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# Comprehensive Analysis of Enterprise Resource Planning System Implementation and Its Impact on Business Performance of Batik MSMEs in Medan City

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## Abstrak

Kemajuan teknologi mendorong Usaha Mikro, Kecil, dan Menengah (UMKM) untuk mengadopsi sistem Perencanaan Sumber Daya Perusahaan guna meningkatkan efisiensi dan daya saing. Namun, UMKM Batik di Kota Medan masih menghadapi tantangan seperti keterbatasan informasi, kesiapan sumber daya manusia, dan manajemen persediaan yang lemah. Studi ini menganalisis dampak implementasi ERP terhadap kinerja bisnis UMKM Batik, dengan fokus pada integrasi proses pembelian, produksi, penjualan, dan persediaan. Menggunakan desain eksperimental dengan sistem ERP berbasis Odoo, data dikumpulkan melalui observasi, wawancara, dan kuesioner, kemudian diuji validitas dan reliabilitasnya. Hasil menunjukkan bahwa sebagian besar UMKM Batik masih mengandalkan proses manual, yang menyebabkan ketidakefisienan dalam pencatatan stok, transaksi, dan pengambilan keputusan. Pasca implementasi, ERP secara signifikan meningkatkan akurasi stok (dari 75% menjadi 96%), mengurangi waktu pengambilan keputusan (dari lebih dari satu hari menjadi kurang dari satu jam), dan meningkatkan pemenuhan pesanan tepat waktu (dari 65% menjadi 95%). Orientasi kewirausahaan, inovasi, proaktif, dan pengambilan risiko ditemukan sebagai faktor kritis dalam adopsi ERP yang sukses. Secara keseluruhan, implementasi ERP mengorganisir proses bisnis, meningkatkan produktivitas, dan memperkuat daya saing. Digitalisasi melalui ERP oleh karena itu direkomendasikan sebagai inovasi strategis bagi UMKM untuk mengatasi ketidakefisienan operasional dan berkembang di pasar yang semakin kompetitif.

**Kata Kunci:** Kinerja Bisnis; Digitalisasi; ERP; Manajemen Persediaan; Orientasi Kewirausahaan

## Abstract

*Technological advancements encourage Micro, Small, and Medium Enterprises (MSMEs) to adopt Enterprise Resource Planning (ERP) systems to enhance efficiency and competitiveness. However, Batik MSMEs in Medan City still face challenges such as limited information, human resource readiness, and weak inventory management. This study analyzes the impact of ERP implementation on Batik MSMEs' business performance, focusing on the integration of purchasing, production, sales, and inventory processes. Using an experimental design with an Odoo-based ERP system, data were collected through observations, interviews, and questionnaires, then tested for validity and reliability. Results reveal that most Batik MSMEs continue to rely on manual processes, leading to inefficiencies in stock recording, transactions, and decision-making. Post-implementation, ERP significantly improved stock accuracy (from 75% to 96%), reduced decision-making time (from more than one day to less than one hour), and increased on-time order fulfillment (from 65% to 95%). Entrepreneurial orientation—innovation, proactiveness, and risk-taking—was found to be a critical factor in successful ERP adoption. Overall, ERP implementation structured business processes, enhanced productivity, and strengthened competitiveness. Digitalization through ERP is therefore recommended as a strategic innovation for MSMEs to overcome operational inefficiencies and thrive in increasingly competitive markets.*

**Keywords:** Business Performance; Digitalization; ERP; Inventory Management; Entrepreneurial Orientation

## 1. Introduction

Technological advancements have transformed the way businesses operate, urging even the smallest enterprises to adapt and innovate to remain competitive. Micro, Small, and Medium Enterprises (MSMEs) in Indonesia play a vital role in national economic growth through employment creation and contributions to Gross Domestic Product (GDP). Within this sector, Batik MSMEs represent both cultural heritage and creative industry potential. In 2022, Batik exports reached USD 64.56 million and were projected to grow to USD 100 million by the end of 2023 (Kemenperin, 2023). These figures highlight the resilience and opportunities of Batik MSMEs in global markets.

