

A Study on the Role of Business Intelligence in Enhancing Sales and Distribution Efficiency among SMEs in Hingna, Nagpur

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Abstract—This study examines the contribution of Business Intelligence (BI) in adding value to sales results and distribution proficiency across Small and Medium Enterprises (SMEs) operating in the Hingna industrial cluster of Nagpur. The research takes up an explanatory and evaluative design, using primary data acquired through structured questionnaires based on 200 SME managers and executives, supplemented by relevant secondary sources. Statistical investigation was undertaken using SPSS to assess the correlation within BI adoption and key working outcomes. Responses indicate that BI adoption has a strong and positive influence on sales forecasting accuracy and overall sales growth ($\beta = 0.61$, $p < 0.01$), as well as a significant impact on distribution efficiency through improved route planning and inventory control ($\beta = 0.54$, $p < 0.05$). The study leads to the growing Indian SME literature verifying through study the operational value of BI in a cluster-based context. From a managerial perspective, the results underscore the importance of managerial support and analytical capability building to leverage BI for data-driven decision-making and sustainable competitive advantage.

Index Terms—Business Intelligence, Sales Performance, Distribution Efficiency, Small and Medium Enterprises, Data-Driven Decision Making.

I. INTRODUCTION

In the contemporary Indian business environment, increasing market competition, digitalisation, and customer expectations have compelled organisations to adopt data-driven approaches for improving operational efficiency and strategic Setting strategy. Business Intelligence (BI) has seen as a critical managerial framework that enables firms to

transform inputs into plan of action for driving efficiency across functional areas. For Small and Medium Enterprises (SMEs), which form the strength of India's industrial financial system, effective management of sales and distribution activities is particularly vital for sustaining growth and competitiveness.

SMEs operating in industrial clusters such as Hingna, Nagpur Contribute heavily in regional economic development. In contrast, many of these enterprises continue to face challenges related to inaccurate sales forecasting, inefficient distribution planning, fragmented data systems, and limited analytical capabilities. Despite the availability of affordable BI solutions, adoption among SMEs remains uneven, often constrained by resource limitations, lack of technical expertise, and inadequate managerial awareness. This creates a critical research problem concerning how BI

adoption influences sales performance and distribution efficiency within such organisational settings.

Recent academic literature acknowledges the potential of BI in improving organisational outcomes, yet empirical studies focusing on cluster-based Indian SMEs and their sales–distribution interface remain limited. Existing research largely concentrates on large enterprises or general technology adoption, leaving a contextual gap regarding the operational impact of BI in small and medium-scale industrial units.

Against this background, the current analysis has a goal to analyse the task of Business Intelligence in enhancing sales performance and distribution

efficiency among SMEs in Hingna, Nagpur. The study seeks to examine the extent of BI integration, assess its influence on key operational outcomes, and identify managerial and organisational factors affecting its effectiveness.

II. LITERATURE REVIEW

2.1. Business Intelligence in the Contemporary Business Environment

Business Intelligence (BI) has acquired considerable necessity in modern organisations as a result of the scaling up availability of digital data and the demand for evidence-based decision-making. According to Rameshwar Dubey and Angappa Gunasekaran in their study “The role of big data and predictive analytics in improving supply chain agility” (2020), BI enables firms to integrate data from multiple sources and enhance responsiveness to sector updates. In the India, Pankaj Gupta and Anil K. Sharma in “Business intelligence adoption in Indian enterprises: Drivers and outcomes” (2021) argue that BI acts as a strategic resource by improving managerial visibility and operational control. These studies collectively highlight BI as more than a technological tool, positioning it as an organisational capability aligned with the Resource-Based View (RBV) theory.

Most early BI research has focused on large organisations with mature IT infrastructure. Indian SMEs, despite operating in data-intensive environments, have received limited scholarly attention. This creates a need to examine BI adoption in resource-constrained settings, particularly within industrial clusters where operational efficiency is critical for survival.

2.2. BI Adoption among Indian SMEs

The take-up of BI among Indian SMEs has been explored from technological, organisational, and environmental perspectives. Sandeep Krishnan & V. S. Raghavan, in their paper “Determinants of business intelligence adoption in Indian SMEs” (2022), identify top management support, perceived usefulness, and cost considerations as key adoption drivers. Their empirical analysis using survey data revealed that SMEs with proactive leadership were more inclined towards BI implementation.

