The Role of AI-Based Demand Forecasting in Inventory Planning for Seasonal Small Businesses in India

An exploratory study of selected small businesses in New Palam Vihar and Rajendra Park, Gurugram

Research paper

Research period: October 2026
Study locations: New Palam Vihar and Rajendra Park, Gurugram, Haryana
Primary method: Face-to-face exploratory interviews
Sample: Approximately 5–10 small businesses

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Abstract

This study explores how seasonal changes in customer demand affect inventory planning among selected small businesses in New Palam Vihar and Rajendra Park, Gurugram, and considers whether affordable AI-based demand forecasting could help business owners make better stock decisions. Primary information was collected through face-to-face conversations with approximately 5–10 businesses operating in categories including footwear, electronics, stationery and food items during October 2026. The field notes indicate that respondents commonly described festival periods as busy, while some reported slower trading during periods of intense heat. Festivals and changing fashion trends were identified as demand drivers. Respondents described instances of excess stock and occasional lost sales due to unavailable products. Unsold goods were often discounted or held for a later season. Some businesses maintained sales or inventory records, while others did not. Respondents had limited practical knowledge of AI forecasting but expressed interest in an affordable tool if it could help reduce unsold stock and related losses. The study is exploratory and does not claim statistical representativeness. Because exact respondent counts by answer, monthly sales records and detailed forecasting-method responses were not available, the analysis is qualitative and no percentages, forecast-accuracy scores or causal effects are calculated. The findings suggest that any useful forecasting solution should be low-cost, easy to use, understandable and able to work with incomplete business records.

Keywords

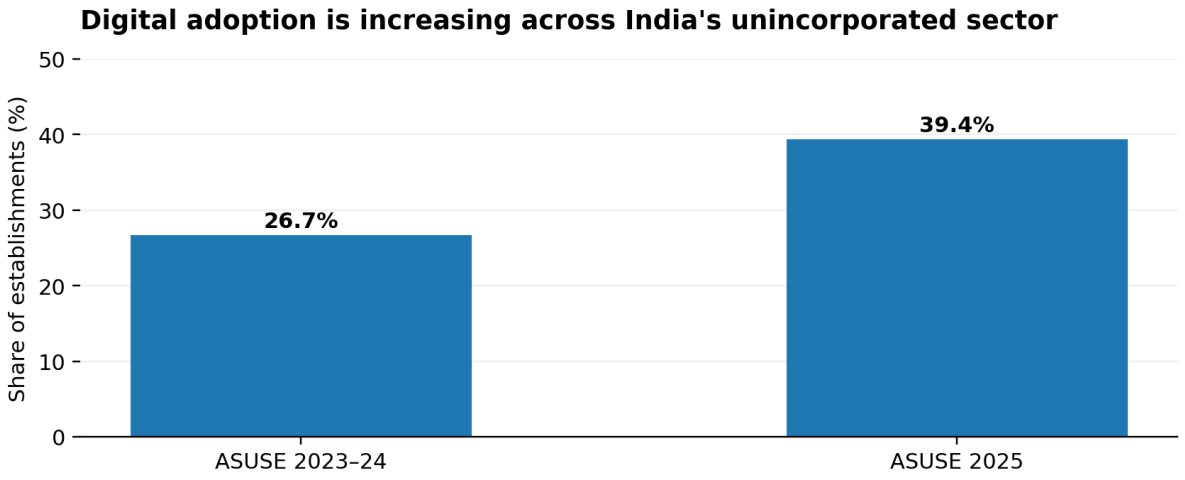
AI-based demand forecasting; seasonal demand; inventory planning; small businesses; MSMEs; Gurugram; stockouts; unsold inventory.