Despite this potential, many Batik MSMEs—particularly in Medan City—still rely on manual operations, resulting in inefficiencies in inventory management, production planning, and reporting. Preliminary observations of MSMEs supported by

Bank Indonesia revealed that business records are often maintained in notebooks or spreadsheets, leading to inaccurate data, delayed decisions, and operational bottlenecks (Lutfiana & Puspitosari, 2020). Such inefficiencies hinder scalability and competitiveness.

Enterprise Resource Planning (ERP) systems offer a technological solution by integrating core functions such as purchasing, inventory, manufacturing, sales, and finance into a unified platform. Previous studies have demonstrated ERP's role in improving operational efficiency, data accuracy, and decision-making (O'Brien, 2011; Monk & Wagner, 2013; Shaiti, 2020). While ERP systems were once exclusive to large enterprises due to high costs, open-source platforms such as Odoo have made ERP accessible to MSMEs through modularity and affordability (Affandy, Widodo, & Sarah, 2022).

However, ERP adoption among MSMEs in creative industries remains limited. Most prior research has focused on large-scale manufacturing or service sectors, leaving a gap in understanding ERP's impact on small creative enterprises. Moreover, few empirical studies have examined how inventory management and entrepreneurial orientation—defined by innovation, proactiveness, and risk-taking—interact with ERP adoption to influence MSME performance (Riana, 2019; Ramadhan, 2024; Zahra, Syaifuddin, & Siswanto, 2023).

This study seeks to address these gaps by analyzing the implementation of an Odoo-based ERP system in Batik MSMEs in Medan City. Using a case study approach on Batik XYZ, the research investigates:

1. Current business process challenges,
2. The compatibility of ERP modules with Batik MSME operations,
3. The readiness and capability of MSMEs to adopt ERP, and
4. The combined influence of ERP implementation, inventory management, and entrepreneurial orientation on business performance.

By clarifying these dimensions, the study contributes both practical insights for MSME owners and policymakers, and theoretical contributions to ERP literature in the creative industry context. Ultimately, ERP adoption is positioned not merely as a technological upgrade but as a strategic enabler for digital competitiveness and sustainable growth.

## 2. Literature Review

### 2.1. Enterprise Resource Planning (ERP)

Enterprise Resource Planning (ERP) is a system designed to integrate various business processes into a unified platform, enabling real-time visibility and decision-making. According to (O'Brien, 2011), ERP systems act as the backbone of modern business operations, integrating sales, purchasing, inventory, finance, and production functions. (Monk & Wagner, 2013) emphasized that ERP facilitates information flow across departments, ensuring process efficiency and timely data access.

Historically, ERP systems were developed for large enterprises due to high implementation costs and complex infrastructure requirements. However, the evolution of open-source ERP solutions, such as Odoo, has made this technology accessible to Micro, Small, and Medium Enterprises (Katu, 2020). Odoo's modular design, affordability, and adaptability have positioned it as a preferred ERP system among MSMEs in various sectors, including manufacturing and retail (Affandy, Widodo, & Sarah, 2022).

The system includes key functional modules such as Inventory, Purchase, Manufacturing, and Sales, which are crucial for businesses that rely on accurate demand forecasting and efficient operations. Purchasing is a process carried out by consumers in buying the desired goods or services (Septiadi, Salamah, & Nujiyatillah, 2022). According to (Putri & Suhatmi, 2022) purchasing activities include ordering raw materials, checking raw materials, recording debts and finding suppliers with more competitive prices (Putri & Suhatmi, 2022). Sales is how to create long-term relationships with customers through the company's products or services (Widharta & Sugiharto, 2019). Production is the process of converting inputs into outputs. Basically, production activities have the responsibility to satisfy customers, and the quality of the product must be reliable (Rudiawan, 2021). Inventory is an activity to organize goods or record existing goods or materials correctly, the purpose of inventorying goods is to facilitate the implementation of supervision or control activities (Novendri, Saputra, & Firman, 2019).

