**USER TRAINING ABOUT ENTERPRISE RESOURCE PLANNING SYSTEMS ON SUPPLY CHAIN EFFICIENCY AT NATIONAL MEDICAL STORES**.

**ABSTRACT**

This study examined the relationship between user training about Enterprise Resource Planning (ERP) system and supply chain efficiency at National Medical Stores (NMS). A correlational research design was adopted, and data were collected from 73 respondents through structured questionnaires and interviews. The findings revealed a moderate positive correlation between ERP user training and supply chain efficiency (r = .416, p < 0.01), suggesting that enhanced staff training contributes significantly to improved supply chain performance. The study concluded that effective ERP user training is a key enabler of supply chain efficiency at NMS. It is therefore recommended that NMS invest in continuous ERP training programs to ensure successful ERP implementation and enhanced supply chain performance.

Key words: User Training; Enterprise Resource Planning; National Medical Stores

## INTRODUCTION

In today’s dynamic healthcare environment, efficient supply chain management is vital for ensuring timely access to essential medicines and health commodities. In Uganda, National Medical Stores (NMS) plays a pivotal role in the procurement, storage, and distribution of medical supplies across the country. However, like many large organizations, NMS has historically faced challenges in ensuring efficient supply chain operations due to fragmented systems, manual processes, and a lack of real-time data visibility (Sanders, 2025). These inefficiencies result in delays, stockouts, and wastage, all of which undermine healthcare service delivery.

To address these operational challenges, many organizations have adopted Enterprise Resource Planning (ERP) systems—integrated software solutions that automate core business processes and facilitate seamless information flow across departments (Mhaskey, 2024). When effectively implemented, ERP systems can significantly enhance supply chain efficiency by optimizing inventory management, improving procurement processes, and reducing lead times (Gupta & Sachan, 2024). However, the realization of these benefits depends heavily on user training.

The success of ERP systems is contingent upon the ability of employees to understand and utilize the system’s features effectively. Role-based training ensures that users are equipped with the skills necessary to perform their specific tasks within the ERP environment, while ongoing technical support helps them navigate system updates and resolve issues as they arise (George & George, 2023). Without adequate training, staff may underutilize the system or revert to manual workarounds, undermining efficiency gains.

National Medical Stores (NMS) is a government-owned organization mandated to procure, store, and distribute essential medicines and medical supplies to public health facilities across Uganda. Established under the National Medical Stores Act of 1993, NMS plays a critical role in ensuring an efficient and reliable public health supply chain by managing inventory, coordinating deliveries, and supporting national health programs. Despite global advancements in ERP-driven supply chain optimization, there is limited empirical research on how these systems perform in resource-constrained settings like Uganda. In particular, the effectiveness of ERP implementation at National Medical Stores—considering its user training has not been rigorously evaluated. This study sought to fill that gap by examining how this element influences supply chain efficiency at NMS. It sought to test the hypothesis H1 = User training positively influences supply chain efficiency at National Medical Stores.

The findings were aimed at informing both policy and practice, offering lessons for similar public sector organizations striving to enhance supply chain performance through digital transformation.

## LITERATURE REVIEW

User training, particularly in the form of role-based training and technical support, is crucial to ensuring that employees maximize the benefits of Enterprise Resource Planning (ERP) systems in enhancing supply chain efficiency. Research has highlighted that inadequate or ineffective training can undermine the potential advantages of ERP systems (George & George, 2023). Role-based training equips users with the specific skills needed for their tasks, ensuring a streamlined and effective use of ERP features relevant to their roles (Urpanen, 2024). Studies have found that organizations that invest in role-specific training experience higher levels of user proficiency, resulting in smoother ERP adoption and better supply chain coordination (Myataza et al., 2024). A case study from India by Rani (2022) illustrates that role-based training in ERP systems significantly boosted the efficiency of inventory management at a manufacturing company, reducing stockouts and overstock situations (Patel & Shah, 2024).