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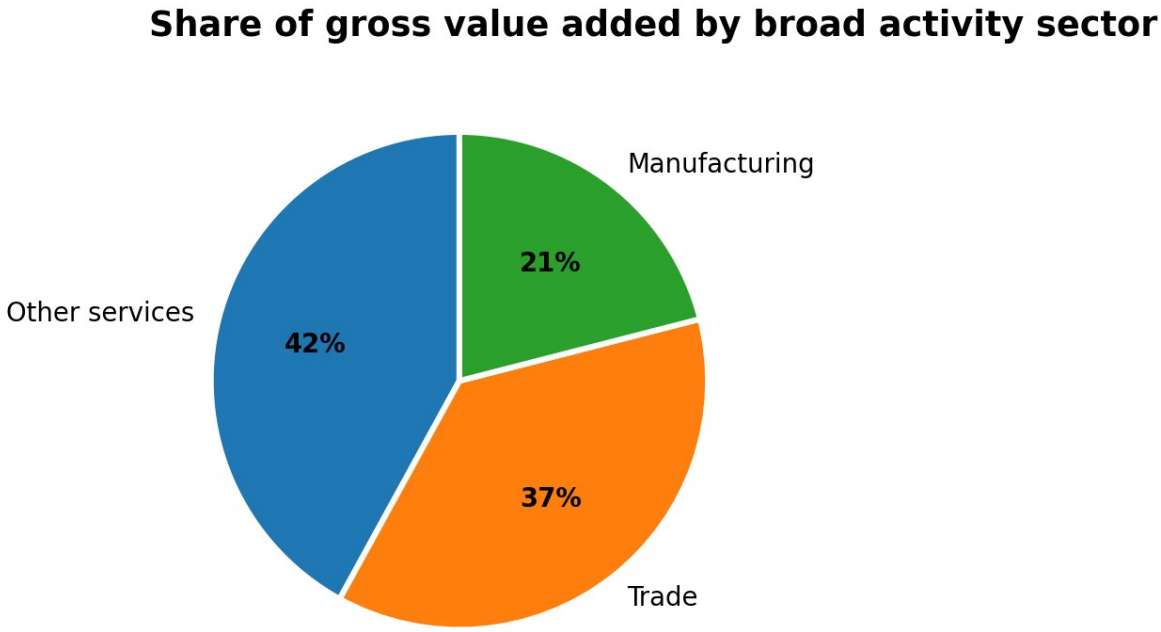
Visual Evidence & Context

The following charts use published secondary data to place the local field observations in context. They are not calculated from the 5–10 local interviews.



Source: MoSPI, ASUSE 2025 results (published 24 March 2026). National data; not the study sample.

Figure 2. Internet use among unincorporated establishments in India increased from 26.7% in ASUSE 2023–24 to 39.4% in ASUSE 2025. Source: MoSPI / PIB, 24 March 2026 [1].



Source: MoSPI, ASUSE 2025 results. National market-establishment GVA shares.

Figure 3. National share of gross value added by broad activity sector in ASUSE 2025: other services 42%, trade 37%, manufacturing 21%. Source: MoSPI / PIB [1].

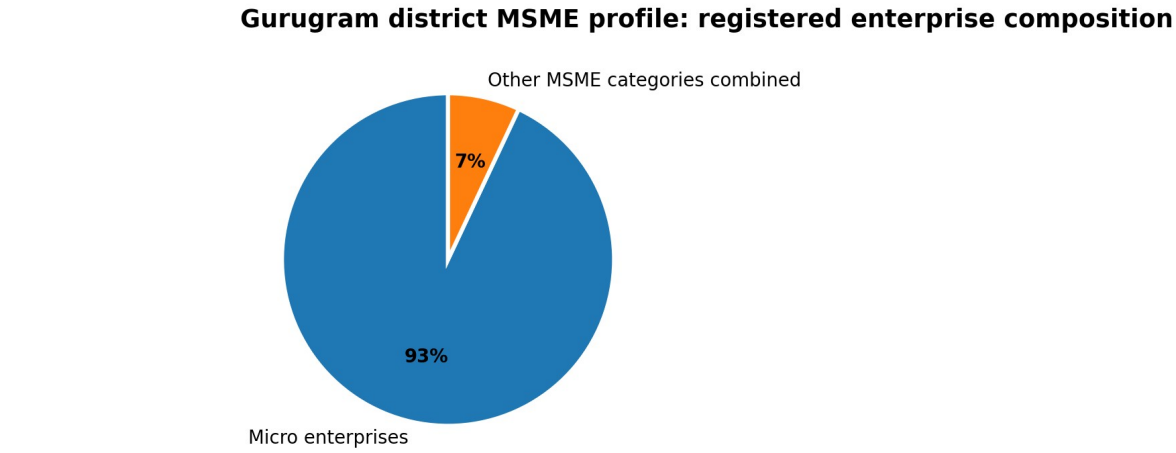


Figure 4. The Gurugram district profile reports 93% of 76,834 Udyam-registered MSMEs as micro enterprises in its reference data. The remaining 7% represents other MSME categories combined. Source: Haryana RAMP district profile [2].

