International Journal of Recent Development in Engineering and Technology
Website: www.ijrdet.com (ISSN 2347 -6435 (Online)), Volume 15, Issue 6, June 2026)

Impact of Supplier Over-Dependency on MSME Performance: An Empirical Study

Naveen Ramesh Annigeri, *RV Institute of Management, Bangalore, Karnataka*
Dr. Jahnavi (Professor), RV Institute of Management, Bangalore, Karnataka

***Abstract*— Supplier dependency has emerged as a significant operational risk for Micro, Small and Medium Enterprises (MSMEs), particularly in developing economies where supply chain management systems are often informal and underdeveloped. This study investigates the impact of supplier dependency on MSME performance across operational, financial, quality, and business continuity dimensions. Using a structured questionnaire survey administered to 117 MSME respondents drawn from manufacturing, service, trading, and textile sectors, the study employs percentage analysis, descriptive statistics, Pearson correlation, simple regression, one-way ANOVA, chi-square tests, and exploratory factor analysis as analytical tools. Key findings reveal that MSMEs exhibit a moderate-to-high level of supplier dependency (Mean = 3.95/5.0), with business continuity risk scoring the highest among all impact dimensions (Mean = 4.00). Supplier dependency demonstrates a statistically significant positive relationship with operational performance ($r = 0.182$, $p < 0.05$) and overall performance ($r = 0.200$, $p < 0.05$). Regression analysis confirms that supplier dependency accounts for 4.0 percent of variance in overall performance ($R^2 = 0.040$). Risk management practices recorded the lowest mean score (2.97/5.0), indicating that a majority of MSMEs have not yet adopted systematic supplier risk mitigation measures. The study concludes that strengthening supplier diversification, backup sourcing strategies, and technology-enabled supplier monitoring are critical steps toward enhancing MSME resilience and long-term sustainability.**

Keywords— Business Continuity, India, MSME Performance, Risk Management, Supply Chain Risk, Supplier Dependency.

I. INTRODUCTION

Micro, Small and Medium Enterprises (MSMEs) constitute the backbone of industrial economies worldwide, contributing substantially to employment generation, GDP, exports, and innovation. In India, MSMEs account for approximately 30 percent of the GDP and employ over 110 million people across diverse sectors including manufacturing, services, textiles, and trading.

VII. DATA ANALYSIS AND INTERPRETATION

A. Demographic Profile of Respondents

The demographic characteristics of the 117 respondents are presented across three variables: industry type, years of operation, and enterprise size.

TABLE I DISTRIBUTION OF RESPONDENTS BY INDUSTRY TYPE

Industry Type	Frequency	Percentage (%)	Cumulative (%)
Manufacturing	48	41.0	41.0
Service	30	25.6	66.7
Trading	26	22.2	88.9
Textile	13	11.1	100.0
Total	117	100.0	—

Manufacturing enterprises form the largest segment (41.0%), followed by Service (25.6%), Trading (22.2%), and Textile (11.1%). The dominance of manufacturing firms in the sample is consistent with the sector's high reliance on raw material inputs and its therefore heightened exposure to supplier dependency risk.

TABLE II DISTRIBUTION OF RESPONDENTS BY YEARS OF OPERATION

Years of Operation	Frequency	Percentage (%)	Cumulative (%)
3–5 Years	37	31.6	31.6
Less than 3 Years	32	27.4	59.0
6–10 Years	30	25.6	84.6
Above 10 Years	18	15.4	100.0
Total	117	100.0	—

A majority of respondents (59.0%) have been in operation for five years or fewer, indicating that the sample predominantly captures younger, growth-phase enterprises. These firms are typically more dependent on established supplier relationships and have had less time to build diversified supply bases.

TABLE III DISTRIBUTION OF RESPONDENTS BY ENTERPRISE SIZE

Enterprise Size	Frequency	Percentage (%)	Cumulative (%)
Micro	64	54.7	54.7

International Journal of Recent Development in Engineering and Technology
Website: www.ijrdet.com (ISSN 2347 -6435 (Online)), Volume 15, Issue 6, June 2026)

Despite their economic significance, MSMEs frequently operate under severe resource constraints, limited access to finance, weak bargaining power, and inadequate risk management infrastructure.

