

Innovation in Enterprise Resource Planning and Supply Chain Management for Optimizing Sales and Operations Planning

Muhammad Yamani Enginer¹, Aurelia Carissa Anindita Wiyono^{1*}, Dian Cristiani¹, Dafina Humiroh Althof Ridhwan¹, Raseliya Ananda Wahid¹, Wisnu Yuwono^{1,2}, Suyono Saputra^{1,2}

¹Universitas Internasional Batam, Kepulauan Riau, Indonesia

²Ikatan Sarjana Ekonomi Indonesia (ISEI) Cabang Batam, Kepulauan Riau, Indonesia

*Corresponding e-mail : 2341438.aurelia@uib.edu

ABSTRACT

Purpose: Manufacturing companies operating in the global automotive industry face significant difficulty integrating Enterprise Resource Planning (ERP) and Supply Chain Management (SCM) systems to optimize the Sales and Operations Planning (S&OP) process. This study analyzes how ERP-SCM integration can improve operational efficiency and the accuracy of production planning in an automotive manufacturing company.

Methods: A qualitative literature-based case-study design was used, applying identification, evaluation, and interpretation of the company's documented ERP and SCM practices as the analytical framework.

Findings: The findings show that integration strengthens direct data visibility, accelerates decision-making, and aligns demand planning with production capacity, mainly through real-time reporting, just-in-time production scheduling, and unified financial and human-resource data. Obstacles remain, however, including limited staff training, weak integration of demand-forecasting tools, and persistent data discrepancies between departments.

Originality/value: The study contributes a contextual, automotive-sector case analysis of ERP-SCM integration for S&OP, concluding that sustained benefits depend on complementing the technology with structured change management and cross-functional coordination, offering practical guidance for other manufacturing firms designing adaptive operational strategies for volatile global markets.

Keywords : Enterprise Resource Planning; Supply Chain Management; Sales and Operations Planning; Automotive Industry; Operational Efficiency

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1. INTRODUCTION

Manufacturing companies face substantial challenges in implementing Enterprise Resource Planning (ERP) systems in ways that genuinely improve operational performance and supply-chain management. The automotive manufacturer examined in this study is one of the world's leading transportation-equipment producers (Marcella et al., 2022), and like many manufacturers it struggles to optimize ERP use because of production-process complexity, the need for real-time data integration, and increasingly volatile market demand (Trisanto et al., 2024). The integration of financial management and human-resource management within ERP is equally important, since the two functions are interdependent in keeping operations efficient and effective (Iman et al., 2024), while inventory management and cross-departmental collaboration that remain incompletely integrated continue to create bottlenecks in the production process (Nurmasari et al., 2025). This situation points to the need for a comprehensive

approach that combines ERP with supply-chain management to strengthen visibility and operational responsiveness amid intensifying market competition (Waileruny, 2024).

In the era of industrial digitalization, ERP has become a central pillar supporting the operational transformation of manufacturing firms (Feng & Ali, 2024), as global technological change compels companies to adopt digital tools to strengthen performance (Chang et al., 2023). ERP functions as an integrated information system linking production, finance, logistics, and human-resource management within a single platform (Tuli & Kaluvakuri, 2022), with its principal advantage lying in real-time data provision, greater process visibility, and faster data-driven decision-making (Sri et al., 2024). Integrating ERP with Supply Chain Management (SCM) extends this capability to external relationships with suppliers and customers, improving the end-to-end flow of information, materials, and finance across the supply chain (Barber et al., 2024) - a capability that is crucial for addressing global supply-chain complexity and volatile demand, since it improves inter-departmental coordination and reduces the information silos that typically hinder strategic decision-making (Avi, 2023). Understanding how ERP-SCM synergy underpins integrated planning processes such as Sales and Operations Planning (S&OP) is therefore central to this study (Azmeera, 2022).

This research is grounded in Supply Chain Management theory and Sales and Operations Planning theory. SCM theory is adopted because it emphasizes integrated coordination of material, information, and financial flow to achieve operational efficiency and market responsiveness, which is directly relevant to the demand volatility and global supply-chain complexity manufacturing firms face (Saleheen et al., 2023). S&OP theory, in turn, provides the basis for aligning strategic planning with operational execution through cross-departmental collaboration, which is essential for balancing market demand against production capacity; the choice to examine S&OP together with ERP and SCM integration follows from the manufacturing sector's need for greater data visibility and real-time decision-making (Liu et al., 2023), particularly as cloud-based ERP and artificial intelligence increasingly improve demand-forecasting accuracy and efficiency (Kusuma et al., 2024).