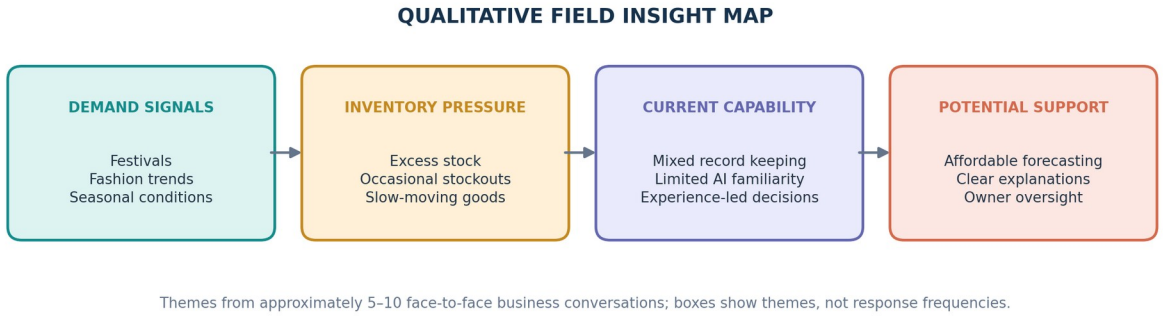


Figure 5. Qualitative synthesis of themes reported in the local interviews. This diagram does not represent counts or percentages.

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1. Introduction

Small businesses often make inventory decisions under uncertainty. They must decide what to purchase, how much to keep in stock and when to reorder, even when customer demand changes across the year. For businesses selling seasonal or trend-sensitive products, these decisions can be especially difficult. Buying too much may leave money tied up in unsold goods, while buying too little can mean missed sales when customers want products that are unavailable.

Demand may change because of festivals, weather, holidays, local events, changing fashion preferences and shifts in customer spending. These factors do not affect every business in the same way. For example, a product category that sells well during a festival period may not experience the same pattern as food items or electronics. Forecasting therefore needs to consider the characteristics of the particular business and its products.

Artificial intelligence (AI) and other data-based forecasting methods may help businesses identify patterns in previous sales and combine them with relevant information such as dates, promotions or weather. However, a forecasting tool is useful only when businesses can access it, understand its recommendations and maintain data of sufficient quality. This study connects these broader questions with observations from a small group of local businesses in Gurugram.

2. Research Background and Context

India's unincorporated business sector is economically significant. The Ministry of Statistics and Programme Implementation reported that the Annual Survey of Unincorporated Sector Enterprises (ASUSE) 2025 estimated 7.92 crore establishments for January–December 2025. The same official release reported an increase in the share of establishments using the internet from 26.7% in ASUSE 2023–24 to 39.4% in ASUSE 2025. These national figures provide context for the growing importance of digital tools, but they do not describe the specific businesses interviewed in this study [1].

Gurugram has a diverse MSME ecosystem. The district diagnostic profile prepared under Haryana's Raising and Accelerating MSME Performance (RAMP) programme identifies a range of local activities and reports 76,834 Udyam-registered MSMEs in the profile's reference data, with 93% classified as micro enterprises. The profile also lists food and beverage services among the district's leading product and service categories. These figures are historical profile data and should not be interpreted as a current count for 2026 [2].

A 2025 World Economic Forum and Boston Consulting Group playbook on AI for India's MSMEs discusses the potential of AI in business operations while highlighting barriers such as limited awareness, data readiness and workforce capabilities [3]. This is relevant to the present study because respondents described limited practical knowledge of AI tools. The field observations are consistent with the broad issue of adoption barriers, but this small local sample cannot establish how common those barriers are across India.

3. Problem Statement

The businesses considered in this study face changes in customer demand across seasons and festival periods. Their inventory decisions can result in excess stock, discounting or storage of unsold products. At other times, a product may be unavailable when a customer wants to buy it. Although AI-based forecasting may offer a way to support planning, the local businesses interviewed appeared to have limited practical familiarity with such tools. The central problem is therefore not only whether AI can improve forecasts, but also whether a simple and affordable forecasting approach can be understood and used by small businesses with varying levels of record keeping.

4. Aim, Objectives and Research Questions

Aim

To explore the relationship between seasonal demand changes and inventory-management challenges among selected small businesses in Gurugram, and to examine the perceived usefulness and adoption barriers of AI-based demand forecasting.