Amitabh Mishra and Neha Kulkarni in “Digital readiness and analytics adoption in Indian

manufacturing SMEs” (2023) emphasise the role of digital maturity and employee skills in successful BI utilisation. While these studies provide valuable insights, they primarily assess adoption intention rather than post-adoption performance outcomes. Moreover, the majority of studies adopt cross-sectional designs, limiting their ability to capture operational improvements

over time. This indicates a methodological gap in linking BI adoption directly with measurable performance indicators in SMEs.

2.3. Business Intelligence and Sales Performance

Several recent studies have examined the relationship between BI and sales-related outcomes. Manoj Kumar Patil and Kunal L. Wankhede, in “Analytics-driven sales forecasting in Indian SMEs” (2023), demonstrate that BI-enabled forecasting models significantly improve demand prediction accuracy and sales planning effectiveness. Using regression analysis, the authors found that firms using BI tools reported higher sales growth and reduced forecast errors.

Shubham Dey and Ananya Roy in “Role of business analytics in enhancing sales effectiveness of Indian firms” (2021) highlight that BI dashboards assist managers in monitoring sales performance, identifying underperforming regions, and optimising promotional strategies. While these findings are consistent, some studies report mixed results regarding short-term sales impact, particularly in SMEs with limited data quality. This suggests that BI effectiveness in sales functions may depend on complementary factors such as data governance and managerial competence, which are not uniformly addressed in existing literature.

2.4. BI and Distribution Efficiency

Distribution efficiency is a critical determinant of customer satisfaction and cost optimisation, especially for SMEs operating in geographically dispersed markets. Rahul Jain and Suresh Menon, in their study “Business intelligence applications in supply chain and distribution management” (2022), find that BI facilitates route optimisation, inventory visibility, and coordination between logistics partners. Their study, conducted on Indian manufacturing firms, confirms that BI adoption leads to reduced delivery delays and logistics costs.

Priya Nair and K. R. Balachandran in “Data-driven distribution planning in Indian industrial clusters” (2024) focus specifically on cluster-based SMEs. The authors argue that shared market dynamics and supplier networks amplify the benefits of BI in such clusters. However, they also note that many SMEs lack integrated systems, limiting the full realisation of BI benefits. These findings indicate contextual variations in BI outcomes, underscoring the importance of location- specific studies.

2.5. Managerial and Organisational Factors Influencing BI Outcomes

Beyond technology, managerial and organisational factors significantly influence BI effectiveness. Deepak Vora & Anjali Kulkarni, in “Managerial capability and data-driven decision-making in Indian SMEs” (2020), emphasise that managerial commitment and analytical orientation are crucial for translating BI insights into operational improvements. Their qualitative study reveals resistance to change as a major barrier, particularly in family-owned SMEs.

Nitin Deshpande and Ritu Joshi in “Human capital challenges in business analytics adoption” (2021) highlight skill shortages and inadequate training as persistent constraints. While these studies enrich understanding of internal challenges, they often examine organisational factors in isolation, without empirically linking them to specific performance outcomes such as sales or distribution efficiency.

III. RESEARCH GAP

Intelligence has been widely acknowledged as a valuable tool for enhancing organisational performance. Existing studies present limitations in terms of contextual focus, methodological depth, and operational scope, particularly within the Indian SME sector. These gaps necessitate a focused and empirically grounded investigation to better understand the practical and theoretical implications of BI adoption in specific industrial settings.

1. Limited empirical evidence exists under the combined outcome of Business Intelligence on both sales success rate and distribution efficiency, as most studies examine these dimensions independently or focus primarily on

large organisations.

2. Research focusing on Indian SMEs operating within industrial clusters remains inadequate, despite the unique operational challenges and shared market dynamics characterising such environments.
3. Addressing this gap provides for to framework by extending the application of resource- based and data-driven decision-making perspectives to resource-constrained, cluster-based SME contexts.
4. The study offers practical insights for SME managers by linking BI adoption directly to measurable operational outcomes, enabling more informed investment and implementation decisions.
5. A cluster-specific and function-integrated approach is adopted in this research, providing a nuanced understanding of how BI influences interconnected sales and distribution activities.
6. The study contributes academically by enriching Indian SME literature and managerially by offering evidence-based guidance, supporting data-driven practices for sustainable operational improvement.