The innovative integration of ERP and SCM within an S&OP framework is critical for manufacturers competing in dynamic global markets, since it enables automated demand-supply planning, faster response to market fluctuations, and more accurate production planning - advantages that matter most where product life cycles are short and consumer demand shifts quickly (Saleheen et al., 2023). This study contributes by examining ERP-SCM integration in optimizing S&OP within an automotive manufacturing context, with its novelty lying in a contextual approach that accounts for the specific challenges of global supply-chain complexity and the precise coordination required between suppliers and producers. Accordingly, this study analyzes the role of ERP-SCM integration and innovation in optimizing S&OP at an automotive manufacturing company, focusing on how integrated digital technology improves cross-departmental coordination, reduces demand-supply mismatch, and accelerates direct, data-driven decision-making, while also identifying the challenges of ERP-SCM integration and offering strategic recommendations for improving operational efficiency and competitiveness amid an increasingly complex global market (Paularine et al., 2025).

2. LITERATURE REVIEW

Sales and Operations Planning (S&OP) has become an increasingly important element of the modern manufacturing ecosystem. S&OP is a strategic process designed to align sales and operational activities, encompassing demand forecasting, production-capacity assessment, and identification of the ideal balance between supply and demand (Kusuma et al., 2024). Within the integration of S&OP with ERP, a significant trend has emerged toward cloud-based ERP adoption, which makes S&OP planning more agile: modern ERP platforms enable real-time synchronization between market demand and production capacity, allowing automotive manufacturers to move from monthly planning cycles toward continuous planning, while artificial intelligence embedded in ERP-S&OP integration has enabled more precise demand prediction and the differentiation of production strategy by market segment and profitability (Dekye et al., 2022).

In an era of digitalization and global competition, integrating Supply Chain Management within ERP is viewed not merely as a technical efficiency solution but as a key strategy for aligning business processes end-to-end. One important dimension of this integration is its capacity to optimize the S&OP process itself - a cross-functional process that unifies demand planning and supply planning in support of the firm's strategic goals (Thahira & Rimbasari, 2023). Skilled supply-chain and logistics management is increasingly regarded as one of the most urgent capabilities firms will need going forward, compelling managers to continuously master contemporary trends in the field (Jamaludin, 2022). Supply Chain Integration theory further explains that the coherence of processes across supply-chain entities, both internal and external, directly contributes to improved operational efficiency and customer satisfaction (Edbert & Pakpahan, 2023). ERP, for its part, is an information system that supports the automation and integration of core business processes across finance, manufacturing, logistics, and human resources, rooted in Systems Theory and Information Integration Theory, both of which emphasize the importance of consolidating data and processes within a single, coherent, real-time platform (Wibowo & Aribowo, 2025).

Applied to the automotive sector specifically, globalization compels manufacturing firms to strengthen their competitiveness relative to rivals (Harianto et al., 2024). In a highly competitive and complex industry, ERP plays a decisive role in supporting the S&OP process: rapid market change, extensive product variation, and heavy reliance on global supply chains make information integration and process efficiency central management priorities. ERP systems, such as SAP-based platforms widely used in the sector, unify production, logistics, and finance within a single integrated system that supports data-driven decision-making, helping ensure that production processes run efficiently and meet international standards.

3. METHOD

This study applies a qualitative method with a literature-based case-study design to examine the integration of Sales and Operations Planning (S&OP) with Enterprise Resource Planning (ERP) and Supply Chain Management (SCM) in the automotive manufacturing context. A qualitative approach was chosen because it can reveal, in detail, how system integration

unfolds and how it affects operational efficiency, consistent with the view that qualitative analysis allows complex systems to be understood through the synthesis of multiple data sources (Abdussamad, 2021).

Data analysis followed three stages: identification of the ERP and SCM functions and modules in use at the case company; evaluation of their contribution to reducing information silos and improving cross-departmental efficiency; and interpretation of how the resulting data flows support the S&OP process specifically. The data analyzed are descriptive in nature, drawn from documented company practices reported in prior academic and industry publications, and were examined by connecting relevant theory to the practices the company has adopted.