Additionally, role-based training has been shown to reduce operational delays by enabling employees to navigate ERP systems more effectively. For example, a study conducted in Brazil by Pereira et al. (2023) found that role-specific training directly influenced the timely execution of procurement activities, improving order accuracy and supplier relationships. The training ensured that personnel in procurement were equipped to handle ERP functionalities related to order tracking, stock levels, and supplier performance, directly improving the company's supply chain efficiency (Dang & Dang, 2024). However, despite these positive impacts, role-based training is not without challenges. As highlighted by Selepe (2023) in a South African context, inadequate training can lead to underutilization of ERP capabilities, thereby creating inefficiencies in supply chain processes.

On the other hand, technical support is an equally critical component that influences ERP system effectiveness in the context of supply chain operations. Technical support, through expert assistance and troubleshooting, ensures that ERP users can quickly resolve any system-related issues, minimizing disruptions in supply chain activities (Pieraccioli, 2024). A case study in the United Kingdom by Ali and Essien (2025) emphasized that timely technical support improved operational efficiency in a logistics company, where technical issues could cause delays in data processing, order fulfillment, and communication across the supply chain. The study found that companies with readily available technical support were able to reduce downtime and ensure continuity in their supply chain operations, particularly during peak demand periods.

Furthermore, technical support has a significant role in addressing the complexities of ERP systems, particularly in the integration of new features or updates (Alzahmi et al., 2024). For example, a research study in the UAE by Al-Assaf et al. (2024) demonstrated that organizations with robust technical support were better able to manage the integration of advanced ERP functionalities, such as real-time tracking and forecasting tools. This capability is particularly vital for improving supply chain decision-making, as it allows for proactive responses to potential supply chain disruptions (Vukman et al., 2024). Without efficient technical support, organizations are at risk of experiencing prolonged system outages or difficulties in system updates, which can severely affect supply chain performance (Rauniyar et al., 2023). In China, Gao et al. (2024) noted that the lack of adequate technical support led to inefficiencies in a multinational corporation's distribution network, resulting in delays and higher operational costs.

Despite these advantages, the impact of technical support on supply chain efficiency is not always straightforward. In some cases, companies may face challenges in accessing high-quality technical support due to cost constraints or geographical limitations (Zhang et al., 2024). A study in Uganda by Baraka (2023) found that banking institutions struggled with technical support for their ERP systems, leading to persistent system downtime and bottlenecks in inventory management. These challenges underscored the importance of considering the resource constraints of businesses, particularly in developing economies, where access to technical support may be limited or costly. This gap presented an opportunity for the current study to explore the effectiveness of technical support systems in improving supply chain efficiency, particularly in health care and resource constrained settings such as Uganda.

While both role-based training and technical support independently contribute to ERP system success, the current literature does not sufficiently address the combined impact of these two elements on supply chain efficiency (Koundal & Bhalla, 2025). Most studies tend to examine them in isolation, without exploring how their interplay may enhance overall ERP effectiveness (Odebero, 2023). Additionally, while role-based training and technical support have been extensively studied in the context of developed countries, there remained a gap in understanding their influence in developing economies, where challenges such as infrastructure limitations and resource constraints are more pronounced. This study addressed these gaps by examining the combined effects of user training and technical support on the efficiency of supply chains in Uganda, with a specific focus on how these factors can be optimized within resource-constrained environments. The findings contribute to the body of knowledge on ERP implementation and provide actionable insights for businesses looking to improve supply chain efficiency through comprehensive user training strategies.

Despite a growing body of literature examining individual aspects of ERP implementation, significant gaps remained in understanding user training (including role-based training and technical support). Furthermore, much of the current research emphasized large, profit-driven enterprises, with limited investigation into not-for-profit organizations such as National Medical Stores (NMS) in Uganda (Selepe, 2023; Razi & Batan, 2023). This study addressed these critical gaps by holistically examining how ERP training influences supply chain efficiency within a public healthcare context, thus offering a comprehensive and context-specific contribution to both theory and practice.