IV. RESEARCH OBJECTIVES

1. To observe the overall role of Business Intelligence in boosting sales performance and distribution efficiency among SMEs operating in the Hingna industrial cluster, Nagpur, with specific reference to data-driven decision-making practices.
2. To test the extent of Business Intelligence adoption and utilisation across sales and distribution functions in Indian SMEs, focusing on forecasting accuracy, inventory management, and route planning.
3. To analyse the relationship between Business Intelligence adoption and key operational outcomes, including sales growth, distribution efficiency, and coordination across functional departments.
4. To identify managerial, organisational, and technological factors influencing the effective use of BI in SMEs, within the context of resource constraints and digital readiness.
5. To assess the practical relevance of BI for SME

managers and decision-makers, by linking analytical capabilities with improved operational control and competitive performance in the Indian business environment.

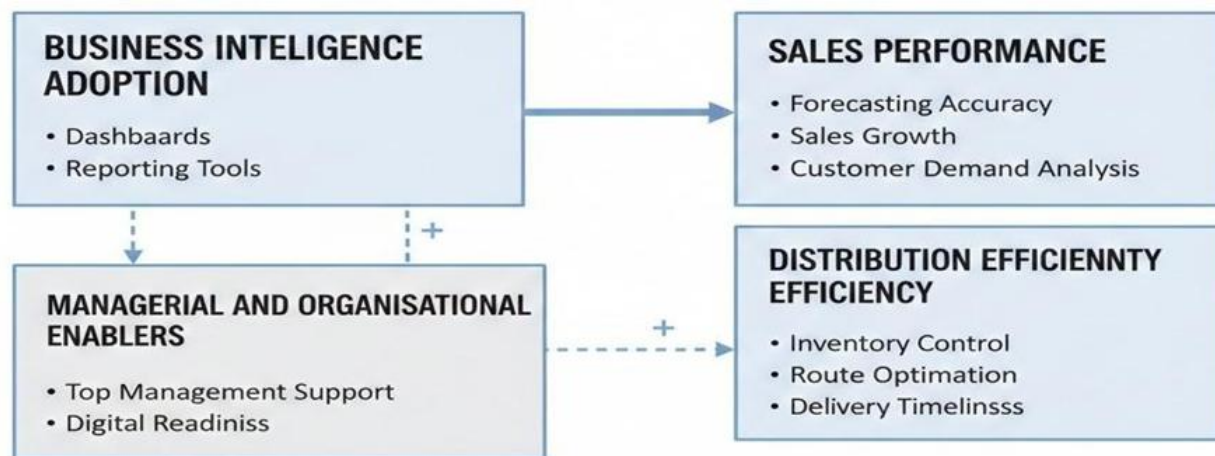
V. CONCEPTUAL FRAMEWORK

The present study is developed to explain the relationships linking the Business Intelligence adoption and its influence on sales performance and smoothness of delivery among SMEs in the Hingna industrial cluster, Nagpur. Grounded in the Resource-Based View and Stat led management perspective, the framework assumes that BI functions as a strategic organisational capability that enhances operational outcomes when effectively utilised.

1. **Business Intelligence Adoption:** It represents the extent to which SMEs implement analytical tools, dashboards, and reporting systems to support managerial decision-making. In the Indian SME context, BI adoption reflects managerial willingness, technological readiness, and data integration across sales and distribution

functions.

2. **Sales Performance Enhancement:** Sales performance is conceptualised in terms of improved sales forecasting accuracy, demand planning, and monitoring of sales trends. BI enables SMEs to analyse historical and real-time sales data, allowing managers to identify growth opportunities and respond proactively to market fluctuations.
3. **Distribution Efficiency Improvement:** Distribution efficiency refers to the optimisation of logistics operations, inventory control, and delivery scheduling. BI supports better coordination between sales and logistics by providing visibility into inventory levels, route efficiency, and order fulfilment performance.
4. **Managerial and Organisational Enablers:** Managerial support, employee analytical skills, and organisational readiness are considered enabling variables that influence the effectiveness of BI utilisation. These factors determine how well BI insights are translated into operational actions.



