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Process Optimization in Material and Inventory Management Using ERPNext: A Case Study of a Home Automation Firm

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ABSTRACT: This research investigates the impact of process optimization and Enterprise Resource Planning (ERP) implementation on material and inventory management in a medium-sized home automation firm in India. The study adopts a qualitative case study methodology to analyze operational inefficiencies related to manual workflows, inventory discrepancies, and limited cross-functional visibility. The intervention involved the deployment of ERPNext integrated with standardized operating procedures (SOPs), physical stock audits, and workflow redesign. Primary data were collected through process mapping, system validation, documentation analysis, and inter-departmental interactions. Findings indicate significant improvements in inventory accuracy, operational transparency, process consistency, and managerial decision-making. The study demonstrates that ERP implementation yields sustainable benefits when supported by disciplined process design, employee involvement, and continuous monitoring. The paper offers practical insights for small and medium enterprises (SMEs) aiming to strengthen supply chain efficiency and operational control through ERP-driven transformation.

KEYWORDS: ERPNext, Inventory Management, Process Optimization, SOP, Supply Chain, Digital Transformation

I. INTRODUCTION

Organizations operating in technology-driven and project-based industries face increasing pressure to enhance operational efficiency, reduce costs, and maintain transparency across business functions. Material and inventory management are critical components of operational performance, directly influencing project timelines, customer satisfaction, and profitability. In small and medium enterprises (SMEs), these functions are often managed through manual records and disconnected systems, resulting in data inaccuracies, delays, and coordination challenges. Enterprise Resource Planning (ERP) systems provide integrated platforms that unify organizational processes and enable real-time information flow. However, empirical evidence suggests that ERP implementations frequently underperform due to inadequate process readiness and lack of standardization. This study addresses this gap by examining how ERPNext, combined with structured SOP development and process optimization initiatives, can enhance material and inventory management in an SME context. The study contributes to applied operations management literature by presenting a real-world case demonstrating ERP-enabled operational transformation.

II. LITERATURE REVIEW

Prior research highlights ERP systems as enablers of operational integration, data accuracy, and organizational agility. Studies report that ERP adoption improves inventory visibility, reduces manual errors, and supports data-driven decision-making across supply chains. Process standardization through SOPs is identified as a critical success factor in sustaining ERP benefits, ensuring consistency, and supporting organizational learning. Literature on SME digital transformation emphasizes that technology adoption must be accompanied by process reengineering, employee training, and governance mechanisms to achieve long-term value. Inventory management research further underscores the role of physical audits, turnover analysis, layout optimization, and real-time tracking in reducing holding costs and operational disruptions. This study extends existing literature by integrating ERP implementation and SOP-driven process optimization within a single empirical case, offering practical insights grounded in operational reality.

III. RESEARCH METHODOLOGY

The research adopts a qualitative case study methodology suitable for in-depth analysis of organizational processes within their real-life context. Primary data were collected through direct observation, process mapping, physical stock audits, ERPNext system testing, and interactions with personnel from procurement, stores, project execution, and administration departments. Secondary data included internal documents, SOP drafts, and system reports. The study focused on evaluating pre- and post-implementation practices to assess improvements in accuracy, efficiency, transparency, and coordination. While the findings are context-specific, they provide transferable insights for SMEs pursuing similar operational transformation initiatives.

IV. CASE ORGANIZATION BACKGROUND

The case organization operates in the home automation industry, delivering integrated solutions for lighting, security, and audio-visual systems. Rapid business growth increased project complexity and exposed limitations in manual inventory tracking, fragmented documentation, and reliance on individual experience. Inventory discrepancies, delayed information flow, and coordination gaps between departments highlighted the need for a centralized system. To address these challenges, the organization initiated ERPNext implementation alongside structured process documentation and workflow standardization.

V. ERP IMPLEMENTATION AND PROCESS OPTIMIZATION

The implementation phase involved mapping existing workflows into ERPNext modules, validating data, and configuring system functionalities to align with operational requirements. SOPs were developed for procurement, inventory handling, installation, and support processes to ensure consistency and clarity.

Physical stock audits were conducted to reconcile system data with actual inventory. ERPNext enabled centralized data access, automated approvals, audit trails, and real-time tracking of material movement. These interventions collectively reduced manual dependency and improved cross-functional coordination.

VI. RESULTS AND DISCUSSION

The results demonstrate significant improvements in inventory accuracy, reduction in discrepancies, and enhanced workflow transparency. Process standardization reduced reliance on tacit knowledge and supported faster onboarding. ERP dashboards facilitated timely decision-making and performance monitoring. The findings align with existing studies emphasizing the synergy between technology and process discipline in achieving operational excellence. The case reinforces the view that ERP systems deliver optimal value when embedded within a structured process framework.

VII. MANAGERIAL IMPLICATIONS

The study offers actionable insights for managers in SMEs. ERP adoption should be approached as a strategic change initiative supported by process readiness, training, and governance. SOPs act as foundational tools for sustaining efficiency and scalability. Managers must emphasize continuous monitoring, data discipline, and cross-functional collaboration to realize long-term benefits from digital transformation initiatives.

VIII. LIMITATIONS AND FUTURE RESEARCH

The study is limited to a single organizational context, which may restrict generalizability. Future research may adopt comparative or longitudinal designs to examine ERP implementation outcomes across multiple SMEs and industries. Quantitative performance metrics may further strengthen empirical validation of ERP-driven process optimization benefits.

IX. CONCLUSION

This study concludes that ERPNext implementation, supported by structured SOP development and process optimization, significantly enhances material and inventory management. The case demonstrates that sustainable operational improvements emerge from the integration of technology, process discipline, and human collaboration. The

findings contribute to applied operations management research and provide a practical roadmap for SMEs pursuing ERP-enabled transformation.

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