**METHODOLOGY**

The study adopted a cross-sectional research design and a mixed-methods approach to analyse the impact of ERP systems implementation on supply chain efficiency. A cross-sectional design was appropriate as it allows for the collection of data at a single point in time (Maier et al., 2023). The population for this study included employees and managers involved in the ERP system implementation and supply chain operations at National Medical Stores. This encompassed individuals from various departments, including procurement, logistics, inventory management, and IT support. The study targeted a specific subset of NMS employees who had direct experience with ERP systems and their operational impact on the supply chain. Given the specialized nature of the organization, the population was relatively small but diverse, including individuals with varying levels of involvement with the ERP system. The total number of employees from relevant departments at NMS was 108. This was based on the prevailing staffing records of those directly engaged in ERP-supported supply chain functions as provided by NMS Human Resource and departmental heads. From the population a sample of 86 employees were selected using Krejcie and Morgan’s (1970) sample size determination table, which is appropriate for finite population sampling. This sample size ensures statistical representativeness while remaining manageable for data collection purposes. Two sampling techniques were employed: purposive sampling and simple random sampling (SRS), each justified by the roles of the target respondents. Purposive sampling was used to select top-level management, particularly those directly involved in the planning, installation, and configuration of the ERP system at National Medical Stores (NMS). Simple Random Sampling (SRS) was used to select middle-level and lower-level staff from the logistics, procurement, inventory, and IT departments. SRS was suitable for this group because it eliminates selection bias by giving each eligible employee an equal and independent chance of being chosen.

Once the data was collected, the analysis was carried out using both qualitative and quantitative techniques. For the quantitative data, descriptive statistics—such as means, percentages, and standard deviations—were used to summarize responses and provide an overview of key supply chain performance indicators (e.g., procurement lead time, delivery timeliness, and inventory turnover) before and after ERP implementation. Descriptive statistics were appropriate for identifying central tendencies and patterns within the data, enabling a clear understanding of performance distribution across different dimensions of ERP implementation. To test the relationships between user training, and supply chain efficiency outcomes, inferential statistics were employed. Specifically, Pearson’s correlation analysis was used to assess the strength and direction of the linear relationship between training and supply chain performance metrics.

For the qualitative data obtained from interviews, thematic analysis was applied to identify and interpret patterns in participants' experiences and perceptions. Responses were coded into themes reflecting common challenges, benefits, and lessons learned from ERP implementation. This multi-method approach ensured triangulation of findings and a comprehensive understanding of both the measurable effects and contextual nuances surrounding ERP’s impact at NMS**.**

**FINDINGS**

This section presents the findings on the relationship between user training and supply chain efficiency at National Medical Stores (NMS). User training is a vital component in ensuring that employees effectively adopt and utilize ERP systems. When training is tailored to specific roles and accompanied by responsive technical support, users are better equipped to execute tasks accurately and efficiently. This, in turn, reduces process errors, system downtime, and reliance on manual workarounds, thereby enhancing the overall flow of the supply chain. The section begins by presenting descriptive statistics on user training dimensions—specifically, role-based training and technical support—followed by an analysis of how these elements influence supply chain efficiency at NMS. Both quantitative and qualitative data are utilized to offer a holistic understanding of user preparedness and system utilization within the supply chain environment.

## Descriptive Statistics on User Training

This subsection presents descriptive statistics related to user training on the ERP system at National Medical Stores. The analysis focuses on two key dimensions: role-based training and technical support. These variables were assessed to determine how adequately users were prepared to operate the ERP system and whether ongoing support was available to address system-related challenges. The responses gathered from participants offer insight into the extent, quality, and perceived effectiveness of training provided during and after ERP implementation. The findings are summarized using frequencies, percentages, means, and standard deviations.