The benefits of ERP adoption in MSMEs include real-time inventory tracking, reduced manual errors in business operations, integrated financial and operational reporting, and improved forecasting and planning (Zahra, Syaifuddin, & Siswanto, 2023). In the context of Batik MSMEs, the integration of ERP supports Make-to-Order and Make-to-Stock production models, allowing better raw material control and synchronization of sales and manufacturing processes. Make to Order is a business strategy in which production is carried out according to customer demand with the advantages of production balanced with demand, cost saving and efficiency (Bhatt, 2024). The role of ERP to MSMEs is very significant, ERP plays a key role in supporting MSMEs by improving operational efficiency, providing accurate information for better decision making, and enabling integration and alignment of company functions (Zai, et al., 2022).

## 2.2. *Inventory Management*

Inventory management plays a vital role in determining the operational performance of SMEs. Inefficient inventory practices often lead to stockouts, overstocking, delayed production, and customer dissatisfaction (Lutfiana & Puspitosari, 2020). The ability to forecast demand, optimize inventory levels, and manage reordering cycles directly impacts the agility and responsiveness of businesses. Studies have shown that ERP systems improve inventory visibility, automate reorder points, and support safety stock calculations, which are critical for MSMEs with limited working capital (Nugroho, et al., 2023). In creative industries like Batik, where raw materials such as kain polos and lilin malam are sourced from different regions, real-time inventory tracking ensures continuity in production and timely order fulfillment.

Inventory management has 2 decisions that must be considered, namely (1) Quantitative decisions, aim to find out what raw materials will be stored, what raw materials will be processed, how much raw material will be ordered, when the manufacture of goods will be carried out and when ordering raw materials. (2) Qualitative decisions are decisions related to ordering techniques and aim to find out what types of raw materials are available in MSMEs, have a list of suppliers, and know the quality of raw materials owned by each supplier (Alfredo, 2014).

Empirical data from Batik XYZ in Medan show significant discrepancies between manual inventory records and actual stock availability. These inefficiencies led to order rejections, delayed deliveries, and excessive costs due to emergency restocking, reinforcing the need for structured inventory management via ERP.

## 2.3. *Entrepreneurial Orientation*

Another key dimension explored in the literature is entrepreneurial orientation. Entrepreneurial orientation (EO) refers to the strategic posture of a business that reflects its tendency to innovate, take risks, and act proactively. (Ramadhan, 2024) emphasized the role of innovation, proactiveness, and risk-taking behavior in enhancing the competitiveness and adaptability of MSMEs. These traits enable businesses to navigate challenges associated with digital transformation, such as ERP implementation. (Riana, 2019) also found that entrepreneurial orientation positively affects MSME performance, especially in dynamic market environments.

Entrepreneurial orientation also supports quick adaptation to ERP-related workflow changes, proactive decision-making based on ERP-generated insights, and innovation in product design, marketing, and customer service. Therefore, integrating EO in ERP implementation strategies enhances not only system adoption but also the performance impact of digitalization.

## 2.4. *Business Performance*

Business performance is a measure of the success or performance of a company in achieving goals and generating profits (Wulandari, Suyitno, Azizi, Ulyah, & Fitriani, 2023). In Research (Chinogwenya & Utete, 2023) said that ERP can make the purchasing process faster, cheaper and more transparent. According to (El-Baz, El-Midany, Ghattas, & AbouEleaz, 2023) the effectiveness of ERP on production processes is low but a well-implemented ERP system can simplify production processes administratively, increase operational efficiency, and improve overall performance. According to (Djiantoro & Tarigan, 2022) ERP implementation can reduce waiting time for orders to suppliers, automatically determine the number of orders, determine the amount of inventory in real time, and easy implementation procedures. According to (Noerpratomo, 2018) with the good implementation of raw material inventory, companies can achieve timeliness in completing products according to targets and can manage all processes in completing these products.

