# Optimizing Supply Chain Practices in Unorganized Machine Tool Retail: Challenges, Collaboration, and Performance Enhancement

**Ravi K. Vaghela**
Research Scholar,
B.K. School of Professional and Management Studies,
Gujarat University,
Ahmedabad, India

**Dr. Mamta Brahmbhatt**
Associate Professor,
B.K. School of Professional and Management Studies,
Gujarat University,
Ahmedabad, India

## Abstract

The unorganized machine tool retail sector forms a vital component of India's industrial supply ecosystem, particularly in manufacturing-intensive states such as Maharashtra. Despite its importance, the sector continues to suffer from persistent supply chain inefficiencies arising from informal operating structures, fragmented supplier relationships, limited inventory discipline, and uneven digital adoption. This study examines prevailing supply chain practices among unorganized machine tool retailers in Maharashtra and analyzes how collaboration, inventory management, and technology usage influence supply chain agility, operational performance, business growth, and retailer satisfaction.

Based on primary survey data collected from unorganized retailers across key industrial locations in Maharashtra, the study finds that stronger supplier collaboration, systematic inventory practices, and pragmatic digital adoption significantly enhance supply chain agility and operational effectiveness. The results provide actionable insights for improving performance and resilience in unorganized industrial retail supply chains and contribute empirical evidence to an under-researched area within supply chain and retail management literature.

**Keywords:** Unorganized Retail, Supply Chain Practices, Machine Tool Retail, Supply Chain Agility, Operational Performance

## 1. Introduction

The machine tool industry serves as a backbone for manufacturing, maintenance, and repair activities, supporting sectors such as automotive, engineering, fabrication, and small-scale industrial production. In India, a substantial proportion of machine tool distribution occurs through unorganized retail outlets that operate with limited formalization, particularly in

industrially developed states like Maharashtra. These retailers play a crucial intermediary role by connecting manufacturers and distributors with workshops, small factories, and individual industrial users.

However, unorganized machine tool retailers face significant operational challenges stemming from fragmented supply chains, reliance on informal supplier relationships, lack of systematic inventory management, and constrained access to advanced digital technologies. These constraints often result in stockouts, delayed deliveries, higher operating costs, and inconsistent customer service.

While organized retail and manufacturing supply chains have been extensively studied, empirical research focusing on unorganized industrial retail remains limited. This study seeks to address this gap by examining supply chain practices in unorganized machine tool retail in Maharashtra and analyzing their impact on agility, performance, and business outcomes.

## Objectives of the Study

1. To examine the influence of key supply chain practices—supplier collaboration, inventory management, and digital technology usage—on supply chain agility among unorganized machine tool retailers in Maharashtra.
2. To analyze the relationship between supply chain agility and operational performance in unorganized machine tool retail supply chains.
3. To assess the impact of operational performance on business growth perceptions and overall retailer satisfaction in the unorganized machine tool retail sector.

---

## 2. Review of Literature

The unorganized retail sector has long been recognized as a critical component of emerging economies, particularly in countries like India where small, independently owned retail enterprises dominate industrial distribution channels. Prior research in supply chain management emphasizes that unorganized retailers operate under conditions of limited formalization, constrained resources, and high dependence on interpersonal relationships. In industrial retail contexts such as machine tool distribution, these constraints are further intensified by product variety, technical complexity, and fluctuating demand patterns.

Existing studies suggest that supply chain inefficiencies in unorganized retail stem primarily from weak coordination mechanisms, inadequate inventory planning, and limited use of information technology. Unlike organized retail chains that rely on integrated information systems and standardized processes, unorganized retailers often depend on experience-based decision-making and informal supplier arrangements. While such arrangements provide flexibility, they also expose retailers to risks related to stockouts, delayed replenishment, and supplier unreliability.

The literature also highlights the growing relevance of collaboration and agility as strategic responses to environmental uncertainty. Collaborative relationships with suppliers, characterized by trust and long-term orientation, have been shown to enhance responsiveness and operational continuity in small business settings. Similarly, even modest adoption of digital tools—such as electronic payments and basic inventory tracking—has been associated with improvements in coordination and service performance. Overall, prior research indicates that agility acts as a key mechanism linking supply chain practices to operational efficiency, growth, and managerial satisfaction, particularly in informal and resource-constrained retail environments.

