Sinergi International Journal of Logistics
E-ISSN: 2988-6244
Volume. 2, Issue 2, May 2024
Page No: 76-89

Enhancing Inventory Accuracy and Operational Performance with ERP

Elisabeth Sudarmi[1], Widodo Sunaryo[2]
[1]Institut Bisnis Nusantara, Indonesia
[2]Universitas Pakuan Bogor, Indonesia
Correspondent : elisabeth@ibn.ac.id [1]

Received : April 15, 2024
Accepted : May 12, 2024
Published : May 31, 2024

Citation: Sudarmi, E., & Sunaryo, W. (2024). Enhancing Inventory Accuracy and Operational Performance with ERP. Sinergi International Journal of Logistics, 2(2), 76-89.

ABSTRACT: This narrative review explores the role of Enterprise Resource Planning (ERP) systems in enhancing inventory management across industries. Drawing from empirical studies, theoretical reviews, and case applications over the past 15 years, it highlights how ERP systems improve operational efficiency, inventory accuracy, and supply chain responsiveness. Key benefits include real-time data access, reduced manual errors, automation, and integration, with technologies like IoT and machine learning further supporting decision-making and coordination. Despite these advantages, challenges such as high costs, resistance to change, data quality issues, and skill gaps hinder implementation. The review emphasizes the need for integrated planning, user training, and strong data governance, and calls for more interdisciplinary research to address behavioral and contextual influences on ERP success. ERP is ultimately seen as a vital tool for navigating modern supply chain complexities.

Keywords: Enterprise Resource Planning, Inventory Management, Supply Chain Integration, Digital Transformation, Operational Efficiency, Data-Driven Decision Making, IoT in Logistics.

INTRODUCTION

The increasing complexity of global supply chains and the demand for real-time, efficient inventory management have led to the widespread adoption of Enterprise Resource Planning (ERP) systems across various industries, particularly within the manufacturing sector. ERP systems offer integrated solutions for managing core business processes, including procurement, production, inventory, and logistics, thereby enhancing organizational transparency and coordination. Despite their potential, implementing ERP systems effectively remains a multifaceted challenge, particularly when addressing the dynamic nature of inventory control in modern manufacturing environments. According to Staykov et al. (2013), integration of processes is central to ERP system functionality, yet companies often struggle to achieve seamless connectivity between legacy systems and modern ERP platforms. This is further compounded by the rapid pace of technological advancement, which demands ongoing system upgrades and customization.

Recent developments in inventory management strategies indicate a growing reliance on data-driven and technologically advanced solutions. The last decade has witnessed a shift from traditional, reactive inventory practices toward proactive, analytics-based approaches enabled by ERP systems. Li and Hou (2013) demonstrated how the logistics module in SAP-ERP enhances cost accounting capabilities from procurement through inventory, ultimately minimizing unnecessary stock accumulation. Similarly, Relich et al. (2014) emphasized the efficacy of material demand forecasting tools embedded within ERP platforms to streamline stock levels and reduce inventory holding costs. These insights underscore the evolution of ERP systems into decision-support tools that are crucial in driving operational efficiency in inventory management.

Moreover, emerging economies have begun leveraging ERP systems to address supply chain inefficiencies and improve responsiveness to market fluctuations. Case studies from countries such as Brazil and China reveal that ERP implementation can significantly improve logistics performance and reduce lead times, contributing to increased competitiveness in global markets (Murray et al., 2013; Tiwari et al., 2024). Tiwari et al. (2024) further highlight that the digitization of supply chains in developing regions has led to notable improvements in inventory accuracy and availability. These findings illustrate the role of ERP systems in facilitating strategic integration across supply chain functions, even in resource-constrained settings.

Despite these promising outcomes, several obstacles persist, especially concerning the financial and human resource investments required for successful ERP deployment. The cost of ERP implementation remains prohibitively high for many firms in developing economies, and a shortage of skilled personnel often hampers the effective utilization of these systems. As Hadidi et al. (2017) argue, structured implementation methodologies and comprehensive user training are crucial for realizing the long-term efficiency gains promised by ERP systems. Without sufficient investment in organizational change management and technical support, firms risk underutilizing ERP capabilities, leading to suboptimal inventory management outcomes.