Objectives

- Identify seasonal factors that business respondents associate with changes in customer demand.
- Explore reported inventory challenges, particularly excess stock, unsold products and occasional stockouts.
- Understand whether businesses maintain sales or inventory records and what this may mean for data-based forecasting.
- Examine respondents' practical familiarity with AI forecasting and their willingness to consider an affordable tool.
- Develop practical recommendations for a simple, accessible forecasting solution.

Research questions

15. How do seasonal and festival-related factors influence demand in the selected businesses?
16. What inventory-management problems do respondents report during high- and low-demand periods?
17. How do record-keeping practices affect the feasibility of data-based demand forecasting?
18. What do respondents understand about AI-based forecasting, and what may prevent them from adopting it?
19. What features would make an AI forecasting tool useful and accessible to small businesses?

5. Literature Review

5.1 Demand forecasting and inventory planning

Demand forecasting is the process of estimating future customer demand using information such as historical sales, seasonal patterns and relevant external factors. Forecasts inform purchasing, replenishment and stock decisions. Hyndman and Athanasopoulos emphasise that analysts should first understand the patterns and characteristics of a time series before selecting a forecasting method [4]. This principle matters for small businesses because a complex AI model is not automatically better than a simple method. A basic seasonal comparison or moving average may be more suitable when sales records are limited.

5.2 Seasonal and event-related demand

Seasonality refers to recurring patterns in demand over a known calendar period. In retail, demand can also be affected by events that do not occur at fixed monthly intervals, such as festivals, local celebrations, promotions or sudden fashion changes. A useful forecasting process should distinguish regular seasonal patterns from one-off events and product-specific changes. The present field observations identify festivals and fashion trends as important influences, while also indicating that some respondents experienced slower trade during periods of intense heat. These observations are exploratory and do not establish a universal seasonal pattern.

5.3 AI and digital adoption among small businesses

AI-based forecasting can combine historical sales with additional variables to identify patterns and estimate future demand. Yet practical implementation requires usable data, accessible technology, staff capability and trust in the outputs. The WEF–BCG playbook describes awareness, action and recognition as important parts of building AI adoption among MSMEs [3]. The Government of India's ASUSE 2025 results also show increasing internet use among unincorporated establishments, while indicating that digital integration is not universal [1]. Internet use alone does not mean that a business is ready to adopt AI forecasting.

5.4 Research gap

National reports and industry playbooks discuss digitalisation and AI adoption at a broad level. The present study adds a small, place-based perspective by recording what selected retailers and other small businesses in two Gurugram localities said about seasonal demand, unsold stock, stockouts, record keeping and AI awareness. Given the small and non-random sample, the study does not claim to fill a national evidence gap. Instead, it offers preliminary local observations that can inform a larger study.

6. Research Methodology

6.1 Research design

The study uses an exploratory, descriptive design combining a review of published secondary sources with primary qualitative information from face-to-face business conversations. This design is appropriate for understanding experiences and identifying themes when the available sample is small and the information is not sufficiently structured for statistical testing.

6.2 Study area and participants

Primary information was collected in October 2026 in New Palam Vihar and Rajendra Park, Gurugram, Haryana. The researcher spoke face-to-face with approximately 5–10 small businesses. The business categories reported included footwear, electronics, stationery and food items, along with other small-business activities. The exact number within this range and the number of respondents in each category were not recorded in the information supplied for this report.

6.3 Sampling and data collection

The sample was a small, non-probability group of businesses approached in the selected localities. Face-to-face conversations were used to collect respondents' views on seasonal demand, inventory problems, record keeping and AI forecasting. The available notes summarise common responses rather than providing a complete respondent-by-respondent transcript. Consequently, the report uses cautious thematic descriptions and does not calculate percentages.

6.4 Data analysis

The responses were grouped into themes: seasonal demand, demand drivers, overstocking, stockouts, treatment of unsold inventory, record keeping, AI familiarity and perceived usefulness. These themes were compared with published material on MSMEs, digitalisation and forecasting. No regression, correlation, reliability coefficient or forecast-accuracy metric was calculated because the required structured dataset was not available.

6.5 Ethical considerations

Business names and personal identifiers are not included. The report presents responses in aggregate and avoids attributing statements to identifiable individuals. Any photographs, recordings or identifiable business information should only be included in a submitted version if permission has been obtained. The researcher should retain original notes securely and distinguish direct quotations from paraphrased summaries.