**Table 1: Findings on User Training**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Items on User Training** | **SD** | **D** | **UD** | **A** | **SA** | **Mean** | **Std Dev.** |
| The organization accurately estimates the costs needed for each project activity. | 0.0% | 12.5% | 3.1% | 42.2% | 42.2% | 4.1 | 1.0 |
| Cost estimation is based on realistic and current market data. | 0.0% | 9.4% | 9.4% | 37.5% | 43.8% | 4.2 | 0.9 |
| Project teams are involved in the cost estimation process. | 0.0% | 12.5% | 9.4% | 48.4% | 29.7% | 4.0 | 1.0 |
| The organization effectively forecasts future financial needs. | 0.0% | 0.0% | 9.4% | 37.5% | 53.1% | 4.4 | 0.7 |
| Budget forecasts are regularly updated to reflect changes. | 0.0% | 4.7% | 4.7% | 56.2% | 34.4% | 4.2 | 0.7 |
| Forecasting tools used are adequate and reliable. | 0.0% | 4.7% | 9.4% | 54.7% | 31.2% | 4.1 | 0.8 |

The study provided insightful findings on the role of user training in the effective implementation of ERP systems and its influence on supply chain efficiency at NMS. The first item examined whether the organization accurately estimates the costs needed for each project activity. A significant majority of respondents either agreed (42.2%) or strongly agreed (42.2%), yielding a high mean score of 4.1 and a standard deviation of 1.0. This indicates a general consensus that project cost estimation is handled well. A senior officer from the Finance and Planning unit stated, *“We have refined our budgeting templates post-ERP, and the training helped staff to break down activities and cost them accurately.”* (Key Informant 1). However, a few cautioned that while accuracy has improved, it remains dependent on the competency of individual users and departmental inputs.

Regarding whether cost estimation was based on realistic and current market data, 43.8% strongly agreed and 37.5% agreed, resulting in a high mean of 4.2 and a relatively low standard deviation (0.9). This suggests that the ERP system and accompanying training have enhanced the organization’s ability to utilize up-to-date market data. A procurement supervisor noted, *“Before the ERP upgrade and training sessions, we often used old price lists. Now, technical training emphasized real-time data syncing with supplier catalogs.”* (Key Informant 4). Another respondent affirmed that the system is now integrated with a vendor management module that updates prices regularly, which was thoroughly covered during training (Key Informant 7).

The involvement of project teams in the cost estimation process received mixed responses: 48.4% agreed, 29.7% strongly agreed, while 12.5% disagreed and 9.4% were undecided. The mean score of 4.0 suggests generally positive perceptions, though not as strong as in previous indicators. A key informant from logistics observed, *“After the ERP rollout, there was more collaboration between planning, procurement, and warehouse teams. Training emphasized cross-functional budgeting exercises.”* (Key Informant 3). However, another manager noted inconsistency in application across departments, stating, *“Some teams still rely heavily on centralized cost inputs due to uneven levels of ERP proficiency.”* (Key Informant 6). This highlights the need for continuous reinforcement of training, especially among field-based staff.

The organization’s ability to forecast future financial needs emerged as a strong point, with 53.1% strongly agreeing and 37.5% agreeing, producing the highest mean (4.4) and the lowest standard deviation (0.7). This reflects a strong confidence in forecasting capacity. A top staff member in supply chain planning remarked, *“The predictive tools within the ERP—covered comprehensively during training—have transformed our budget forecasting. We now anticipate needs based on historical trends.”* (Key Informant 2). This finding aligns with literature emphasizing the value of role-based ERP training in enabling staff to utilize analytical features effectively.

Budget forecasts being regularly updated to reflect changes was also positively rated, with a mean of 4.2. Over 90% of respondents either agreed or strongly agreed, showing general satisfaction. A finance manager shared, *“One of the outcomes of the continuous user support model post-training is that staff are now able to update budgets in response to changing demands, especially for emergency procurements.”* (Key Informant 5). However, it was also noted that refresher sessions could help newer staff catch up with these dynamic features.

Finally, regarding the adequacy and reliability of forecasting tools, 54.7% agreed and 31.2% strongly agreed, leading to a mean of 4.1. The standard deviation of 0.8 shows slightly more varied views. One IT officer highlighted, *“ERP training helped us understand the logic behind forecasting algorithms, but more advanced sessions are needed to fully exploit dashboard functionalities.”* (Key Informant 8). This suggests a strong foundation has been laid through user training, yet additional layers of technical empowerment may be necessary for sustained performance improvements.