In parallel, technological advancements such as Lean principles and innovative inventory control models have contributed to more agile and accurate inventory systems. Giuliana et al. (2024) found that the integration of Lean tools into ERP-based logistics processes significantly enhanced inventory accuracy and availability within small- and medium-sized retail enterprises. This alignment of ERP with continuous improvement methodologies not only streamlines operations but also fosters an innovation-driven organizational culture, further amplifying the benefits of ERP implementation.

Technological convergence, particularly the integration of Internet of Things (IoT) technologies with ERP systems, is reshaping supply chain visibility and responsiveness. As discussed by Wijesinghe et al. (2024), IoT-enabled ERP systems provide real-time insights into supply chain activities, supporting more informed and agile decision-making processes. However, these integrations raise critical issues related to data quality, consistency, and interoperability, especially in environments involving multiple stakeholders and data sources. Addressing these challenges requires a holistic approach to data governance and information management within ERP frameworks.

These developments illustrate a broader shift in the conceptualization of inventory management from a static, cost-centered function to a dynamic, technology-enhanced strategic capability. Effective ERP integration demands not only technical solutions but also organizational alignment and continuous process optimization. The synergy between technological tools, human expertise, and systemic reform is essential for achieving inventory accuracy and operational resilience in the modern manufacturing sector.

Global and regional data further support the assertion that ERP systems contribute to improved inventory management outcomes across industries. Tiwari et al. (2024) provide empirical evidence that ERP-driven digitization enhances inventory control and forecasting accuracy, thereby reducing operational costs. Real-time tracking capabilities embedded in ERP platforms allow firms to monitor stock movements and demand patterns, minimizing uncertainty and facilitating timely replenishment. In the retail sector, the application of Lean-based logistics models through ERP systems has yielded measurable improvements in inventory performance (Giuliana et al., 2024). These results affirm the strategic role of ERP in optimizing inventory flows and aligning supply chain activities with market demands.

The integration of IoT technologies into ERP systems offers further potential for advancing inventory control. As noted by Wijesinghe et al. (2024), IoT-enhanced ERP platforms provide rich data streams and advanced analytics, enabling firms to dynamically adjust inventory levels and predict reorder points with greater precision. This capacity for real-time adaptation is especially valuable in volatile markets where demand uncertainty and supply disruptions are prevalent. However, the literature reveals a gap in understanding how technological and human factors interact to influence ERP adoption and effectiveness in inventory management.

Many existing studies focus primarily on the technical advantages of ERP systems, overlooking the critical role of organizational culture, user acceptance, and behavioral dynamics in determining implementation success. For instance, Hadidi et al. (2017) highlight the behavioral challenges encountered in the construction industry when aligning ERP systems with business processes. This underscores the need for more comprehensive research that incorporates human and contextual factors into ERP evaluation frameworks.

Additionally, external variables such as market volatility and regulatory changes are often underexplored in current ERP literature. Ivanov et al. (2020) emphasize the influence of external shocks on supply chain performance, suggesting that ERP systems must be adaptable to external disruptions to maintain inventory stability. Furthermore, there is a lack of interdisciplinary studies that integrate sustainability, social responsibility, and resilience considerations into ERP and inventory management research (Tinkov et al., 2023).

This literature review aims to address these gaps by synthesizing existing knowledge on ERP implementation and its effects on inventory management, with a particular focus on operational efficiency and technological integration. The review seeks to identify best practices and effective strategies that enhance inventory accuracy, reduce costs, and improve responsiveness to market demands (Staykov et al., 2013; Ivanov et al., 2020; Inprasit & Tanachutiwat, 2018). It also explores the evolution of ERP technologies and their intersection with emerging innovations such as IoT

and machine learning, thereby providing a forward-looking perspective on smart inventory management (Wijesinghe et al., 2024).

Geographically, this review emphasizes comparative analysis between Southeast Asia and Sub-Saharan Africa, regions that exhibit varying degrees of ERP adoption and infrastructure readiness. In Southeast Asia, ERP implementation in manufacturing and retail sectors has yielded significant logistics efficiencies, while Sub-Saharan Africa faces challenges related to technological infrastructure and workforce capacity (Staykov et al., 2013). These disparities highlight the importance of contextual factors in shaping ERP outcomes and provide a basis for regional policy recommendations.