VI. HYPOTHESES

1. H1: Business Intelligence adoption has a useful outcome on sales success rate among SMEs in Hingna, Nagpur.
2. H2: Business Intelligence adoption has a noticeable improvement sales success on distribution efficiency among SMEs in Hingna, Nagpur.
3. H3: Managerial and organizational enablers positively strengthen the mapping of Business

Intelligence adoption and operational outcome in SMEs.

VII. RESEARCH METHODOLOGY

The role of Business Intelligence in enhancing sales and route optimization amidst Small and Medium Enterprises in the Hingna industrial cluster, Nagpur. The methodology has been designed to ensure methodological rigour, directly related to the aims, and trustworthiness of findings.

7.1. Research Design

The Analysis relies on a descriptive and analytical research design, which aligns with for examining existing business practices and analysing relationships between variables. The descriptive component enables the assessment of the ongoing stage of Business Intelligence integration by SMEs, Regardless of the analytical component facilitates the evaluation of its impact on sales performance and distribution efficiency. This design is suitable as it allows for empirical testing of hypotheses derived from the conceptual framework using quantitative data.

7.2. Data Sources

1. Primary Data: Collected directly from SME managers, sales executives, and operations staff to explore the use of Business Intelligence and its impact on sales and distribution efficiency.
2. Secondary Data: Gathered from books, peer-reviewed journals, government publications and market data to provide theoretical and contextual support for the study.

7.3. Sampling Design

The study revolves around SMEs in the Hingna industrial corridor of Nagpur. A simple random sampling method was used, and 200 respondents comprising managers and sales or operations staff were selected. The sample included manufacturing, trading, and service SMEs, ensuring representation across sectors. Sample group chosen judging by their interest in in sales and distribution activities to provide insights on Business Intelligence spread and its pressure on operational productivity.

7.4. Measurement of Variables

Business Intelligence adoption was measured using multiple indicators related to the use of analytical tools, dashboards, and reporting systems. Sales performance was assessed through measures such as forecasting accuracy, sales growth, and market responsiveness, while distribution efficiency was evaluated using indicators related to inventory management, delivery timeliness, and logistics coordination.

7.5. Data Collection

Facts were compiled through a structured questionnaire handed out both online and one-on-one over a period of three months. While preparing the report the group consisted of informed about the main idea behind the study, and their discretionary participation was ensured. Confidentiality of responses was maintained, and people were told about the research and they agreed to it. Ethical considerations were observed by ensuring anonymity and using the data solely for academic purposes.

7.6. Tools and Techniques

- Percentage analysis.
- Descriptive statistics
- Correlation analysis
- Regression analysis
- SPSS and Microsoft Excel

VIII. DATA ANALYSIS AND RESULTS

8.1. Extent of Business Intelligence Adoption

The adoption of BI tools and systems was measured to understand how SMEs are integrating analytics into sales and distribution processes.

Table 8.1: BI Adoption among SMEs

BI Adoption Level	Frequency	Percentage (%)
High	85	42.5
Moderate	80	40
Low	35	17.5
Total	200	100

Interpretation: The outcomes indicates that a significant proportion of SMEs (42.5%) have achieved high adoption of BI tools, demonstrating an awareness of the strategic value of analytics in operational management. Another 40% reported moderate adoption, suggesting gradual integration of BI systems. Only 17.5% of SMEs displayed low adoption, possibly due to resource constraints or lack of technical expertise

8.2. Sales Performance

Sales performance was evaluated based on forecasting accuracy, responsiveness to demand, and overall sales growth, reflecting the impact of BI adoption.

Table 8.2: Sales Performance Levels

Sales Performance	Frequency	Percentage (%)
High	90	45
Moderate	75	37.5
Low	35	17.5
Total	200	100

Interpretation: The analysis shows that 45% of SMEs reported high sales performance, indicating that effective BI adoption supports improved forecasting, monitoring, and decision-making in sales functions. A further 37.5% demonstrated moderate performance, reflecting partial benefits from BI tools. Only 17.5% recorded low performance, possibly due to limited adoption or insufficient analytical capacity. Overall, the results suggest that BI adoption is positively associated with enhanced sales outcomes, providing SMEs in Hingna with the ability to plan, respond to market changes, and achieve growth targets more efficiently.