## GAP

Existing supply chain research largely concentrates on organized retail and manufacturing sectors, leaving **unorganized industrial retail**, particularly machine tool retail, empirically underexplored. There is limited understanding of how unorganized retailers manage supply chain practices under informal and resource-constrained conditions. Moreover, prior studies inadequately explain **how supply chain agility mediates the relationship between operational practices and performance outcomes** in such settings. Additionally, there is a scarcity of **primary, practice-level data** capturing the real operational realities of unorganized industrial retailers. This study addresses these gaps by providing empirical evidence on supply chain practices, agility, and performance outcomes among unorganized machine tool retailers in Maharashtra.

---

# 3. Research Methodology

## 3.1 Research Design

The study adopts a descriptive and empirical research design and forms part of a broader doctoral research effort. The focus is on understanding existing supply chain practices and analyzing their relationship with performance outcomes in unorganized machine tool retail.

## 3.2 Study Area and Sample

The empirical investigation is confined to the Mumbai metropolitan region, one of India's largest industrial and commercial hubs with a dense concentration of machine tool retailers and industrial customers. The study is based on a sample of **50 unorganized machine tool retailers** operating across major industrial markets and commercial areas of Mumbai. The sample comprises small, owner-managed retail establishments that function independently and are not affiliated with organized retail chains.

The empirical investigation is confined to the state of Maharashtra, which hosts a large concentration of industrial clusters and machine tool markets. Data were collected from unorganized machine tool retailers operating in cities such as Mumbai, Pune, Nashik, Kolhapur, Aurangabad, and surrounding industrial belts. The sample primarily consists of small, owner-

managed retail establishments catering to a mixed customer base that includes industrial units, workshops, and individual buyers.

### 3.3 Data Collection

Primary data were collected from **75 respondents** using a structured questionnaire administered through personal visits and assisted interviews to ensure clarity and response accuracy. The respondents included shop owners or senior managers directly involved in procurement, inventory decisions, and customer servicing. The questionnaire captured perceptions related to supplier relationships, inventory practices, technology usage, supply chain responsiveness, operational performance, business growth, and overall business satisfaction. Responses were recorded on a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

Primary data were collected using a structured questionnaire administered through personal visits and assisted responses. The questionnaire captured retailer perceptions on supplier relationships, inventory practices, technology usage, responsiveness, operational efficiency, business growth, and overall satisfaction. Responses were recorded on a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

### 3.4 Data Analysis Approach

The collected data were subjected to systematic analysis using standard statistical techniques appropriate for descriptive and relational research. The analysis focused on summarizing retailer characteristics, identifying prevailing supply chain practices, and examining observed relationships between practices, agility, and performance outcomes.

---

## 4. Data Analysis and Results

### 4.1 Respondent Profile and Business Characteristics

The study is based on responses from 50 unorganized machine tool retailers operating across major industrial clusters in Maharashtra. The majority of respondents were owner-managed establishments with limited workforce strength and informal operational structures.

Years of Business Operation

| Years in Operation | Percentage (%) |
|---|---|
| Less than 5 years | 18 |
| 5–10 years | 42 |
| Above 10 years | 40 |

Interpretation:

A significant proportion (82%) of retailers have been operating for more than five years, indicating that despite operational constraints, unorganized machine tool retailers demonstrate business continuity and experiential learning. This supports the argument that performance in this sector is driven more by relational and experiential capabilities than by formal systems.

---

## 5.2 Descriptive Statistics of Core Constructs

Descriptive Statistics of Study Variables

| Construct | Mean | Std. Deviation |
|---|---|---|
| Supplier Collaboration | 3.81 | 0.59 |
| Inventory Management Discipline | 3.44 | 0.65 |
| Digital Technology Usage | 3.21 | 0.71 |
| Supply Chain Agility | 3.66 | 0.56 |
| Operational Performance | 3.73 | 0.53 |
| Business Growth Perception | 3.48 | 0.62 |
| Retailer Satisfaction | 3.86 | 0.55 |

Interpretation:

Mean values indicate moderately strong agreement across all constructs, with supplier collaboration and retailer satisfaction scoring highest. The relatively lower mean for digital technology usage reflects selective and functional adoption rather than integrated system use. The narrow standard deviations indicate acceptable response consistency, enhancing the reliability of findings.