In the healthcare sector, complex regulatory requirements and operational intricacies pose unique barriers to ERP adoption. Inprasit and Tanachutiwat (2018) demonstrate the potential of machine learning-enhanced ERP systems for pharmaceutical inventory optimization, yet research on the sustainability and social implications of ERP in healthcare remains limited. The retail sector, by contrast, has seen more extensive ERP integration, with Lean-based inventory models producing tangible performance gains (Giuliana et al., 2024). Nonetheless, more comparative research is needed to understand how cultural and economic contexts influence ERP effectiveness across sectors and geographies.

Ultimately, the literature reveals a need for more holistic and comparative evaluations of ERP systems, incorporating technical, human, environmental, and policy dimensions. Current studies often neglect long-term impacts and sustainability considerations, which are crucial for understanding the transformative potential of ERP in modern supply chains (Khan & Yu, 2019). By addressing these gaps, this review contributes to a more nuanced understanding of ERP's role in shaping efficient, resilient, and sustainable inventory management systems.

Through this comprehensive review, the paper aims to inform both practitioners and scholars about the multifaceted dynamics of ERP implementation. It highlights the importance of integrated strategies tailored to specific regional and sectoral contexts and underscores the value of interdisciplinary approaches in enhancing ERP-driven inventory management performance. Future research should continue to explore the intersection of technology, human factors, and external environments to develop adaptive, scalable, and inclusive ERP solutions for global supply chains.

METHOD

The methodology adopted in this study was designed to ensure the identification, selection, and analysis of relevant literature on the integration of Enterprise Resource Planning (ERP) systems with inventory management and broader supply chain practices. A structured literature review approach was applied, drawing from multiple established academic databases to achieve a comprehensive understanding of the research landscape. The goal of this methodology was to

synthesize existing knowledge, highlight research trends, and identify gaps that warrant further investigation.

To ensure coverage of both technological and managerial dimensions of ERP systems, a multi-database search strategy was employed. The primary databases utilized included IEEE Xplore, Scopus, SpringerLink, ScienceDirect, and Google Scholar. Each of these databases offers distinct advantages, such as access to peer-reviewed engineering and information systems articles (IEEE Xplore), broad scientific coverage across disciplines (Scopus and ScienceDirect), and an inclusive repository of grey and white literature (Google Scholar). By combining searches across these platforms, the study aimed to balance comprehensiveness with specificity, ensuring that both technological frameworks and practical applications in ERP and inventory management were adequately represented.

The literature search process emphasized precision and relevance through the use of strategic keyword combinations and Boolean operators. Keywords such as "ERP," "inventory management," "supply chain," "logistics," and "enterprise resource planning" were identified as central search terms due to their prevalence in existing studies and alignment with the scope of the review. These keywords were systematically combined using Boolean operators to refine the search. For instance, combinations like "ERP AND inventory management," "enterprise resource planning AND supply chain," and "ERP AND logistics" were used to target studies that explored the relationship between ERP functionalities and logistics or inventory processes. Additionally, broader combinations like "supply chain AND inventory management" were included to capture literature that might indirectly contribute to the discussion on ERP's impact.

The use of the Boolean operator "OR" was instrumental in accommodating variations in terminology and increasing the inclusivity of the search results. For example, the query "ERP OR enterprise resource planning" was deployed to capture articles using different nomenclature to describe similar systems. Precision in searching was further enhanced through the use of quotation marks for exact phrase matching, such as in the query "material requirements planning," which helped in filtering results with exact terminological relevance. In scenarios where the research interest was more targeted, such as evaluating the role of ERP in healthcare logistics, more specific queries like "ERP AND logistics improvement AND healthcare" were crafted to direct the search toward studies reflecting this context.

The eligibility of literature was determined based on clearly defined inclusion and exclusion criteria. Inclusion criteria required that studies be published in peer-reviewed journals or reputable conference proceedings within the last fifteen years to ensure relevance and recency. Articles had to focus on ERP systems within the context of inventory management or supply chain optimization. Studies were included if they reported empirical findings, whether quantitative, qualitative, or mixed-methods, and presented applications or evaluations of ERP technologies. Exclusion criteria eliminated studies not available in full text, articles not written in English, and papers that lacked a direct connection between ERP and inventory or logistics management. Additionally, duplicate records across databases were removed to ensure a clean and non-redundant dataset for analysis.

Following the initial identification of studies, a multi-stage screening process was conducted. First, article titles and abstracts were reviewed to ascertain alignment with the research objectives. Those that met the preliminary relevance threshold were subjected to full-text review. During this phase, studies were further examined for methodological rigor, context of ERP application, and depth of analysis regarding inventory management outcomes. Only studies that provided substantial insights into the practical or theoretical implications of ERP integration with supply chain and inventory systems were retained. This filtering process ensured that the final corpus of literature comprised high-quality, contextually rich sources.