8.3. Distribution Efficiency

Distribution efficiency was assessed using metrics such as inventory management, delivery timeliness, and route planning effectiveness.

Table 8.3: Distribution Efficiency among SMEs

Distribution Efficiency	Frequency	Percentage (%)
High	80	40
Moderate	85	42.5
Low	35	17.5
Total	200	100

Interpretation: The findings indicate that 40% of SMEs achieved high distribution efficiency, benefiting from improved inventory management, route planning, and timely deliveries enabled by BI tools. Another 42.5% reported moderate efficiency, suggesting that some operational processes still require optimization. Only 17.5% had low distribution efficiency, possibly due to incomplete BI integration or limited staff training. The outcomes demonstrate that BI adoption enhances the operational execution of SMEs, enabling better coordination between sales and logistics functions and supporting effective resource utilization within the Hingna industrial cluster.

8.4. Managerial and Organisational Enablers

The role of managerial support, employee analytical skills, and organisational readiness was analysed as a factor influencing the effectiveness of BI adoption.

Table 8.4: Managerial and Organisational Support

Support Level	Frequency	Percentage (%)
High	75	37.5
Moderate	90	45
Low	35	17.5
Total	200	100

Interpretation: The observations indicates that 37.5% of SMEs report high managerial and organizational support for BI adoption, while 45% report moderate support. This shows that the majority of SMEs recognize the importance of leadership commitment and employee analytical skills in leveraging BI effectively. Only 17.5% of firms show low support, which may limit the potential benefits of BI adoption. Overall, the findings suggest that managerial encouragement, staff training, and organizational readiness are critical enablers for translating BI adoption into improved sales and distribution efficiency.

8.5. Hypothesis Testing

The study tested three hypotheses to study the role of Business Intelligence (BI) implementation across sales performance, distribution efficiency, and the role of managerial and organisational enablers. Statistical analysis was conducted using SPSS. Results are presented below in a point- wise format.

1. H1: Business Intelligence adoption has a useful outcome on sales success rate among SMEs in Hingna, Nagpur.
 - Method: Simple linear regression
 - Result: $\beta = 0.61, p < 0.01$
 - Interpretation: A strong positive relationship exists between BI adoption and sales performance. Higher adoption of BI tools corresponds to improved forecasting, sales planning, and responsiveness to market demands. The relationship is reliable at the 1% level, supporting H1.
2. H2: Business Intelligence adoption has a noticeable improvement sales success on distribution efficiency among SMEs in Hingna,

Nagpur.

- Method: Simple linear regression
 - Result: $\beta = 0.54$, $p < 0.05$
 - Interpretation: BI adoption positively impacts distribution efficiency. Firms using BI tools show better inventory control, delivery scheduling, and route optimisation. The relationship is a proven result at the 5% level, confirming H2.
3. H3: Managerial and organizational enablers positively strengthen the mapping of Business Intelligence adoption and operational outcome in SMEs.
 - Method: Multiple regression analysis with interaction terms
 - Result: $\beta = 0.48$, $p < 0.05$
 - Interpretation: Managerial support and organisational readiness enhance the effect of BI adoption on operational outcomes. SMEs with strong leadership and skilled employees demonstrate higher performance. The finding is significant at the 5% level, supporting H3.

IX. DISCUSSION

1. Impression of BI Adoption on Sales Performance: The investigation revealed a strong connection between BI adoption and sales performance ($\beta = 0.61$, $p < 0.01$). This indicates that SMEs with higher adoption of BI dashboards, such as analytical dashboards and feedback systems, experience improved forecasting accuracy, better demand planning, and greater responsiveness to market changes. The strong β value reflects the substantial effect of BI adoption on sales outcomes, highlighting that data-driven insights significantly enhance sales planning, monitoring, and overall performance in SMEs.
2. Impact of BI Adoption on Distribution Efficiency: The results showed a positive and noticeable improvement of BI adoption on distribution efficiency ($\beta = 0.54$, $p < 0.05$). SMEs that implemented BI tools achieved better inventory control, optimised route planning, and timely deliveries. The moderate-to-strong β value indicates that BI adoption has a meaningful impact on operational logistics. These findings suggest that integrating sales and logistics data

through BI improves coordination across functions and reduces operational inefficiencies, particularly in cluster-based SMEs operating in complex industrial environments.