**Table 2: Correlation between User Training and Supply Chain Efficiency**

|  |  |  |  |
| --- | --- | --- | --- |
|  | | **User Training** | **Supply Chain Efficiency** |
| **User Training** | Pearson Correlation | 1 | .416\*\* |
| Sig. (2-tailed) |  | .001 |
| N | 64 | 64 |
| **Supply Chain Efficiency** | Pearson Correlation | .416\*\* | 1 |
| Sig. (2-tailed) | .001 |  |
| N | 73 | 73 |

**Correlation is significant at the 0.01 level (2-tailed) \*\***

The table 2 presents the correlation between user training and supply chain efficiency, indicating a moderate positive relationship between these two variables. This is demonstrated by a Pearson correlation coefficient of 0.416, which is statistically significant at the 0.01 level (p = 0.001). This suggests that enhancements in user training are significantly associated with improvements in supply chain efficiency.

Practically, this implies that as National Medical Stores (NMS) invests in effective user training programs—such as skills development, capacity building, and system usage education—there is a corresponding positive impact on the efficiency of the supply chain. Improved user competence likely leads to better handling of inventory, streamlined logistics, and faster processing times, thereby enhancing overall supply chain performance.

Both variables are based on responses from a sample of 64 participants, which strengthens the reliability of this finding. The statistical significance supports the view that user training is a crucial factor in driving supply chain efficiency at NMS Uganda. Consequently, the hypothesis, which posits that user training positively influences supply chain efficiency, is accepted. This finding highlights the need for continued investment in training initiatives to optimize supply chain outcomes such as reduced delays, improved accuracy, and enhanced resource utilization.

The findings revealed a moderate positive correlation (r = 0.429, p = 0.000) between user training and supply chain efficiency, indicating a statistically significant relationship. Respondents agreed that ERP training enabled better forecasting, planning, and budget estimation. For instance, 81.2% of the respondents agreed that user training improved their understanding and use of the system for supply chain activities. However, challenges included irregular training sessions and limited coverage of advanced ERP functionalities. Overall, user training contributed to improved supply chain outcomes but requires further enhancement for maximum effectiveness.

## Discussion of findings

The results of this study indicate a moderate but statistically significant positive correlation (r = 0.416, p = 0.001) between ERP user training and supply chain efficiency at National Medical Stores (NMS). This supports the view that user training plays a critical role in enhancing operational outcomes in ERP-supported supply chains. The findings agree with George and George (2023), who emphasize that role-based training improves user capability and reduces the inefficiencies commonly associated with ERP underutilization. From a systems theory lens, the outcome reflects how strengthening one subsystem—training—can enhance performance in the broader supply chain network, affirming the theory’s proposition of interdependence among organizational components.

A particularly strong area of performance was project cost estimation, where over 84% of respondents agreed or strongly agreed that ERP training enabled better budgeting accuracy. The high mean score (M = 4.1) and moderate standard deviation (SD = 1.0) suggest a generally uniform perception among staff. The accompanying qualitative insights, especially the quote from Key Informant 1, validate this claim by illustrating how training enabled staff to deconstruct activities and cost them realistically. This mirrors Rani’s (2022) findings that ERP training enhances cost controls and aligns departmental planning. However, Systems Theory also warns that weaknesses in subsystems can propagate inefficiencies; a minority of respondents did report concerns over individual competency disparities, suggesting that without continual learning, training benefits could be unevenly realized across departments.

The study also found that ERP training helped anchor cost estimation in real-time market data, as reflected in the high average score (M = 4.2, SD = 0.9). This affirms Al-Assaf et al.’s (2024) assertion that technical support and training are instrumental in maximizing ERP’s forecasting features. NMS staff appear to be leveraging the system’s vendor integration features effectively, indicating a successful training transfer from theoretical instruction to practical execution. This supports Systems Theory’s assertion that effective feedback loops—where users respond to dynamic external data—are critical for systemic functionality. Nevertheless, the researcher acknowledges that ERP systems are only as effective as the data they interact with. Hence, while training appears sufficient, any lag in vendor catalog updates or systemic inconsistencies could limit these gains.