Various types of research designs were considered to allow a multifaceted understanding of the topic. Included studies spanned experimental research, such as randomized trials evaluating ERP system performance; observational designs like cohort and case studies illustrating longitudinal ERP impact; and analytical reviews offering comprehensive syntheses of existing knowledge. This heterogeneity in research designs enriched the review by incorporating both practical implementation cases and theoretical discourse on ERP and inventory system alignment.

To assess the scholarly impact and reliability of the selected articles, citation metrics and journal quality indicators were considered. High-impact journals with significant citation frequencies were prioritized to anchor the review in authoritative sources. Fomina and Samoylov (2017) emphasize that the impact factor of journals, as well as citation count, are valid indicators of scholarly influence and relevance. This step helped ensure that the literature review reflected not only a breadth of perspectives but also academic rigor.

Throughout the selection and evaluation process, careful attention was paid to the thematic focus of the literature. Studies were categorized according to thematic relevance, such as technological integration (e.g., ERP-IoT convergence), organizational change management, inventory accuracy, and supply chain visibility. These thematic categories allowed for a systematic synthesis of findings and facilitated comparative analysis across different industrial sectors and geographic contexts. Particular attention was given to identifying studies from diverse economic settings to understand how ERP systems are adapted in various operational environments, including those with resource limitations or regulatory complexities.

In summary, the methodological framework for this literature review was grounded in systematic search strategies, precise keyword application, rigorous inclusion criteria, and detailed evaluation of scholarly relevance. The multi-database approach, combined with strategic Boolean logic, enabled the identification of a robust set of academic works that illuminate the intersections of ERP systems, inventory management, and supply chain efficiency. By integrating both empirical evidence and theoretical insights, the methodology supports a comprehensive analysis that informs current debates and provides a foundation for future research in this evolving domain.

RESULT AND DISCUSSION

The implementation of Enterprise Resource Planning (ERP) systems has consistently demonstrated significant improvements in operational efficiency across various industries including manufacturing, retail, and healthcare. Empirical evidence from Tiwari et al. (2024) indicates that companies adopting ERP systems experienced substantial enhancements in supply chain coordination and inventory management accuracy. These improvements were marked by a noticeable reduction in process time and an increase in data accuracy due to system integration. Aldoradin et al. (2024) further emphasized that a comprehensive implementation of ERP resulted in optimized stock handling and operational cost reduction within industrial enterprises. The case of manufacturing, as discussed by Ivanov et al. (2020), underscores ERP's ability to accommodate fluctuating market demand by offering greater flexibility in production scheduling and faster product delivery cycles. Similar trends are evident in the retail sector, where Giuliana et al. (2024) illustrated that the adoption of Lean-based logistics control models through ERP increased inventory accuracy and shortened order cycle times.

An essential component contributing to this efficiency is the preparedness and training of personnel. As ERP systems centralize operational data, cross-departmental collaboration and communication are streamlined. Well-trained teams can engage more effectively with the system, resulting in faster and more accurate decision-making processes. Aldoradin et al. (2024) found that staff training significantly reduced manual errors, which previously plagued inventory operations. This link between human capacity development and ERP efficiency highlights the importance of organizational readiness for digital transformation.

In terms of order cycle time reduction and lower stockout rates, ERP systems have made demonstrable impacts. Although some studies suggest significant reductions in order cycle times, quantitative data supporting a fixed percentage is currently limited. However, Inprasit and Tanachutiwat (2018) provide compelling evidence that ERP systems utilizing machine learning to automate reorder points can reduce stockout rates by 20% to 40%, depending on industry and organizational size. These findings suggest that ERP contributes to demand forecasting precision, facilitating inventory levels that align more closely with market needs and thereby reducing product unavailability.

Supporting this, Wijesinghe et al. (2024) demonstrated how integrating IoT into ERP enhances real-time inventory management. Through the continuous input of live data from IoT sensors, companies are better equipped to predict inventory fluctuations and prevent stock imbalances. These capabilities foster a dynamic equilibrium between supply and demand, ensuring companies remain agile in a volatile market environment. Collectively, these outcomes point to ERP's centrality in enhancing decision-making efficiency, optimizing cycle times, and managing inventory risk.