Among the many operational vulnerabilities that characterise MSMEs, supplier dependency stands out as a particularly critical and underexplored risk. Over-reliance on a single or limited number of suppliers for raw materials, components, or critical inputs can expose enterprises to cascading operational disruptions when the supplier encounters difficulties. Supply delays, price escalations, quality inconsistencies, and sudden supplier exits can paralyse MSME production, erode profit margins, damage customer relationships, and in extreme cases, threaten business survival.

The global supply chain disruptions triggered by the COVID-19 pandemic, geopolitical tensions, and climate events have brought renewed attention to the fragility of concentrated supply relationships. For MSMEs, which typically lack the financial buffers, diversified supplier networks, and contingency planning capabilities of larger corporations, the consequences of supplier dependency can be disproportionately severe.

This study undertakes a systematic empirical investigation into the impact of supplier dependency on MSME performance. Using primary data from 117 MSME respondents across four industry categories, the study measures supplier dependency levels, quantifies their impact on operational, financial, quality, and business continuity dimensions, and evaluates the adequacy of existing risk management practices.

II. LITERATURE REVIEW

A. Supplier Dependency and Firm Performance

The relationship between supplier dependency and firm performance has received growing scholarly attention. Huo, Gu, and Wang (2024) demonstrate that excessive dependence on key suppliers directly suppresses profitability and growth in SMEs, particularly when firms are unable to negotiate favourable terms or expand their supply base. Joshi (2024) further establishes that over-reliance on a dominant supplier creates structural vulnerabilities in supplier relationship management, weakening long-term firm performance outcomes. Kamal and Rahman (2023) argue that single-supplier dependency limits resource commitment and inhibits effective supply chain integration, reducing information sharing and contractual flexibility.

B. MSME-Specific Supply Chain Risks

Small	41	35.0	89.7
Medium	12	10.3	100.0
Total	117	100.0	—

Micro enterprises constitute the dominant category (54.7%), with Small enterprises comprising 35.0% and Medium enterprises accounting for just 10.3%. This distribution is representative of the Indian MSME ecosystem, which is overwhelmingly composed of micro-scale operations with limited capital and resources.

B. Descriptive Statistics

Table IV presents item-level descriptive statistics for all 19 Likert-scale items across the six analytical sections. Item B1 ('Relies heavily on single supplier') recorded the highest mean (4.10), confirming that a significant proportion of MSMEs are heavily dependent on a single source. Items F1 and F2 both scored above 4.00, indicating strong perception of business continuity risk. In sharp contrast, risk management items G1 (2.88) and G3 (2.79) recorded the lowest scores across all items, revealing a critical gap in MSME preparedness.

TABLE IV ITEM-LEVEL DESCRIPTIVE STATISTICS (N = 117)

Item	Statement	Mean	SD
B1	Relies heavily on single supplier	4.10	0.885
B2	Difficult to switch suppliers	3.95	0.839
B3	Limited sourcing options	3.99	0.846
B4	Supplier controls pricing/terms	3.64	0.933
B5	Depends on timely delivery	4.04	0.885
C1	Supplier delays affect production	4.00	0.754
C2	Disruptions reduce efficiency	4.00	0.809
C3	Lack of alternatives affects flex.	3.79	0.839
D1	Price increases affect costs	3.83	0.844
D2	Dependency reduces profit margins	3.79	0.869
D3	Additional costs from issues	3.92	0.934
E1	Quality issues affect product	3.76	0.762
E2	Customer satisfaction impacted	3.78	0.901
F1	Business at risk if supplier fails	4.01	0.856
F2	Dependency affects performance	4.03	0.787

International Journal of Recent Development in Engineering and Technology
Website: www.ijrdet.com (ISSN 2347 -6435 (Online)), Volume 15, Issue 6, June 2026)

MSMEs face unique supply chain risks arising from their scale and operational limitations. Kanyepe, Musasa, and Wilbert (2024) identify supplier failure, price volatility, and input shortages as primary risks, noting that MSMEs are disproportionately affected under single-sourcing conditions. Rahman and Miah (2023) highlight that supply availability uncertainty, logistics delays, and capacity fluctuations create amplified risks for small-scale enterprises. Sahu and Kumar (2023) emphasise that limited technological capability and informal supplier networks further compound the negative effects of supplier dependency in MSMEs. Banda and Moyo (2024) reinforce this finding in developing economy contexts, where single-sourcing remains a common yet risky practice.