7. Primary Research Findings

7.1 Business profile

The conversations covered a varied group of small businesses, including footwear, electronics, stationery and food-item businesses. This range is useful for exploratory comparison because demand patterns and stock characteristics may differ across product categories. However, the available notes do not provide exact counts by category, business age, number of employees or product line.

7.2 Seasonal demand and its drivers

Respondents generally described periods close to festivals as busier. Festivals were identified as an important reason for increased demand, and changing fashion trends were also mentioned. The notes further indicate that some respondents considered periods of intense heat to be slower. Since the information does not identify the exact months, products or number of businesses reporting each pattern, these observations should be interpreted as reported experiences rather than a measured seasonal index.

7.3 Inventory challenges

Respondents reported that businesses sometimes purchase more stock than customers ultimately buy. Unsold products may be sold later at a reduced price or stored for the following year or season. This indicates two possible consequences: discounting may reduce the revenue recovered from inventory, while storage delays the recovery of cash tied up in stock. Respondents also acknowledged occasional lost sales when products were unavailable, although this was described as not very frequent.

7.4 Record keeping

Some businesses reportedly maintain sales or inventory records, while others do not. This variation is important for forecasting. Historical sales records can help identify recurring patterns, but incomplete or inconsistent records limit the ability to compare periods and estimate demand. Businesses without digital records may need a simple record-keeping step before using a forecasting tool.

7.5 Awareness and perceived usefulness of AI

Respondents showed limited practical knowledge of how AI could be used for demand forecasting. The main barrier described was not knowing how to use AI. At the same time, respondents expressed interest in an affordable tool if it could help reduce unsold inventory and related losses. This suggests an opportunity for solutions that explain recommendations in plain language and require minimal technical skill. It does not prove that respondents would purchase or consistently use such a tool.

7.6 Summary of themes

Theme	What the field notes indicate	Interpretation
Seasonality	Festival periods are commonly described as busy; some hot-weather periods are described as slow.	Demand patterns may depend on calendar events and product category.
Demand drivers	Festivals and changing fashion trends.	Forecasts may need event and trend information, not only past sales.
Overstocking	Some businesses have excess stock.	Purchasing decisions are made under uncertainty.
Unsold inventory	Discounted or stored for a later season.	Stock can tie up cash or require price reductions.
Stockouts	Some lost sales, described as limited.	Availability problems exist but were not reported as frequent.
Records	Some keep records; others do not.	Data readiness differs across businesses.
AI familiarity	Limited practical knowledge of how to use AI.	Awareness and usability are potential adoption barriers.
Interest	Affordable forecasting support was viewed positively.	Perceived usefulness may depend on affordability and simplicity.

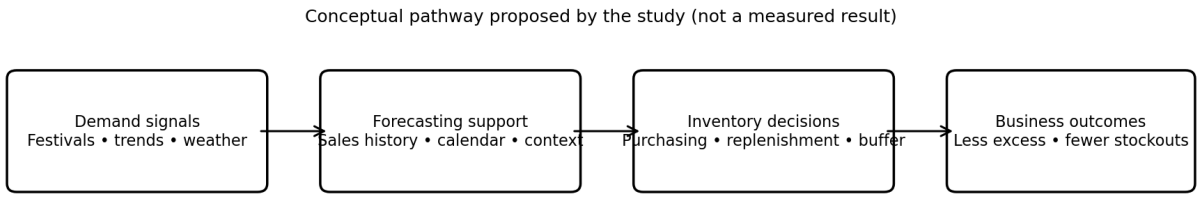


Figure 1. Conceptual pathway linking demand signals, forecasting support, inventory decisions and possible business outcomes. This is a proposed framework, not an empirical result.

8. Discussion

The field observations suggest that inventory challenges are connected to uncertainty about when demand will rise or fall. Festival periods and changing fashion trends may create opportunities for additional sales, but buying too much can leave businesses with unsold products. Discounting and storing products for another season are practical responses, but both can have costs. Discounting may reduce the amount recovered, while storage can delay the use of working capital.

The findings also highlight that the potential value of forecasting is linked to record keeping. A business with consistent sales records may be able to begin with simple methods such as comparing sales in similar periods, moving averages or a seasonal-naïve benchmark. A business without records may first need a basic daily or weekly sales log. This staged approach is consistent with forecasting guidance that recommends understanding the data before choosing a model [4].

The limited practical familiarity with AI described by respondents is consistent with wider discussion of AI adoption barriers in the WEF–BCG playbook [3]. A tool designed for small businesses should therefore avoid technical complexity. It should explain why it recommends a stock quantity, allow the owner to adjust the recommendation and clearly show when the available data are insufficient.