With regard to inventory accuracy, several empirical studies underscore the efficacy of ERP systems in improving stock tracking and documentation. Li and Hou (2013), in a case study of SAP-ERP deployment at Jiaozuo Wanfang, observed notable improvements in inventory accuracy post-implementation. Their findings emphasized the role of Material Resource Planning (MRP) modules in stock control, enabling more effective monitoring and reduction in reporting errors.

Likewise, Heck et al. (2010) explored the relationship between process-oriented performance measurement and inventory management, concluding that the use of ERP-driven key performance indicators (KPIs) significantly reduced discrepancies between physical and digital inventory records. The proactive monitoring facilitated by ERP enhanced the transparency and reliability of inventory data, a critical factor in minimizing operational disruptions.

From a technological standpoint, Relich et al. (2014) highlight that ERP's integration of MRP with Business Intelligence (BI) tools provides organizations with predictive analytics for better purchase planning. This integration ensures that stock levels are maintained with precision, reducing the frequency of backorders or overstock scenarios. Further advancements such as the use of IoT and machine learning within ERP platforms, as detailed by Inprasit and Tanachutiwat (2018), offer real-time visibility into inventory movement and status. These innovations drastically reduce the gap between recorded and actual stock levels, increasing system reliability and supporting customer satisfaction through improved order fulfillment.

ERP systems play a pivotal role in integrating diverse organizational functions including procurement, warehousing, and sales. This integration is vital for achieving streamlined operations and reducing information silos that hinder cross-functional collaboration. Li and Hou (2013) demonstrated that ERP systems facilitate the convergence of logistical and inventory processes with purchasing and sales functions, ensuring all departments operate from a unified data source. The immediate availability of real-time data across departments allows for agile responses to market demand shifts, thereby reducing both lead times and inventory inaccuracies.

Li and Hou's (2013) analysis of ERP deployment in a manufacturing environment revealed that automated modules enabled seamless coordination between fluctuating customer demand and internal supply chain adjustments. As a result, decisions related to procurement and inventory replenishment could be synchronized with sales activities, preventing both stockouts and excess inventory. This type of operational cohesion reflects ERP's core value in managing complexity through automation.

Hadidi et al. (2017) further explored ERP's role in minimizing manual intervention. Automation through ERP substantially reduces human error, particularly in repetitive inventory tasks such as data entry and reorder calculations. Automated MRP modules compute material needs in real time based on actual sales data, replacing the traditional manual systems that are prone to inaccuracies. According to Relich et al. (2014), ERP systems equipped with BI capabilities can generate timely reports and inventory forecasts, allowing managers to make data-driven decisions while maintaining control over inventory dynamics.

Giuliana et al. (2024) examined the deployment of ERP systems integrated with sensor technology and IoT in the retail sector. These technologies automate the monitoring of inventory conditions and movement, providing continuous feedback loops for system optimization. The ability to access detailed, real-time information enables companies to reduce reliance on manual inventory counts and to quickly respond to anomalies in stock levels. Thus, ERP not only integrates functions but also elevates operational intelligence through automation and smart monitoring.

Notwithstanding these benefits, ERP implementation often encounters significant challenges that can undermine its effectiveness. One common issue is the complexity of integrating ERP with

legacy systems. In many cases, the architectural differences and incompatible data formats between old and new systems create synchronization issues, leading to data inconsistencies and inefficiencies in inventory tracking. Moreover, the financial burden of ERP deployment—covering software, hardware, and training costs—remains a barrier for small and medium enterprises.

Organizational culture poses another critical challenge. Resistance to change, particularly from employees accustomed to legacy systems, often hinders ERP adoption. Without strong managerial support and comprehensive training, the workforce may fail to leverage the system's full capabilities. Poor data quality is an additional obstacle; inaccurate or incomplete data inputs can impair ERP functionality, resulting in misleading reports and flawed decision-making processes. Furthermore, the shortage of adequately skilled personnel to operate ERP systems exacerbates these issues, highlighting the need for targeted workforce development strategies.

To overcome these barriers, successful organizations have adopted various strategies as reported in the literature. Careful pre-implementation planning, involving all stakeholders, is crucial for anticipating integration issues and ensuring alignment across departments. Effective training programs not only enhance user proficiency but also build trust and acceptance of the new system. Maintaining high data quality through regular audits and standard operating procedures ensures ERP systems function with integrity. Fostering a collaborative culture that promotes cross-departmental engagement with ERP systems enhances system utility and aligns with strategic goals.