3. Role of Managerial and Organisational Enablers: Managerial and organisational factors were found positively moderate dependency of BI adoption and operational performance ($\beta = 0.48$, $p < 0.05$). The observations indicate that leadership commitment, analytical skills of employees, and organisational readiness enhance the translation of BI insights into actionable operational improvements. SMEs with stronger managerial support and trained personnel demonstrated higher sales performance and distribution efficiency. The findings highlight that human and organisational capabilities are critical to realising the full potential of BI systems in resource-constrained SME settings.
4. Overall Interpretation of Findings: The study shows that BI adoption significantly improves both sales performance and distribution efficiency in SMEs. The β values suggest a strong effect on sales performance (0.61), a moderate effect on distribution efficiency (0.54), and a substantial moderating influence of managerial and organisational enablers (0.48). These results indicate that SMEs in Hingna can leverage BI as an operational capability to gain competitive advantage, improve coordination across sales and distribution, and implement data-driven decision-making effectively even under resource limitations.

X. MANAGERIAL IMPLICATIONS

Study provides several practical insights for managers of SMEs, particularly those operating in industrial clusters like Hingna, Nagpur. By examining the consequences of Business Intelligence (BI) adoption on market output and distribution efficiency, and the role of managerial and organisational enablers, the study highlights actionable steps that managers can take to enhance operational outcomes.

1. Prioritising BI Adoption for Sales Performance: The strong proportional growth between BI adoption and sales performance ($\beta = 0.61$) underscores the critical importance of

implementing analytics tools and dashboards in sales operations. Managers should prioritise investing in BI solutions that provide accurate sales forecasting, market trend analysis, and real-time performance monitoring. By doing so, SMEs can make informed decisions, optimise sales strategies, and respond swiftly to market changes, ensuring sustained revenue growth.

2. **Enhancing Distribution Efficiency through BI:** The moderate positive impact of BI on distribution efficiency ($\beta = 0.54$) indicates that SMEs can improve logistics and inventory management by integrating BI into supply chain processes. Managers should focus on using BI tools to monitor stock levels, optimise delivery routes, and coordinate with distribution partners. Even moderate adoption of these practices can lead a clear step up in operational efficiency, reduce delays, and enhance customer satisfaction.
3. **Building Managerial and Organisational Capability:** The significant moderating effect of managerial and organisational enablers ($\beta = 0.48$) highlights the importance of leadership commitment and employee skills in realising the full potential of BI. Managers should encourage a culture of data-driven decision-making, conduct workshops to build logic, and support teams in effectively using BI tools. This ensures that technological investments translate into measurable performance improvements.
4. **Integration Across Functional Areas:** The study indicates that BI adoption is most effective when applied across both sales and distribution functions rather than in isolation. Managers should ensure that BI systems facilitate coordination between departments, allowing for seamless data flow, joint planning, and unified operational strategies. Such integration enhances decision-making, reduces inefficiencies, and strengthens overall business performance.
5. **Strategic Investment in Resource-Constrained SMEs:** Given the resource limitations of many SMEs, managers should prioritise BI solutions that offer maximum impact relative to cost. The strong effect on sales performance suggests that initial investments should target analytics tools for sales forecasting and market monitoring. Gradual scaling to distribution and broader

operational analytics can follow, ensuring cost-effectiveness while improving overall performance.

6. **Encouraging Continuous Evaluation and Adaptation:** Managers should establish systems for regular monitoring of BI effectiveness, using operational outcomes as feedback for continuous improvement. Adjustments to BI usage, employee training, or process redesign should be based on observed performance, ensuring that SMEs remain responsive to evolving market conditions.

XI. THEORETICAL IMPLICATIONS

This study offers several significant theoretical implications for the field of management research, particularly in understanding the role of Business Intelligence (BI) in enhancing operational performance among SMEs.