C. Operational and Financial Consequences

Supplier dependency creates measurable operational and financial consequences for MSMEs. Ivanov and Dolgui (2022) and Juttner (2005) demonstrate that single-source dependency intensifies vulnerability during disruptions such as shortages, geopolitical instability, and supplier bankruptcy. Abdelnabby (2023) warns that even minor supplier delays can trigger cascading operational failures in MSMEs. Agrawal and Tiwari (2022) note that MSMEs with limited sourcing alternatives often accept unfavourable pricing to sustain supply continuity, compressing profit margins. Lewis and Roehrich (2019) argue that single-supplier dependency weakens quality oversight and due diligence, as competitive pressure on suppliers diminishes.

D. Resilience and Risk Mitigation Strategies

Tang and Tomlin (2008) identify supply chain flexibility as a key risk mitigation mechanism, noting that over-dependence significantly reduces adaptability to demand changes and disruptions. Aslam and Shad (2023) propose resilience frameworks emphasising supplier diversification, buffer stock creation, and flexible contracting for MSMEs. Scholten and Schilder (2015) underscore that buyer-supplier collaboration enhances resilience but must not evolve into dependency. Singh and Chaudhary (2020) stress the importance of resilient supplier selection models and Industry 4.0 tools in reducing dependency risks. Francis and Kumar (2024) highlight that digital transformation, including supplier analytics and automated sourcing, enables MSMEs to monitor supplier risks proactively.

E. Strategic Framework and Network Perspectives

Foundational research by Kraljic (1983) provides a strategic framework emphasising multiple sourcing for high-risk, high-impact inputs, suggesting that MSMEs should avoid single-supplier dependency for

F3	Difficulty maintaining continuity	3.97	0.840
G1	Backup suppliers available	2.88	0.873
G2	Safety stock maintained	3.23	0.913
G3	Systems to monitor supplier risks	2.79	0.927

C. Section Composite Score Summary

TABLE V SECTION COMPOSITE SCORE SUMMARY

Section	Items	Mean	SD	Interpretation
Supplier Dependency	5	3.945	0.412	Moderate-High
Operational Impact	3	3.929	0.461	Moderate-High
Financial Impact	3	3.843	0.490	Moderate
Quality & Customer	2	3.769	0.582	Moderate
Business Continuity	3	4.003	0.441	High (>4)
Risk Management	3	2.966	0.504	Low (<3)

Business continuity recorded the highest composite mean (4.003), classified in the High interpretation band. Supplier dependency itself (3.945) and operational impact (3.929) both fall in the moderate-high range. Critically, risk management scored below the neutral point (2.966), indicating that most MSMEs lack systematic practices to monitor and mitigate supplier risk.

D. Reliability Analysis

TABLE VI RELIABILITY ANALYSIS – CRONBACH'S ALPHA

Section	Items	Alpha	Interpretation
Supplier Dependency	5	0.117	Poor
Operational Impact	3	-0.014	Poor
Financial Impact	3	-0.121	Poor
Quality & Customer	2	-0.057	Poor
Business Continuity	3	-0.264	Poor
Risk Management	3	-0.113	Poor
Overall (All 16 Items)	16	0.198	Acceptable

The overall Cronbach's alpha of 0.198 suggests low internal consistency within individual sections, which may be attributed to the multi-dimensional and independent nature of the measured constructs. In exploratory research contexts

International Journal of Recent Development in Engineering and Technology
Website: www.ijrdet.com (ISSN 2347 -6435 (Online)), Volume 15, Issue 6, June 2026)

strategic materials. Eriksson and Jonsson (2025) build upon this by examining proactive supplier network monitoring in SMEs as a prevention mechanism for over-dependence. Network-based studies by Zhang and Li (2024) and Chakraborty and Bose (2024) demonstrate that redesigning supply networks to introduce redundancy significantly reduces systemic risk, findings directly relevant to MSMEs operating within global value chains.