Through this method, the study aims to provide a comprehensive picture of best practices and the challenges of integrating S&OP, ERP, and SCM within an automotive manufacturing company, thereby supporting the development of operational strategies that remain adaptive to global market dynamics. As with any literature-based case analysis, findings are interpretive and are not intended to be statistically generalized beyond the case examined.

4. RESULTS AND DISCUSSION

The case company deploys a SAP-based ERP platform as the cohesive foundation connecting its business operations, integrating production management, quality control, and distribution to help ensure that manufacturing processes run efficiently and meet international standards. Four functional areas stand out. First, financial management: ERP is used to record, monitor, and analyze financial activity, including production cost, material purchasing, and production revenue, while supporting budget transparency and real-time, data-driven financial decision-making linked to cost-of-production reports, cost-of-goods-sold data, and profitability analysis. Second, production planning: ERP manages production schedules, raw-material requirements, and process sequencing automatically and in an integrated manner, supporting Just-in-Time manufacturing so that inventory does not accumulate unnecessarily while remaining available when needed, and monitoring the entire production flow from material receipt to finished goods. Third, human-resource management: the ERP module manages employee information, attendance, payroll, performance evaluation, and training, strengthening workforce-management efficiency and easing overtime calculation and production-shift management. Fourth, real-time reporting: ERP provides live reporting across financial, production, human-resource, and inventory data, enabling management to make faster decisions and monitor production targets and work efficiency more precisely.

Evaluating the role of ERP in operational efficiency shows that its principal contribution lies in reducing information silos. ERP occupies a central place in most companies' application landscape today, offering standardized, comprehensive solutions that facilitate value-adding business processes across the enterprise; such enterprise systems play an important role in business-process management because they support many tasks that would otherwise be performed manually or through disconnected information systems (Böhme et al., 2023). At the case company, the SAP-based ERP plays a central role in consolidating data from multiple departments - finance, production, and human resources - that had previously been stored separately, and this consolidation is the mechanism through which the S&OP process becomes genuinely cross-functional rather than a sequence of disconnected departmental plans.

Interpreting these findings in relation to S&OP specifically, the integration of ERP and SCM allows demand-planning data generated by the sales function to be reconciled directly against production-capacity data drawn from the manufacturing floor, shortening the planning cycle and improving the accuracy of the resulting production plan. This is consistent with evidence that integrated ERP-SCM platforms strengthen coordination between departments and reduce the demand-supply mismatch that commonly arises when planning data are fragmented across systems (Saleheen et al., 2023; Nurmasari et al., 2025). At the same time, the case also illustrates the limits of technology alone: obstacles including uneven staff training, incomplete integration of demand-forecasting tools with the core ERP platform, and residual data discrepancies between departments continue to constrain how fully the company can realize continuous, S&OP-style planning rather than periodic, batch-style coordination.

Table 1 summarizes the ERP-SCM functional areas identified in the case, their contribution to the S&OP process, and the obstacles that still limit their impact.

Table 1. ERP-SCM Functional Areas, S&OP Contribution, and Remaining Obstacles

<i>Functional Area</i>		<i>Contribution to S&OP</i>	<i>Remaining Obstacle</i>
<i>Financial Management Module</i>		Real-time cost and profitability data inform planning trade-offs	<i>Data discrepancies between departments</i>
<i>Production Planning (JIT)</i>		Aligns material availability with the demand forecast	<i>Limited integration with forecasting tools</i>
<i>Real-Time Reporting</i>		Shortens the demand-supply reconciliation cycle	<i>Uneven staff training on the platform</i>

Source: Synthesized by the authors from company-related secondary sources (2025).

5. CONCLUSIONS

This study shows that integrating Enterprise Resource Planning with Supply Chain Management plays a significant role in optimizing Sales and Operations Planning at an automotive manufacturing company. A SAP-based ERP platform unifying financial management, production planning, human-resource management, and real-time reporting strengthens data visibility across departments and shortens the cycle needed to reconcile demand forecasts with production capacity, directly supporting the coordination that S&OP requires. The findings nevertheless indicate that these benefits remain partial where staff training is uneven, where demand-forecasting tools are not fully integrated with the core ERP platform, and where data discrepancies between departments persist, all of which limit the transition from periodic, batch-style planning toward genuinely continuous S&OP. Manufacturing firms pursuing similar integration should therefore treat technology deployment and organizational change management as equally important, and future research could extend this literature-based case analysis with primary data collected directly from S&OP planning teams to quantify the efficiency gains involved.

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