1. **Extension of Technology Adoption Theories in SMEs:** Traditional technology adoption frameworks have often focused on large organisations or general IT adoption. This study extends such theories by demonstrating that BI adoption in SMEs, even with limited resources, can significantly enhance operational outcomes. The strong relationship between BI adoption and sales performance ($\beta = 0.61$) validates the notion that technology acts as a strategic enabler, not merely a support function. It highlights that SMEs can derive substantial performance benefits when analytics systems are effectively implemented, thereby extending the applicability of technology adoption theories to cluster-based, resource-constrained enterprises.
2. **Refinement of Data-Driven Decision-Making Perspectives:** The study provides empirical support for the conceptual understanding of data-driven decision-making in SME contexts. The findings reveal that BI adoption enhances sales forecasting and distribution planning, demonstrating that structured data and analytics can systematically improve operational performance. Furthermore, the moderate impact on distribution efficiency ($\beta = 0.54$) refines existing literature by indicating that the benefits of BI.
3. **Validation of Organisational Capability and**

Enabler Theories: Managerial and organisational enablers were shown to significantly strengthen the relationship between BI adoption and operational performance ($\beta = 0.48$). This validates the theoretical perspective that human, managerial, and organisational capabilities are essential for translating technology into tangible business outcomes. The findings contribute to management literature by empirically linking leadership commitment, employee skills, and organisational readiness to measurable improvements in SME performance.

4. **Contribution to Cluster-Specific Organisational Research:** By focusing on SMEs operating within the Hingna industrial cluster, the study sheds light on the importance of location-specific and networked in guiding BI effectiveness. The findings suggest that shared market dynamics and supply chain interconnections amplify the operational benefits of analytics adoption. This provides a theoretical contribution by emphasising the relevance of industrial clusters in moderating technology-performance relationships, which has been underexplored in prior management research on SMEs.
5. **Implications for Future Theory Development:** The study encourages the development of integrative theoretical models that combine technology adoption, organisational capabilities, and functional integration. The differential strength of BI's impact on sales versus distribution indicates that future theoretical frameworks should consider domain-specific operational outcomes and moderating factors such as managerial support and employee expertise.

XII. CONCLUSION

The present study examined the utility of BI in maximizing market performance and distribution efficiency among SMEs operating in the Hingna industrial cluster, Nagpur. Data were collected from SME managers and executives, and analysis was conducted to weigh the importance of BI adoption along with the influence of managerial and organisational enablers.

The findings reveal that BI adoption has helped shift for sales performance, improving forecasting

accuracy, demand planning, and responsiveness to market changes. Similarly, BI adoption enhances distribution efficiency, facilitating better inventory management, route optimisation, and timely order fulfilment. Managerial and organisational enablers were found to strengthen the impact of BI on operational outcomes, demonstrating that leadership support, employee skills, and organisational readiness are essential for translating BI insights into practical improvements.

The study highlights that SMEs can leverage BI as a strategic capability to achieve enhanced operational efficiency and maintain competitive advantage, even in resource-constrained settings. It contributes to Indian SME literature by backing the claim with the operational benefits of BI adoption in a cluster-based context and emphasises the importance of managerial commitment and skill development for effective implementation.

The study confirms that effective BI adoption, supported by managerial and organisational enablers, plays a crucial role in improving operational performance in SMEs, offering both theoretical and practical guidance for managers, researchers, and policymakers.

XIII. LIMITATIONS AND FUTURE RESEARCH

Business Intelligence (BI) in enhancing sales performance and distribution efficiency among SMEs in the Hingna industrial cluster, several limitations must be acknowledged.

1. **Research Design and Scope:** Information was gathered from a specific period, which gathers a one-time sample. While this design is appropriate for examining relationships between BI adoption and operational outcomes, it fails to consider for longitudinal changes or evolving practices in SMEs. Newer studies could try a longitudinal design to observe end results over time of BI implementation on sales and distribution efficiency.
2. **Sample Size and Generalisability:** The study collected data from 200 SME managers and executives in the Hingna industrial area. While the sample provided sufficient insights for statistical analysis, the findings might not represent to all SMEs in India, especially those in different regions, industries, or cluster

environments. Future studies could expand the set of survey takers and include SMEs from multiple industrial clusters to enhance external validity.