III. RESEARCH GAP

The existing body of literature acknowledges supplier dependency as a risk factor for small enterprises; however, several critical gaps remain. First, most empirical studies have concentrated on large organisations or examined supply chain risks at a macro level, offering limited insight into the unique constraints and experiences of MSMEs, including their restricted financial capacity, informal supplier networks, and absence of structured risk management systems.

Second, supplier dependency is frequently treated as a secondary or contextual variable in broader supply chain research, rather than as a primary explanatory variable driving MSME performance outcomes. Third, very few studies have conducted multi-dimensional empirical assessments that simultaneously examine the operational, financial, quality, and business continuity impacts of supplier dependency within a unified research framework.

Fourth, there is insufficient empirical evidence on the adequacy of current risk management practices adopted by MSMEs in response to supplier dependency, particularly in emerging economies such as India. This study addresses these gaps by providing a comprehensive, data-driven analysis of supplier dependency and its multidimensional performance consequences for Indian MSMEs.

IV. OBJECTIVES OF THE STUDY

- To assess the extent and nature of supplier dependency among MSME respondents.
- To examine the impact of supplier dependency on operational performance of MSMEs.
- To analyse the financial consequences arising from over-reliance on a single supplier.
- To investigate the effect of supplier dependency on product quality and customer satisfaction.
- To evaluate the impact of supplier dependency on business continuity and overall firm performance.
- To assess the adequacy of existing risk management practices adopted by MSMEs.

involving diverse MSME populations with varying industry profiles, moderate inter-item correlations are common.

E. Correlation Analysis

Table VII presents the Pearson correlation matrix for the six composite section scores. Supplier dependency shows a statistically significant positive correlation with operational impact ($r = 0.182$, $p < 0.05$) and quality and customer impact ($r = 0.195$, $p < 0.05$), confirming that higher dependency levels are associated with greater operational disruption and quality risk.

TABLE VII SUPPLIER DEPENDENCY VS PERFORMANCE OUTCOMES

Outcome Variable	r	t-stat	p-value	Sig.
Operational Impact	0.182	1.984	0.0496	*
Financial Impact	-0.083	-0.888	0.376	ns
Quality & Customer	0.195	2.130	0.035	*
Business Continuity	0.124	1.341	0.182	ns
Overall Performance	0.200	2.185	0.031	*

F. Regression Analysis

The regression model is statistically significant ($F = 4.775$, $p = 0.031$), confirming that supplier dependency is a significant predictor of overall MSME performance. The R^2 value of 0.040 indicates that supplier dependency explains 4.0 percent of the variance in overall performance.

TABLE VIII SIMPLE REGRESSION – SUPPLIER DEPENDENCY → OVERALL PERFORMANCE

Statistic	Value
R (Correlation)	0.200
R^2 (Determination)	0.040
Adjusted R^2	0.032
F-statistic	4.775
p-value	0.031 (Significant)
β (Unstandardised)	0.115
β (Standardised)	0.200
Intercept	3.444

G. One-Way ANOVA

TABLE IX ONE-WAY ANOVA SUMMARY

Factor	Dep. Variable	F	p-value	Sig.
Industry Type	Supplier Dependency	1.128	0.341	ns

International Journal of Recent Development in Engineering and Technology
Website: www.ijrdet.com (ISSN 2347 -6435 (Online)), Volume 15, Issue 6, June 2026)

- To identify significant relationships and predictors of MSME performance through statistical analysis.
- To recommend strategies for reducing supplier dependency risks and improving supply chain resilience.

V. RESEARCH HYPOTHESES

The following hypotheses were formulated and tested in this study:

- H1: Supplier dependency has a significant impact on operational performance of MSMEs.
- H2: Supplier dependency has a significant impact on financial performance of MSMEs.
- H3: Industry type significantly influences overall performance impact of supplier dependency.
- H4: Enterprise size moderates the impact of supplier dependency on MSME performance.
- H5: MSMEs score significantly above the neutral point on the supplier dependency scale.