---

## 5.3 Supplier Collaboration Practices

Supplier Collaboration Response Distribution

| Likert Scale | Percentage (%) |
|---|---|
| Strongly Disagree | 2 |
| Disagree | 10 |
| Neutral | 20 |
| Agree | 46 |
| Strongly Agree | 22 |

Interpretation:

Nearly 68% of respondents agree or strongly agree that they maintain strong collaborative relationships with suppliers. This highlights the dominance of trust-based, informal coordination mechanisms in unorganized machine tool retail. Such collaboration enables flexible credit terms, expedited deliveries, and alternative sourcing during supply disruptions, compensating for the absence of formal contracts or digital integration.

---

## 5.4 Inventory Management Practices

Level of Inventory Management Discipline

| Inventory Practice Level | Percentage (%) |
|---|---|
| Very Weak | 8 |
| Weak | 20 |
| Moderate | 34 |
| Good | 26 |
| Very Good | 12 |

Interpretation:

Inventory management practices show greater dispersion compared to collaboration. While 38% of retailers exhibit good or very good discipline, a substantial proportion still relies on intuition-based stocking decisions. This variation explains differences in stock availability, emergency procurement, and customer service reliability across retailers. The findings suggest that even modest improvements in inventory discipline can yield tangible operational benefits.

---

## 5.5 Digital Technology Usage

Mean Scores of Digital Technology Adoption Areas

| Digital Usage Area | Mean |
|---|---|
| Digital Payment Systems | 4.15 |
| Mobile Communication with Suppliers | 3.92 |
| Digital Record Keeping | 3.05 |
| Inventory Software / Tools | 2.42 |

Interpretation:

Retailers show high adoption of transaction-oriented digital tools such as digital payments, reflecting external pressures and customer expectations. However, adoption of inventory-related digital systems remains low. This pattern confirms that digitalization in unorganized retail is utility-driven rather than strategy-driven, supporting the view that technology acts as an enabler rather than a primary performance driver.

---

## 5.6 Supply Chain Agility

Supply Chain Agility Dimensions

| Agility Dimension | Mean |
|---|---|
| Responsiveness to Demand Changes | 3.64 |

| Agility Dimension | Mean |
|---|---|
| Ability to Source Alternatives | 3.76 |
| Speed of Order Fulfillment | 3.58 |

Interpretation:

Retailers demonstrate relatively stronger agility in sourcing flexibility than in predictive responsiveness. This reflects a reactive agility model, where retailers rely on supplier networks and market knowledge rather than formal forecasting systems. Such agility is particularly critical in machine tool retail, where demand is irregular and customer requirements are often urgent.

---

## 5.7 Relationship Between Supply Chain Practices and Performance

Pearson Correlation Matrix

| Variables | Collaboration | Inventory | Digital | Agility | Performance |
|---|---|---|---|---|---|
| Supplier Collaboration | 1.00 | | | | |
| Inventory Management | 0.46 | 1.00 | | | |
| Digital Technology Usage | 0.39 | 0.50 | 1.00 | | |
| Supply Chain Agility | 0.64 | 0.58 | 0.47 | 1.00 | |
| Operational Performance | 0.56 | 0.62 | 0.45 | 0.69 | 1.00 |

Interpretation:

All correlations are positive and moderate, indicating theoretically sound relationships without multicollinearity concerns. Supply chain agility exhibits the strongest relationship with operational performance ($r = 0.69$), empirically validating its mediating role. Inventory management also shows a strong association with performance, underscoring its operational significance even in informal settings.

---

## 5.8 Performance Outcomes: Business Growth and Satisfaction

Agreement Levels on Performance Outcomes

| Outcome Variable | Agree + Strongly Agree (%) |
|---|---|
| Improved Order Fulfillment | 74 |
| Reduced Customer Complaints | 70 |
| Confidence in Business Growth | 66 |
| Overall Business Satisfaction | 80 |

Interpretation:

High satisfaction levels suggest that unorganized retailers prioritize operational stability and reliability over aggressive growth. Reduced stress, predictable workflows, and customer retention appear to drive positive business perceptions more strongly than revenue expansion alone.

## Reliability Analysis (Cronbach's Alpha)

Cronbach's alpha was used to assess the internal consistency of the measurement scales. All constructs demonstrated acceptable reliability ($\alpha > 0.70$), confirming the suitability of the instrument for further analysis.

---

## One-Way ANOVA

One-way ANOVA was conducted to examine differences in supply chain agility across retailer experience levels. The results indicate statistically significant differences, suggesting that business experience enhances agility in unorganized retail operations.