Feedback mechanisms also play a vital role in post-implementation optimization. Continuous evaluation of ERP performance enables organizations to make incremental improvements and adapt to evolving business needs. By integrating these strategies, firms can better navigate the complexities of ERP implementation and maximize the system's potential in inventory management. In summary, while ERP presents transformative benefits for inventory accuracy, operational efficiency, and systemic integration, its success is contingent upon strategic planning, employee engagement, and a robust digital infrastructure.

The findings from the literature review affirm the critical role of Enterprise Resource Planning (ERP) systems in modern inventory management, reinforcing existing theories while also challenging traditional assumptions in the supply chain and logistics domains. The integration of ERP within diverse operational contexts such as manufacturing, retail, and healthcare demonstrates that these systems not only enhance efficiency and accuracy but also transform how organizations conceptualize and execute their inventory strategies. The following discussion unpacks the implications of these findings, assesses contributing systemic factors, explores practical and theoretical applications, and highlights potential avenues for further research.

One of the most notable contributions of ERP systems lies in their capacity for cross-functional integration. As demonstrated by Tiwari et al. (2024), ERP enables seamless communication between procurement, warehousing, and sales, facilitating real-time data exchange that enhances organizational responsiveness. This interconnected structure supports inventory synchronization and aligns operational processes with market demand fluctuations. From a theoretical standpoint, these insights reinforce the systems theory model in supply chain management, which emphasizes the value of integrated processes to reduce complexity and enhance agility. Empirical findings indicate that ERP not only supports this framework but extends it by embedding real-time analytics and predictive modeling capabilities into core operations.

The literature also consistently underscores the transformative potential of ERP in reducing manual dependency. The work of Giuliana et al. (2024) provides a compelling case where ERP implementation led to significant improvements in inventory accuracy and operational efficiency through automation. This supports the principles of lean inventory management, where the goal is to eliminate waste and reduce errors associated with human intervention. These outcomes validate automation as a central pillar of contemporary inventory control, suggesting that ERP systems serve not only as data repositories but also as active participants in decision-making and error mitigation.

However, the effective functioning of ERP systems hinges on the quality of data being processed. Although Hadidi et al. (2017) focused primarily on ERP applications in construction, broader literature implies that high-quality data is essential to optimizing ERP's inventory management capabilities. The integrity of input data determines the reliability of forecasting, reporting, and order fulfillment processes. Inaccurate data can propagate systemic inefficiencies, undermining the advantages that ERP systems are intended to deliver. Thus, organizational efforts to implement ERP must include parallel investments in data governance protocols and training programs aimed at ensuring data accuracy.

The integration of emerging technologies with ERP has opened new avenues for smart inventory systems. Wijesinghe et al. (2024) explored how Internet of Things (IoT) technologies complement ERP functionalities by enabling real-time tracking of inventory levels and environmental conditions. This convergence of technologies moves beyond traditional ERP capabilities, offering predictive insights and enabling dynamic decision-making in inventory management. These advancements question older models that assume static inventory systems and instead advocate for fluid, data-driven frameworks that adjust to environmental cues and consumer behavior in real time.

The implications of these findings are both theoretical and practical. On a theoretical level, they suggest a need to update existing inventory management models to incorporate the role of intelligent systems and human-technology interaction. Traditional models such as Economic Order Quantity (EOQ) and Just-in-Time (JIT) must be recontextualized within ERP-enabled environments, where decisions are informed by live data streams rather than static parameters. Practically, the research encourages organizations to pursue comprehensive ERP strategies that integrate advanced technologies while emphasizing user training, data accuracy, and process alignment.

In addition to internal operational improvements, ERP systems also contribute significantly to broader supply chain efficiency. Li and Hou (2013) discuss how ERP facilitates material planning, procurement, and production synchronization, fostering a cohesive workflow that eliminates information silos. The ability to consolidate these functions within a unified system increases transparency and expedites decision-making, reducing the time needed to respond to market changes. These insights have important implications for both firm-level strategy and national industrial policy.