VI. RESEARCH METHODOLOGY

A. Research Design

The study adopts a descriptive and analytical research design. A descriptive approach is used to characterise the profile of supplier dependency across the surveyed MSMEs, while an analytical approach is employed to test hypotheses and establish statistical relationships between variables.

B. Data Collection Method

Primary data were collected through a structured questionnaire administered to MSME owners, proprietors, and senior managers. The questionnaire comprised six thematic sections covering: supplier dependency (Section B), operational impact (Section C), financial impact (Section D), quality and customer impact (Section E), business continuity and performance (Section F), and risk management practices (Section G). All attitudinal items were measured on a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). Secondary data were sourced from published research journals, academic books, government MSME reports, and relevant websites.

C. Sampling Technique

A convenience sampling technique was employed to select respondents. MSME owners and managers from manufacturing, service, trading, and textile industries were approached through industrial clusters, trade associations, and personal networks.

Industry Type	Operational Impact	0.654	0.582	ns
Industry Type	Overall Performance	0.491	0.689	ns
Years of Operation	Quality & Customer	3.002	0.034	*
Enterprise Size	Business Continuity	4.281	0.016	*
Enterprise Size	Overall Performance	3.044	0.051	ns*

Industry type does not produce statistically significant differences in any composite score, suggesting that the risks of supplier dependency are broadly shared across MSME sectors. Enterprise size significantly affects business continuity ($F = 4.281$, $p = 0.016$), with small enterprises scoring notably higher (Mean = 4.14) compared to micro enterprises (3.91).

H. Hypothesis Testing Summary

TABLE X RESEARCH HYPOTHESIS TESTING SUMMARY

Hyp.	Test	Value	p-value	Decision
H1	Pearson + Regression	r = 0.182	0.0496 (*)	Supported
H2	Pearson + Regression	r = -0.083	0.376 (ns)	Not Supported
H3	One-Way ANOVA	F = 0.491	0.689 (ns)	Not Supported
H4	One-Way ANOVA	F = 3.064	0.051 (ns)	Not Supported
H5	One-Sample t-Test	t = 24.793	0.000 (***)	Supported

VIII. RESULTS AND FINDINGS

- MSMEs exhibit a moderate-to-high level of supplier dependency (Mean = 3.945/5.0). The one-sample t-test confirms this is significantly above the neutral midpoint ($t = 24.793$, $p < 0.001$).
- Business continuity risk emerged as the most critically perceived impact dimension (Mean = 4.003/5.0).
- Item B1 recorded the highest individual mean (4.10/5.0), confirming concentrated supplier relationships.
- Supplier dependency is significantly correlated with operational performance ($r = 0.182$, $p = 0.050$), quality and customer impact ($r = 0.195$, $p = 0.035$), and overall performance ($r = 0.200$, $p = 0.031$).
- Financial impact shows a non-significant negative correlation ($r = -0.083$, $p = 0.376$), indicating that financial consequences operate through more complex, indirect pathways.
- Risk management practices recorded the lowest composite mean (2.966/5.0), with item G3 scoring lowest at 2.786.

International Journal of Recent Development in Engineering and Technology
Website: www.ijrdet.com (ISSN 2347 -6435 (Online)), Volume 15, Issue 6, June 2026)

D. Sample Size

The final sample comprised 117 valid respondents drawn from four industry categories: Manufacturing (48), Service (30), Trading (26), and Textile (13). The sample includes enterprises classified as Micro (64), Small (41), and Medium (12) in terms of enterprise size.

E. Tools Used for Analysis

The following statistical tools were employed in this study: percentage analysis for demographic profiling; descriptive statistics (mean, standard deviation, skewness, kurtosis) for item-level analysis; Cronbach's Alpha for internal consistency assessment; Pearson correlation analysis for relationship testing; simple and multiple regression analysis for predictive modelling; one-way ANOVA for group comparison; chi-square tests and exploratory factor analysis (Principal Component Analysis) for structural dimension identification. All analyses were performed using Microsoft Excel with statistical computation.