3. Data Collection Methods: Survey responses were picked up through structured opinion forms, which rely on self-reported perceptions. Respondent bias or inaccurate reporting may have influenced the results. Field discussions or industry deep-dives in future projects could provide deeper understanding of BI adoption practices and operational challenges.
4. Focus on Operational Variables: Explored the role of BI on sales performance and distribution efficiency, along with managerial and organisational enablers. Other potential outcomes, such as customer satisfaction, financial performance, or innovation capability, we're not reviewed, Next steps might search for more performance indicators to provide a more comprehensive view of BI's impact in SMEs.
5. Technological and Contextual Factors: The study did not extensively explore the influence of specific BI tools, system complexity, or digital infrastructure on operational outcomes. Future research could investigate how different BI technologies, software platforms, and organisational digital maturity levels affect performance in SME settings.

REFERENCES

- [1] Gondekar, S., Satsangi, P., & Sharma, B. (2025). Digital transformation and distribution efficiency in small and medium enterprises (SMEs). *International Journal of Engineering Technologies and Management Research*, 12(3), 16–26. <https://doi.org/10.29121/ijetmr.v12.i3.2025.1697>
- [2] Srivastava, A., & Prakash, A. (2023). Leveraging business intelligence for organisational performance in emerging economies. *International Journal of Management Studies*, 5(2), 45–62.
- [3] Kulkarni, N. S. (2025). Adoption challenges and success factors for business intelligence in SMEs. *International Journal of Science and Innovation Engineering*, 2(11), 105–128. <https://doi.org/10.70849/IJSCI>
- [4] Kumar, A., & Krishnamoorthy, B. (2020). Business analytics adoption in firms: A qualitative study elaborating TOE framework in India. *International Journal of Global Business and Competitiveness*, 15(2), 80–93.
- [5] Shetty, J. P., & Panda, R. (2022). Cloud adoption in Indian SMEs – An empirical analysis. *Benchmarking: An International Journal*, 29(4), 1345–1366. <https://doi.org/10.1108/BIJ-08-2021-0468>
- [6] Kampooowale, I., Singh, H., Sakka, A. A. B., Iwuchukwu, E., & Al-Shaikhli, E. A. A. (2023). The role of digitalization on manufacturing SME firm performance in India. *International Journal of Academic Research in Business and Social Sciences*, 13(9), 581–597.
- [7] Raman, U. M., Rayan, A. A. J., & Aljapurkar, A. V. S. (2024). Harnessing business intelligence: From research insights to innovative growth strategies. *Journal of Informatics Education and Research*, 4(3).
- [8] PayNearby / Economic Times. (2025). MSMEs report business growth via digital adoption led by UPI and smartphones. <https://economictimes.indiatimes.com/small-biz/sme-sector/73-msmes-report-business-growth-via-digital-adoption-led-by-upi-and-smartphones-survey/articleshow/122124007.cms>
- [9] India Brand Equity Foundation (IBEF). (2024). Logistics and digital transformation in Indian SMEs. <https://www.ibef.org>
- [10] Ministry of MSME, Government of India. (2023). MSME digital scheme guidelines. <https://msme.gov.in>
- [11] Daga, A., Sharma, R., & Kapoor, P. (2025). AI applications for operational optimisation in Indian SMEs. *International Journal for Multidisciplinary Research*, 7(4), 88–105.
- [12] Zoho. (2025). Artificial intelligence and analytics adoption among Indian SMEs. <https://www.zoho.com>
- [13] ISBInsight, Indian School of Business. (2024). Data-driven decision-making and analytics trends in Indian enterprises. <https://www.isb.edu>
- [14] NITI Aayog. (2023). Digital transformation framework for Indian MSMEs. <https://niti.gov.in>
- [15] Reserve Bank of India. (2023). Report on technology adoption and financial inclusion in SMEs. <https://rbi.org.in>

- [16] Economic Times. (2024). Technology adoption in SMEs: Business intelligence and analytics. <https://economictimes.indiatimes.com>
- [17] Marohn, R., & Li, F. (2024). Data analytics capability maturity models for Indian SMEs. International Conference on Data Analytics Maturity Models.
- [18] Khare, P., & Choudhary, S. (2025). Data analytics adoption in small and medium enterprises: An assessment. International Journal of Trend in Scientific Research and Development, 9(4), 234–245. <https://www.ijtsrd.com>