
STRATEGIC PARTNERSHIPS AND SUPPLY CHAIN RESPONSIVENESS: IMPLICATIONS FOR OPERATIONAL PERFORMANCE IN INDONESIA'S PETROCHEMICAL SECTOR



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Abstract

This research investigates the influence of strategic supplier partnerships and customer relationships on supply chain responsiveness and their subsequent impact on operational performance within Indonesia's petrochemical and plastic sectors. A quantitative approach using structural equation modeling was applied to data collected from 170 supply chain professionals. The results indicate that both strategic supplier partnerships and customer relationships significantly improve supply chain responsiveness, which positively drives operational performance. However, demand uncertainty weakens these relationships, reducing the effectiveness of collaborative practices under volatile market conditions. The findings extend the literature by demonstrating how demand uncertainty shapes the effectiveness of relational strategies in volatile emerging markets. The unique contribution of this study lies in empirically validating a moderated mediation model that integrates relational, capability based, and environmental perspectives, offering practical insights for enhancing supply chain resilience.

Keywords: Strategic Supplier Partnership; Customer Relationship; Supply Chain Responsiveness; Operational Performance; Demand Uncertainty

INTRODUCTION

Indonesia's petrochemical and downstream plastic industries are fundamental to supporting critical sectors such as automotive, construction, electronics, and packaging. Despite their strategic role, these industries face persistent structural challenges caused by heavy reliance on imported raw materials such as ethylene, propylene, and polyethylene combined with intensified competition from low cost plastic imports, particularly from China. According to the Ministry of Industry (2024), capacity utilization has fallen to approximately 50–60%, underscoring significant vulnerability to global volatility and limited domestic safeguards.

In this highly uncertain environment, the development of responsive and integrated supply chains has shifted from being an operational option to a strategic imperative. Contemporary supply chain management (SCM) extends beyond efficiency-driven objectives, emphasizing agility, integration, and real-time responsiveness to cope with fluctuating demand and external shocks (Mentzer et al., 2001; Lambert & Cooper, 2000). Two critical relational practices, strategic supplier partnerships and customer relationship management, are widely acknowledged for enhancing information sharing, collaboration, and coordination, thereby improving responsiveness and enabling firms to achieve operational performance targets related to cost, quality, and delivery reliability.

Although these linkages are well established in global studies, empirical research in resource-constrained, import-dependent economies remains limited. Furthermore, the role of demand uncertainty, which intensifies coordination complexity, has not been sufficiently examined in these contexts. Understanding how relational strategies interact with environmental volatility to shape supply chain responsiveness and operational outcomes is essential for both theory and practice.

This study uniquely contributes to the supply chain literature by introducing a moderated mediation model in a high volatility, import-reliant sector, a setting that remains underrepresented in prior research.

REVIEW OF LITERATURE

Supply Chain Management (SCM) is a strategic approach that integrates procurement, production, distribution, and customer service activities within a business network to create added value (Mentzer et al., 2001). Modern SCM goes beyond cost efficiency, emphasizing agility, visibility, and collaborative practices to manage external uncertainties (Lambert & Cooper, 2000). In the petrochemical sector, which is capital-intensive and import-dependent, SCM is critical for ensuring resilience and responsiveness (Christopher, 2016).

Strategic Supplier Partnership (SSP) refers to long-term relationships with suppliers built on trust, joint planning, information sharing, and collaborative problem solving (Li et al., 2006). Previous studies confirm that SSP significantly enhances Supply Chain Responsiveness (SCR) by creating stability and enabling quick decision-making (Letsoin et al., 2023).

Customer Relationship (CR) involves establishing long-term, trust-based interactions with customers through transparent communication and a deep understanding of their needs (Palmatier et al., 2006). Effective CR improves demand visibility and accelerates response to market changes (Nenavani & Jain, 2022).

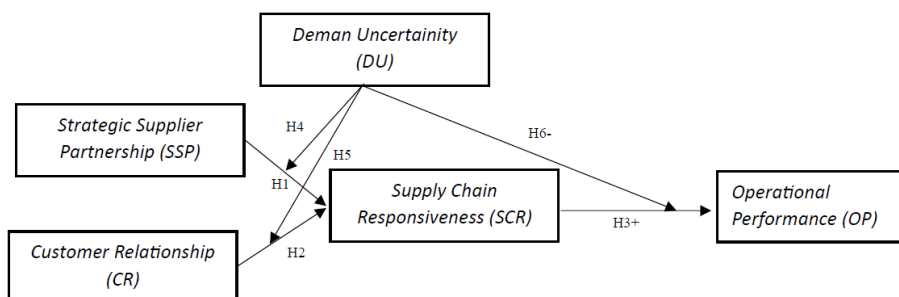
Supply Chain Responsiveness (SCR) is the capability of a supply chain to respond quickly and effectively to demand shifts and supply disruptions (Gunasekaran et al., 2008). Studies have identified SCR as a mediating factor between relational practices (SSP, CR) and operational outcomes (Letsoin et al., 2023).