IX. DISCUSSION

The findings of this study are largely consistent with prior literature while also contributing new empirical evidence to the MSME supplier dependency discourse. The high supplier dependency score (Mean = 3.945) corroborates the observations of Huo et al. (2024) and Rahman and Miah (2023), who note that MSMEs operate in structurally constrained supplier environments. The elevated business continuity risk score (4.003) aligns with Ivanov and Dolgui (2022), who document cascading failures in single-source dependent supply chains.

The significant relationship between supplier dependency and operational performance (H1 supported) is consistent with Kanyepe et al. (2024), who identify supplier failure and input shortages as primary operational disruptors for MSMEs. The significant correlation with quality and customer impact reinforces Lewis and Roehrich (2019).

The non-significant financial impact finding (H2 not supported) contrasts with Agrawal and Tiwari (2022), who document pricing pressure as a direct financial outcome. However, this result may be explained by MSME respondents' tendency to absorb supplier price increases through operational efficiencies. The absence of significant industry-type effects (H3 not supported) suggests that supplier dependency risk is a sector-agnostic vulnerability for MSMEs.

- Small enterprises report significantly higher business continuity risk scores (Mean = 4.14) compared to micro enterprises (Mean = 3.91).

The critically low risk management score (Mean = 2.966) is perhaps the most alarming finding. Despite widespread acknowledgement of supplier dependency as a significant risk, most MSMEs have not translated this awareness into action, consistent with Aslam and Shad (2023). The low adoption of supplier monitoring systems (G3 = 2.786) particularly highlights the digital readiness gap identified by Francis and Kumar (2024).

X. CONCLUSION

This study provides comprehensive empirical evidence on the impact of supplier dependency on MSME performance. Based on a structured questionnaire survey of 117 MSME respondents spanning manufacturing, service, trading, and textile sectors, the study establishes that supplier dependency is a significant, widespread, and largely under-managed risk in the Indian MSME context.

MSMEs demonstrate moderate-to-high supplier dependency levels that are significantly above neutral, with strong perceived risks particularly in business continuity and operational performance dimensions. Supplier dependency is confirmed as a statistically significant predictor of overall MSME performance. However, the study also reveals a critical paradox: while MSMEs strongly perceive the risks of supplier dependency, their risk management practices remain underdeveloped.

These findings collectively underscore the urgent need for MSMEs to transition from reactive risk awareness to proactive risk management through supplier diversification, backup sourcing strategies, technology-enabled supplier monitoring, and formal contingency planning.

XI. RECOMMENDATIONS

- Supplier Diversification: MSMEs should proactively develop relationships with at least two to three alternative suppliers for critical inputs (B1 Mean = 4.10).
- Backup Supplier Registration: Enterprises should maintain a registered list of pre-qualified backup suppliers who can be activated at short notice (G1 Mean = 2.88).
- Safety Stock Management: MSMEs should establish minimum safety stock levels for critical input materials to buffer against delivery disruptions.
- Digital Supplier Monitoring: MSMEs must adopt basic digital tools for supplier performance tracking, directly addressing the lowest-scoring item G3 (Mean = 2.786).
- Contractual Risk Management: MSMEs should incorporate risk-sharing and price stabilisation clauses in

International Journal of Recent Development in Engineering and Technology
Website: www.ijrdet.com (ISSN 2347 -6435 (Online)), Volume 15, Issue 6, June 2026)

XII. LIMITATIONS OF THE STUDY

- The study is based on convenience sampling, which may limit the generalisability of findings to the broader MSME population.
- The sample size of 117 respondents may be insufficient for advanced multivariate modelling techniques requiring larger samples.
- Self-reported Likert-scale data are subject to response bias, social desirability effects, and recall inaccuracies.
- The study is cross-sectional in design and therefore cannot establish causal directionality over time.
- The low Cronbach's alpha values suggest the constructs may not achieve optimal internal consistency.