Enhanced communication across departments, enabled by ERP platforms, plays a critical role in streamlining operations. Tiwari et al. (2024) report that digitalized supply chains, supported by ERP, improve visibility and responsiveness to customer demand. Real-time data sharing fosters a

more agile organizational environment, where procurement, sales, and logistics can align their strategies quickly in response to shifting market conditions. This increased responsiveness not only boosts customer satisfaction but also enhances supply chain resilience.

Transparency in inventory management is another significant benefit highlighted by the literature. According to Relich et al. (2014), accurate inventory tracking supported by ERP systems allows for better demand forecasting and production planning. This level of visibility reduces the risks of stockouts and overstocking, both of which have financial implications and can disrupt service delivery. Accurate and timely inventory data thus forms the backbone of efficient supply chains, making ERP an indispensable tool for operational excellence.

Beyond the organizational context, ERP adoption has wider implications at the national level. Governments that promote ERP implementation across key sectors such as manufacturing and logistics can enhance national competitiveness. As Tinkov et al. (2023) note, sustainable supply chain practices supported by ERP contribute not only to operational efficiency but also to social and environmental outcomes. By facilitating better resource allocation and reducing waste, ERP aligns with broader goals of industrial sustainability and policy-driven digital transformation.

Despite these benefits, the successful implementation of ERP remains fraught with challenges. The literature identifies several recurring barriers, including high initial costs, resistance to change, lack of skilled personnel, and poor data quality. These issues highlight the systemic nature of ERP adoption, where technical, organizational, and human factors must align. Addressing these barriers requires a multipronged strategy encompassing training, change management, and infrastructure investment.

Several solutions have been proposed to overcome these challenges. Relich et al. (2014) recommend comprehensive training programs to equip users with the necessary skills to navigate ERP systems effectively. Data quality can be maintained through regular audits and automated validation protocols. Wijesinghe et al. (2024) suggest leveraging IoT and machine learning to enhance system intelligence and reduce manual oversight. A fuzzy multi-objective planning approach, as presented by Supriyanto and Noche (2011), provides a structured methodology to navigate complex trade-offs in inventory decisions under uncertainty.

Institutional support is also essential. As highlighted by Staykov et al. (2013), interdepartmental collaboration and strong leadership are key to overcoming resistance and ensuring coherent ERP implementation. Moreover, national-level policies that provide incentives for ERP adoption—such as training subsidies or tax breaks—could accelerate digital transformation, particularly in small and medium enterprises. Tinkov et al. (2023) argue that such policy interventions are crucial for integrating sustainability objectives with technological innovation.

While the current body of research offers valuable insights, several gaps remain. First, there is limited comparative analysis across different sectors and geographies. Most studies are concentrated in industrialized regions or specific industries, leaving a void in understanding how ERP systems function in less developed or more volatile markets. Furthermore, the long-term impact of ERP on organizational performance, sustainability, and labor dynamics remains underexplored. These areas represent fertile ground for future research, particularly in assessing the evolving role of ERP as part of broader digital ecosystems.

Another underdeveloped area is the interaction between ERP systems and organizational culture. The success of ERP often hinges not just on technological implementation but on the readiness of the workforce to embrace change. Qualitative research exploring user behavior, management styles, and cultural readiness could provide deeper insights into the human dimensions of ERP success. Such research would complement existing quantitative studies and offer a more holistic understanding of ERP dynamics.

In conclusion, ERP systems have redefined inventory management by integrating technology, human resources, and organizational processes. The findings from this review validate the transformative potential of ERP while acknowledging the systemic challenges that impede its success. As organizations navigate increasingly complex supply chain environments, the strategic deployment of ERP, supported by sound policies and adaptive cultures, will be critical in achieving operational excellence and long-term sustainability.

CONCLUSION

This narrative review demonstrates that the integration of Enterprise Resource Planning (ERP) systems into inventory management significantly enhances operational efficiency, inventory accuracy, functional integration, and overall supply chain responsiveness. Empirical evidence from various industries confirms that ERP facilitates real-time data sharing, reduces manual dependency, and supports predictive decision-making by integrating advanced technologies such as Internet of Things (IoT) and machine learning. These outcomes challenge traditional inventory models and affirm ERP's transformative role in creating agile, data-driven, and transparent supply chains.

Despite the recognized benefits, ERP implementation is often hindered by systemic challenges including high initial costs, data quality concerns, inadequate training, and organizational resistance. To overcome these barriers, organizations must adopt comprehensive strategies that prioritize structured implementation planning, continuous user training, robust data governance, and strong interdepartmental collaboration. National-level policy interventions such as training incentives and digital infrastructure support may further facilitate ERP adoption, particularly among small and medium enterprises.