---

## Multiple Regression Analysis

Multiple regression analysis was employed to evaluate the combined impact of supply chain practices and agility on operational performance. The results identify supply chain agility as the

strongest predictor, with collaboration and inventory management also contributing significantly.

### 5.9 Summary of Data Analysis

Supplier collaboration forms the foundation of operational resilience.
Inventory discipline differentiates service reliability.
Digital tools enhance coordination but do not independently drive performance.
Supply chain agility mediates the relationship between practices and performance.
Operational performance translates into growth confidence and retailer satisfaction.

## 5. Discussion

The analysis underscores the critical role of collaborative supplier relationships in compensating for the lack of formal systems in unorganized retail. In the Maharashtra context, relational governance emerges as a key enabler of flexibility and continuity. Inventory discipline and selective digital adoption act as complementary mechanisms that enhance visibility and responsiveness. The findings reinforce the view that supply chain agility serves as a crucial link between operational practices and performance outcomes in resource-constrained retail environments.

## 6. Major Findings

- Unorganized machine tool retailers in Maharashtra rely heavily on trust-based supplier relationships to manage uncertainty.
- Systematic inventory practices, even when basic, significantly reduce stockouts and delivery delays.
- Pragmatic digital adoption improves communication efficiency and transaction speed.
- Supply chain agility enhances operational performance and supports sustained business growth.
- Higher operational stability contributes to greater retailer satisfaction and optimism about future prospects.

## 7. Implications

### 7.1 Managerial Implications

Retailers can improve performance by formalizing key aspects of supplier collaboration and inventory planning without incurring significant costs. Incremental digital adoption can yield tangible efficiency gains.

### 7.2 Policy Implications

Industry associations and policymakers may support training initiatives focused on basic supply chain management and digital literacy for unorganized retailers, particularly in industrial clusters.

## 8. Conclusion

This study provides empirical insights into supply chain practices within the unorganized machine tool retail sector in Maharashtra. By highlighting the roles of collaboration, inventory management, and agility, the research contributes to a deeper understanding of how small industrial retailers can enhance performance despite structural constraints. The findings offer a foundation for further doctoral-level research and evidence-based policy formulation.

## 9. References

Basu, R., & Nair, S. (2019). Supply chain challenges in India's unorganized retail sector. *International Journal of Retail & Distribution Management*, 47(8), 845–862. https://doi.org/10.1108/IJRDM-11-2018-0245

Christopher, M. (2016). *Logistics and supply chain management* (5th ed.). Pearson Education.

Flynn, B. B., Huo, B., & Zhao, X. (2010). The impact of supply chain integration on performance: A contingency and configuration approach. *Journal of Operations Management*, 28(1), 58–71. https://doi.org/10.1016/j.jom.2009.06.001

Gunasekaran, A., Subramanian, N., & Rahman, S. (2017). Supply chain resilience: Role of complexities and strategies. *International Journal of Production Research*, 55(22), 6809–6819. https://doi.org/10.1080/00207543.2017.1360564

Kumar, S., & Singh, R. K. (2018). Managing supply chain flexibility in small and medium enterprises. *Benchmarking: An International Journal*, 25(6), 1713–1732. https://doi.org/10.1108/BIJ-05-2017-0126

Pillai, K. G., & Sharma, A. (2020). Digital adoption and performance outcomes in small retail firms. *Journal of Small Business Management*, 58(4), 735–758. https://doi.org/10.1080/00472778.2019.1709381

Sarkar, A., & Mohapatra, P. K. J. (2021). Agility and resilience in emerging market supply chains. *Supply Chain Management: An International Journal*, 26(3), 343–357. https://doi.org/10.1108/SCM-09-2020-0471

Sharma, S. K., & Bhagwat, R. (2007). An integrated BSC–AHP approach for supply chain management evaluation. *Measuring Business Excellence*, 11(3), 57–68.

Vachon, S., & Klassen, R. D. (2008). Environmental management and manufacturing performance: The role of collaboration. *International Journal of Production Economics*, 111(2), 299–315.

## Limitations and Future Research

The study is limited to a sample of 50 unorganized machine tool retailers in Mumbai and relies on cross-sectional, self-reported data. Future research may expand the sample size, include additional industrial regions, and apply longitudinal or advanced analytical approaches to further validate and extend the findings.