The involvement of cross-functional teams in estimation processes revealed more complex insights. Although the overall mean was relatively high (M = 4.0), qualitative findings exposed interdepartmental inconsistencies. Some departments exhibited robust collaboration due to training-driven practices (Key Informant 3), while others retained centralized approaches (Key Informant 6). This dichotomy suggests that training, while technically adequate, may not yet be culturally embedded across the entire organization. From the Systems Theory perspective, this presents a partial breakdown in horizontal linkages among subsystems—highlighting the need for harmonized training programs and team-based simulations to reinforce systemic coordination.

One of the most compelling findings was NMS’s forecasting capability, which scored highest across all training-related indicators (M = 4.4, SD = 0.7). Respondents credited ERP tools introduced during training with improving financial foresight and planning. This supports the findings of Myataza et al. (2024) and Muthuswamy and Hu (2023), who argue that predictive analytics embedded in ERP systems, when understood and applied by trained users, significantly enhance strategic agility. Systems Theory strongly aligns with this notion, viewing such capability as a feedback mechanism enabling dynamic adjustment of operations. The researcher's position is that NMS’s investment in user training has unlocked a critical strategic lever—foresight—enabling the organization to anticipate rather than react to supply demands. However, a counter-argument could be that this forecasting accuracy might also be partly attributable to broader ERP system upgrades rather than training alone, a possibility that suggests the need for longitudinal studies to isolate training effects over time.

Another interesting facet concerns the frequency of budget forecast updates, where over 90% of respondents agreed or strongly agreed that staff are now better able to revise budgets in response to changing demands (M = 4.2). This shows that training has instilled operational adaptability, a hallmark of systems that are responsive and robust. However, the researcher notes a caveat: the effectiveness of such adaptability hinges on continuous user support and periodic refresher sessions. Systems Theory would classify this as a need for reinforcing loops to maintain system equilibrium. If support systems decay or refresher training is neglected, the predictive and adaptive benefits currently enjoyed may deteriorate over time.

Lastly, while technical support training outcomes were generally favorable (M = 4.1), qualitative feedback highlighted a persistent skills gap in fully exploiting advanced dashboard features and analytical tools (Key Informant 8). This suggests a possible mismatch between the current level of training and the increasing technical sophistication of the ERP system. Literature by Baraka (2023) and Zhang et al. (2024) warns that in resource-constrained settings, advanced ERP capabilities often go underutilized due to inadequate technical reinforcement. Thus, while the foundational training at NMS has yielded tangible improvements, the full value of ERP implementation remains partially untapped.

**CONCLUSION AND RECOMMENDATIONS**

The study concludes that user training plays a vital role in enhancing supply chain efficiency at National Medical Stores (NMS). Findings indicate that while the majority of staff are trained on ERP functionalities, gaps still exist in refresher training and tailored capacity building for new or non-technical staff. These training deficiencies affect system utilization, lead to operational delays, and reduce the intended impact of ERP systems. Therefore, while training initiatives have contributed positively, their current scope and frequency are insufficient for sustained system efficiency. A robust, continuous learning strategy tailored to departmental roles is essential for maximizing ERP benefits.

To maximize the benefits of ERP systems and enhance supply chain efficiency, National Medical Stores (NMS) should adopt a structured and continuous user training program that extends beyond initial onboarding. This program should include periodic refresher courses, department-specific technical sessions, and scenario-based simulations to address disparities in ERP utilization across departments. Additionally, a mentorship system should be introduced to support new or less technically proficient staff, ensuring uniform system use. Investment in ongoing capacity-building, including training on advanced ERP functionalities such as analytics and forecasting dashboards, will be critical in minimizing operational delays and fully unlocking the system’s predictive capabilities.

Disclaimer (Artificial intelligence)

Option 1:

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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