The study does not demonstrate that AI would reduce inventory losses by a specific amount. No controlled comparison, historical dataset or forecast evaluation was conducted. The most defensible conclusion is that respondents identified problems that forecasting might help address and expressed interest in an affordable solution, while practical adoption would depend on data availability, ease of use and trust.

9. Practical Recommendations

- Start with simple records: maintain product-wise sales, purchases, returns and closing stock at a consistent daily or weekly interval.
- Record event information: note festival dates, promotions, local events and unusual weather conditions alongside sales records.
- Begin with simple forecasting: compare recent sales with the same period in previous seasons where records exist; use simple averages as a baseline before introducing AI.
- Provide understandable recommendations: show suggested purchase quantities, expected demand ranges and a short explanation of the factors behind the forecast.
- Allow human review: owners should be able to adjust recommendations based on supplier delays, local knowledge and unexpected events.
- Keep the tool affordable and accessible: a mobile-friendly interface, local-language guidance and minimal data entry may make adoption easier.
- Flag uncertainty: the tool should clearly warn users when there is too little historical information to produce a reliable forecast.

10. Limitations of the Study

- The sample was small (approximately 5–10 businesses) and non-random; findings cannot be generalised to all Gurugram businesses or Indian MSMEs.
- The exact number of participating businesses and category-wise respondent counts were not recorded in the information available for this report.

- The notes provide common themes rather than complete transcripts or a response-by-response dataset.
- The exact forecasting methods currently used by respondents were not established.
- No monthly sales, purchase, stockout or unsold-stock figures were supplied; therefore, no numerical inventory-loss estimate or seasonal demand chart can be calculated.
- The study did not test an AI model or compare its forecasts with actual sales.
- The phrase 'small business' is used descriptively; the formal MSME classification or registration status of each participating business was not verified.

11. Conclusion

This exploratory study examined seasonal demand and inventory-management experiences among approximately 5–10 small businesses in New Palam Vihar and Rajendra Park, Gurugram, during October 2026. Respondents commonly associated higher activity with festival periods and identified festivals and changing fashion trends as demand drivers. Some described slower business during periods of intense heat. The field notes also point to excess inventory, discounting or storage of unsold products, occasional stockouts and inconsistent record keeping.

Respondents had limited practical knowledge of AI-based forecasting but expressed interest in an affordable tool that could help reduce unsold stock and related losses. The findings suggest that AI adoption should not begin with complex technology alone. It should be supported by basic record keeping, accessible explanations, affordable design and human oversight. Since the sample was small and no numerical business records were supplied, the study offers preliminary qualitative insights rather than statistically representative conclusions or proof of AI effectiveness.

A useful next step for future research would be to collect product-level monthly sales and inventory data from a larger group of businesses over at least one full seasonal cycle. This would allow a comparison of simple forecasting methods and, where the data justify it, more advanced models. Forecast performance should be evaluated against a simple baseline before claiming that an AI system improves decisions.

References

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[4] Hyndman, R. J., & Athanasopoulos, G. (2021; online edition updated 2026). Forecasting: Principles and Practice (3rd ed.). OTexts. https://otexts.com/fpp3/

[5] Ministry of MSME, Government of India. (2024). Annual Report 2023–24. https://www.msme.gov.in/sites/default/files/FINALMSMEANNUALREPORT2023-24ENGLISH.pdf

Appendix A. Interview topics reflected in the field notes

20. Business category and general business profile.
21. Busiest and slowest periods of the year.
22. Factors associated with changes in demand, including festivals and trends.
23. Experiences of excess stock and products remaining unsold.
24. Experiences of unavailable products and lost sales.
25. How unsold products are handled after a season.
26. Whether sales or inventory records are maintained.
27. Familiarity with AI-based demand forecasting and perceived usefulness of an affordable tool.

Appendix B. Research integrity note

This report is based on the researcher's summary of face-to-face conversations and the secondary sources listed above. The exact business count is reported as approximately 5–10 because a precise count was not provided. No respondent-level frequencies, percentages, quotations, monthly sales figures, financial-loss estimates or model-performance results have been invented. If the original notes later provide more precise information, the methodology and findings should be updated accordingly. The colourful charts in the visual-evidence section use national or district-level published statistics and are explicitly labelled as secondary context; no numerical chart is presented as if it came from the local interview sample.