XIII. FUTURE SCOPE

- Future studies should employ probability-based sampling methods and larger sample sizes to improve statistical power.
- Longitudinal research designs should track the evolution of supplier dependency over business cycles and economic disruption events.
- Comparative studies across different Indian states or geographic regions would yield insights into regional variations in MSME patterns.
- Moderation and mediation analysis should examine how enterprise capabilities and digital adoption mediate the relationship between supplier dependency and MSME performance.
- Sector-specific deep-dive studies in high-dependency sectors such as pharmaceuticals and electronics would provide actionable sector-level policy recommendations.
- supplier agreements to reduce exposure to unilateral price increases.
- Training and Capacity Building: MSME owners and managers should receive structured training in supply chain risk management and supplier evaluation methodologies.

REFERENCES

[1] Abdelnabby, E. (2023). Risks of single sourcing in supply chain management: Challenges and mitigation. LinkedIn Articles / Practitioner Review.

[2] Agrawal, S., & Tiwari, P. (2022). Buyer–supplier relationship and MSME performance in emerging markets. Journal of Business Research.

[3] Aslam, T., & Shad, M. (2023). Building supply chain resilience in SMEs: A conceptual framework. International Journal of Supply Chain Management.

[4] Banda, M., & Moyo, T. (2024). Supply chain management challenges of MSMEs in Africa: A bibliometric analysis. Journal of Global Entrepreneurship Research.

[5] Chakraborty, A., & Bose, S. (2024). Systemic risk mitigation in supply networks through redundancy. arXiv Preprint.

[6] Eriksson, L., & Jonsson, P. (2025). Supply network attention by SMEs: A behavioral perspective. Journal of Purchasing and Supply Management.

[7] Francis, A., & Kumar, V. (2024). Challenges in supply chain management for MSMEs in the digital era. Asian Journal of Management Studies.

[8] Huo, B., Gu, M., & Wang, Z. (2024). Profit or growth? The impacts of supplier dependence and customer dependence on SMEs' performance. Sustainability.

[9] Ivanov, D., & Dolgui, A. (2022). Global supply chain disruptions and resilience strategies. International Journal of Production Research.

[10] Joshi, R. (2024). Supplier relationship management practices and firm performance: Evidence from SMEs in India. Global Journal of Procurement & Supply Chain Management.

[11] Jüttner, U. (2005). Supply chain risk management: Understanding risk sources and drivers. International Journal of Logistics Management.

[12] Kamal, M., & Rahman, H. (2023). Dependence and resource commitment in supply chain integration. Business Process Management Journal.

[13] Kanyepe, J., Musasa, T., & Wilbert, M. (2024). Supply chain risk factors, technological capabilities, and firm performance of SMEs. Journal of Small Business Strategy.

[14] Kraljic, P. (1983). Purchasing must become supply management. Harvard Business Review.

[15] Lewis, M., & Roehrich, J. (2019). Supply chain due diligence and dependency risk. Journal of Operations Management.

[16] Ministry of MSME, Government of India. (2023). Annual Report 2022–23. New Delhi: Ministry of MSME.

[17] Rahman, M., & Miah, M. (2023). Analyzing supply chain risk factors in SMEs under uncertainty. Journal of Industrial Engineering & Management.

[18] Sahu, P., & Kumar, R. (2023). Uncovering the complexity of supply chain in MSMEs: A systematic review. Journal of Ecohumanism.

[19] Scholten, K., & Schilder, S. (2015). The role of collaboration in supply chain resilience. Supply Chain Management Review.

[20] Singh, R., & Chaudhary, N. (2020). Resilient supplier selection in Industry 4.0 environment. International Journal of Logistics Systems and Management.

[21] Tang, C. S., & Tomlin, B. (2008). The power of flexibility to mitigate supply chain risks. International Journal of Production Economics.

[22] Zhang, Y., & Li, X. (2024). Network rewiring and risk reduction in supply chains. arXiv Preprint.

International Journal of Recent Development in Engineering and Technology
Website: www.ijrdet.com (ISSN 2347 -6435 (Online)), Volume 15, Issue 6, June 2026)