such as firm size and technology adoption, and incorporate digital-transformation perspectives to better capture contextual influences on JIT effectiveness among MSMEs.

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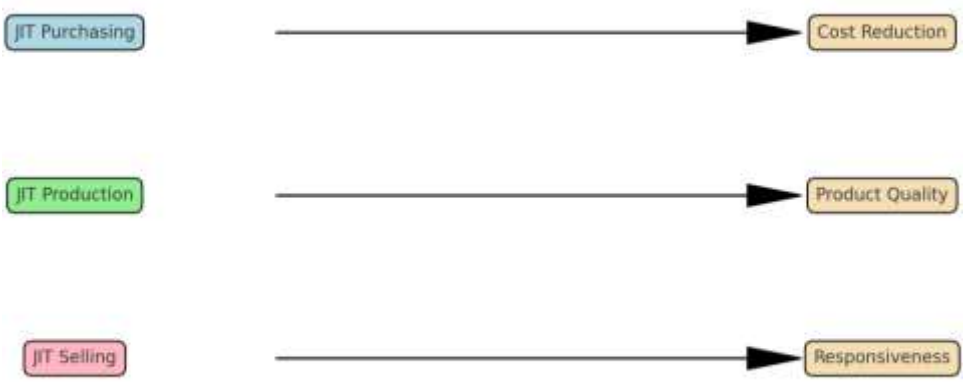
Appendix



Source: Study Model 2026