Operational Performance (OP) reflects the efficiency and effectiveness of a company in achieving cost control, delivery reliability, and quality standards (Chavez et al., 2012). High SCR levels are associated with improved OP through faster cycle times and optimized resource allocation (Nenavani & Jain, 2022).

Demand Uncertainty (DU) refers to unpredictability in the volume, timing, and variation of customer orders (Merschmann & Thonemann, 2011). High DU complicates production and distribution planning, reducing the efficiency of collaborative strategies unless adaptive mechanisms are in place (Nenavani & Jain, 2022).

Previous Studies A review of prior research (Nenavani & Jain, 2022; Letsoin et al., 2023) reveals that while moderated mediation models have been examined globally, empirical studies in import-dependent emerging markets like Indonesia remain scarce.

Synthesis and Conceptual Framework, the literature suggests the following relationships: 1) Strategic Supplier Partnership (SSP) and Customer Relationship (CR) → improve Supply Chain Responsiveness (SCR) 2) Supply Chain Responsiveness (SCR) → enhances Operational Performance (OP) 3) Demand Uncertainty (DU) Strategic Supplier Partnership (SSP) → Supply Chain Responsiveness (SCR) and Customer Relationship (CR) → Supply Chain Responsiveness (SCR).



RESEARCH METHOD

This study adopts a quantitative, causal research design using Structural Equation Modeling (SEM) with SmartPLS to analyze the direct, indirect, and moderating effects among variables. The primary aim is to examine how Strategic Supplier Partnership (SSP) and Customer Relationship (CR) influence Supply Chain Responsiveness (SCR), which subsequently impacts Operational Performance (OP), under the moderating effect of Demand Uncertainty (DU).

The population consists of professionals working in Indonesian petrochemical and downstream plastics companies. These industries were selected for three main reasons: 1) The petrochemical and plastics sector is a key enabler for automotive, construction, packaging, and electronics, making its supply chain performance critical to the national economy. 2) High Import Dependency and Volatility Over 50% of raw materials such as ethylene, propylene, and polyethylene are imported, leading to greater vulnerability to global

price fluctuations and supply disruptions. 3) Underrepresentation in Previous Research While studies on SCM practices exist for general manufacturing, few have examined moderated mediation models in highly volatile, import-reliant sectors, especially in emerging markets.

The sampling technique used is purposive sampling, targeting supervisors and managers in procurement, supply chain, operations, and logistics functions, as these roles directly influence SSP, CR, SCR, and OP practices.

Sample size determination: Based on Hair et al. (2019), the minimum sample requirement is 5–10 times the number of indicators. With 24 indicators across all constructs, the sample size should be at least 120 respondents. This study collected data from 170 valid respondents, exceeding the minimum requirement.

The research model includes five constructs: 1) Independent Variables: Strategic Supplier Partnership (SSP), Customer Relationship (CR). 2) Mediating Variable: Supply Chain Responsiveness (SCR). 3) Dependent Variable: Operational Performance (OP), Moderating Variable: Demand Uncertainty (DU).

All indicators are measured using a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree). The indicators are adapted from validated instruments in prior studies (Li et al., 2006; Nenavani & Jain, 2022; Letsoin et al., 2023).

Table 1.
Research Constructs, Indicators, and Sources

Construct	Number of Indicators	Indicators (Example)	Source
Strategic Supplier Partnership (SSP)	4	Supplier involvement in planning, info sharing	Li et al. (2006)
Customer Relationship (CR)	5	Complaint handling, long-term relationship, openness	Li et al. (2006)
Supply Chain Responsiveness (SCR)	4	Flexibility, rapid response to order changes	Qrunfle & Tarafdar (2013)
Operational Performance (OP)	5	Quality, cost efficiency, on time delivery	Chavez et al. (2012)
Demand Uncertainty (DU)	6	Demand unpredictability, frequent rescheduling	Merschmann & Thonemann (2011)

Total Indicators: 24

Data were collected via an online survey distributed through Google Forms and direct distribution during company visits. Respondents were screened to ensure they held managerial or supervisory roles in supply chain-related departments. The analysis will follow a two-step approach using SEM with SmartPLS: Measurement Model (Outer Model): Validity and reliability tests (Factor Loadings ≥ 0.7 , Composite Reliability ≥ 0.7 , AVE ≥ 0.5). Structural Model (Inner Model): Path coefficient analysis, R^2 for predictive relevance, and bootstrapping for significance testing ($p < 0.05$). Moderation Test: Interaction term approach to test DU's moderating role on SSP \rightarrow SCR and CR \rightarrow SCR relationships.