Future research should focus on comparative analyses across diverse sectors and geographies, and explore the long-term impacts of ERP on sustainability and workforce adaptation. Investigations into behavioral and cultural dimensions of ERP adoption will enrich the understanding of how organizations can align technological change with human factors.

Ultimately, this review affirms that ERP systems—when implemented strategically with automation, integration, and quality data at their core—can serve as a pivotal mechanism for enhancing inventory management and addressing the complexities of modern supply chains.

REFERENCE

Aldoradin, M., Saidi, A., & Djordjevic, M. (2024). ERP implementation for cost reduction and inventory control in manufacturing. *Industrial Engineering Journal*, 16(1), 45–61.

Fomina, S., & Samoylov, R. (2017). Journal impact and citation metrics as tools for assessing academic significance. *Journal of Research Evaluation*, 26(3), 243–252.

Giuliana, M., Ortega, A., & Silveira, R. (2024). Lean ERP logistics models in retail: Enhancing inventory accuracy. *Retail Management and Strategy Journal*, 9(2), 123–139.

Hadidi, L. A., Veyssière, L., & Ghosh, S. (2017). Implementation challenges of ERP in the construction industry. *International Journal of Construction Management*, 17(4), 267–278.

Heck, E., Spruit, M., & Batenburg, R. (2010). Inventory performance and process orientation in ERP environments. *Information Systems Management*, 27(1), 39–49.

Inprasit, W., & Tanachutiwat, S. (2018). Inventory optimization in pharmaceutical supply chains using machine learning-enhanced ERP systems. *Healthcare Logistics Journal*, 6(3), 98–112.

Ivanov, D., Dolgui, A., & Sokolov, B. (2020). The impact of external disruptions on supply chains: Insights from the COVID-19 pandemic. *International Journal of Production Research*, 58(10), 2904–2915.

Khan, A. A., & Yu, W. (2019). The strategic role of ERP in sustainable supply chains. *Journal of Cleaner Logistics*, 11(2), 67–83.

Li, Y., & Hou, C. (2013). Application of SAP ERP in Jiaozuo Wanfang's inventory control system. *Chinese Journal of Systems Engineering*, 31(5), 100–108.

Mohammad, W. (2023). The role of AI Waifu characters in supporting Weaboos with Post-Traumatic Relationship Syndrome (PTRS). *Sinergi International Journal of Education*, 1(2), 77–96.

Murray, P., Alves, L., & Da Silva, M. (2013). ERP adoption in Brazil: Competitive advantages and barriers. *Journal of Emerging Market Information Systems*, 5(1), 1–14.

Relich, M., Bzdyra, K., & Pawlewski, P. (2014). Forecasting demand in ERP systems with business intelligence tools. *International Journal of Production Economics*, 154, 65–78.

Staykov, A., Tsvetkov, A., & Kolev, D. (2013). ERP implementation and integration challenges in SMEs. *Journal of Enterprise Systems Integration*, 8(1), 54–68.

Supriyanto, W., & Noche, B. (2011). Fuzzy multi-objective planning for ERP-supported inventory decisions. *International Journal of Advanced Manufacturing Systems*, 12(3), 174–185.

Tinkov, B., Mihaylov, M., & Georgieva, S. (2023). ERP and sustainability alignment in industrial policy. *Journal of Sustainable Industrial Practices*, 17(4), 202–219.

Tiwari, P., Zhang, H., & Kumar, S. (2024). ERP-driven digitization in emerging markets: A comparative study. *Asian Journal of Supply Chain Innovation*, 10(1), 89–105.

Wang, S., & Ip, W. H. (2013). Evaluating RFID deployment in retail supply chain with system dynamics. *International Journal of Production Research*, 51(5), 1433–1450.

Wilke, M., Mertens, M., & Ziekow, H. (2022). RFID in hospital medication management: Empirical evaluation of performance. *Health Systems*, 11(1), 50–66.

Wu, N., Nystrom, M. A., Lin, T. R., & Yu, H. C. (2010). Challenges to global RFID adoption. *Technovation*, 30(3), 154–160.

Wijesinghe, R., Silva, K., & Fernando, P. (2024). Enhancing inventory tracking with IoT-integrated ERP systems. *Journal of Smart Supply Chains*, 6(2), 77–91.