RESULTS AND DISCUSSION

To present the findings more concisely, Table 2 summarizes the path coefficients (β), t-statistics, and p-values for each hypothesis.

Table 2.
Hypothesis Testing Results in systems, data analytics, and responsive operations to better navigate volatile demand conditions

Hypothesis	Path	β	t-statistic	p-value	Result
H1	SSP → SCR	1.176	8.478	<0.001	Supported
H2	CR → SCR	0.163	2.439	0.015	Supported
H3	SCR → OP	0.499	4.810	<0.001	Supported
H4	SSP × DU → SCR	0.022	6.657	<0.001	Supported (Moderating)
H5	CR × DU → SCR	0.002	2.711	0.007	Supported (Moderating)
H6	SCR × DU → OP	0.003	2.308	0.021	Supported (Moderating)

Note: An explicit summary of interaction terms and interpretation is presented in Table 3

Table 3.
Moderation Effect of Demand Uncertainty (DU)

Interaction	β	t-statistic	p-value	Interpretation
SSP × DU → SCR	0.022	6.657	<0.001	DU reduces the positive effect of SSP on SCR under high uncertainty
CR × DU → SCR	0.002	2.711	0.007	DU weakens CR's contribution to SCR responsiveness
SCR × DU → OP	0.003	2.308	0.021	DU dampens SCR's ability to drive OP

H1 and H2: Both strategic supplier partnerships and customer relationships significantly enhance supply chain responsiveness. However, SSP has a stronger effect compared to CR, reflecting the upstream dependency on imported raw materials in Indonesia's petrochemical sector. Supplier collaboration through joint planning and shared information becomes crucial for mitigating disruption risks.

H3: SCR strongly drives operational performance, aligning with prior studies (Nenavani & Jain, 2022; Letsoin et al., 2023). Responsive supply chains reduce cycle times, improve on-time delivery, and maintain cost efficiency even under market fluctuations.

H4 and H5, Why DU Weakens SSP and CR Effects: Despite the positive role of SSP and CR, their effectiveness diminishes as demand uncertainty rises. Possible explanations include: 1) Digital Capability Gaps: Limited adoption of real-time data sharing tools restricts the visibility required for quick adjustments. 2) Procurement Inflexibility: Import dependency and rigid contractual terms reduce agility in sourcing decisions. 3) Limited

Internal Responsiveness: Firms may lack integrated planning systems or agile production setups, preventing rapid responses despite strong external relationships.

H6: DU also reduces SCR's contribution to operational performance, suggesting that even responsive processes lose efficiency when market signals are highly volatile and unpredictable.

CONCLUSION

This study examined the influence of Strategic Supplier Partnership (SSP) and Customer Relationship (CR) on Supply Chain Responsiveness (SCR) and its subsequent impact on Operational Performance (OP) in Indonesia's petrochemical and plastics sector. Demand Uncertainty (DU) was introduced as a moderating variable, with key findings including: 1) SSP and CR significantly enhance SCR, with SSP having a stronger effect due to upstream supply dependency. 2) SCR positively affects OP, emphasizing the critical role of responsiveness in operational excellence. 3) DU weakens the positive impact of SSP and CR on SCR and reduces the strength of SCR's effect on OP, highlighting the vulnerability of relational strategies under high volatility.

This research contributes to the supply chain management literature by empirically validating a moderated mediation model that integrates relational, capability-based, and environmental perspectives within a high volatility, import-reliant context. Extending prior work (e.g., Nenavani & Jain, 2022) by demonstrating how demand uncertainty shapes the effectiveness of relational strategies in emerging markets. Highlighting SCR as a strategic capability that mediates relational practices and operational outcomes.

For practitioners, the results underscore that: 1) Supplier partnerships should involve structured joint planning, collaborative forecasting, and integrated risk management to strengthen SCR. 2) Customer relationships must go beyond transactional engagement toward real time information sharing and demand visibility through digital platforms. 3) Investments in digital supply chain technologies, such as ERP integration, predictive analytics, and real time tracking, are critical to mitigate the dampening effect of DU on responsiveness and performance.

This study is cross sectional and focuses exclusively on the petrochemical and plastics sector in Indonesia, which may limit generalizability. The analysis does not account for technological adoption or cultural factors in relationship management. Future research should explore longitudinal data or sectoral comparisons to better understand temporal effects and industry-specific dynamics. Further, integrating constructs such as digital integration, supply chain resilience, and agility would enrich the understanding of how firms adapt to uncertainty.

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