## 2.5. *ERP Implementation and Study Aim*

ERP implementation studies also show that systems like Odoo, when aligned with MSME needs, can significantly enhance performance. (Zahra, Syaifuddin, & Siswanto, 2023) demonstrated that ERP implementation improved business process efficiency and customer response times. Similarly, (Nugroho, et al., 2023) revealed that integrating manufacturing and purchasing modules in ERP helped SMEs monitor their bill of materials (BoM), reduce manual errors, and generate real-time purchase orders and invoices.

To address these challenges, the Indonesian government, through institutions like Bank Indonesia and Kementerian Perindustrian, has initiated digital empowerment programs for creative MSMEs such as Batik. However, gaps remain in the availability of affordable, sector-specific ERP solutions and localized training (Kemenperin, 2023). By leveraging open-source ERP platforms like Odoo and coupling them with proper training and a supportive ecosystem, Batik MSMEs can transition toward more structured and data-driven business management.

While previous studies have separately investigated ERP systems, inventory management, and entrepreneurial orientation, few have analyzed the combined effect of these variables on the business performance of creative MSMEs, especially Batik producers

in Indonesia. This study aims to bridge this research gap by examining how ERP implementation, moderated by EO and inventory management efficiency, enhances MSME business performance in a real-world setting. This study attempts to bridge this gap by examining how these factors collectively influence business performance when integrated via Odoo ERP in Medan-based Batik MSMEs.

### 2.6. Proposed Research Framework

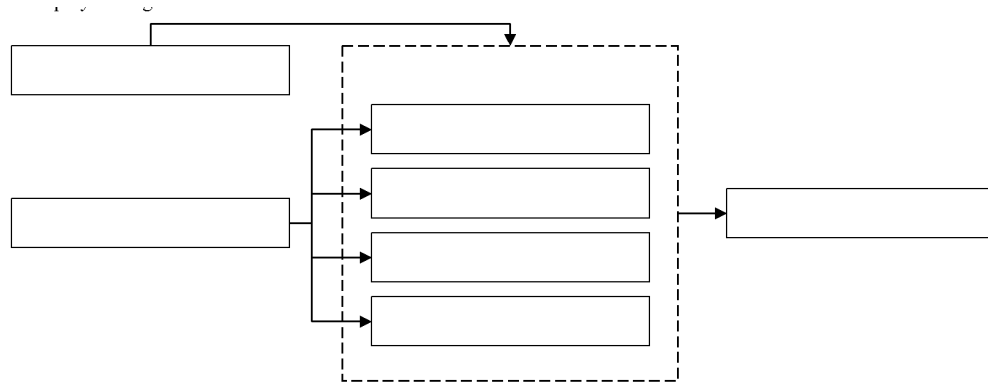


Figure 1. Proposed Research Framework

This framework illustrates the relationship between ERP implementation, inventory management, entrepreneurial orientation, and business performance in Batik MSMEs. ERP implementation is positioned as the central driver, integrating purchasing, inventory, manufacturing, and sales processes. Inventory management acts as a mediating factor, ensuring that ERP adoption translates into operational improvements such as reduced stock discrepancies and improved production continuity. Entrepreneurial orientation—defined by innovation, proactiveness, and risk-taking—functions as a moderating factor, influencing the success of ERP adoption and amplifying its impact on performance. Business performance, measured through indicators such as stock accuracy, decision-making speed, and order fulfillment, represents the final outcome of these interactions.

This framework emphasizes that ERP adoption alone is insufficient; its effectiveness depends on structured inventory practices and the entrepreneurial mindset of MSME owners. By integrating these dimensions, the model provides a holistic view of how digital transformation can enhance competitiveness in creative industries such as Batik.

### 3. Methods

This study employed an experimental research design to analyze the impact of ERP implementation on the business performance of Batik MSMEs in Medan City. The design focused on process integration in purchasing, production, sales, and inventory management.

A one-group pretest-posttest design was chosen because it allows direct comparison of MSME performance before and after ERP implementation, ensuring measurable causality. This approach makes it possible to identify changes attributable to ERP adoption rather than external factors. The population consisted of Batik MSMEs under the guidance of Bank Indonesia. Batik XYZ was selected as the case study subject using purposive sampling, based on its clear process documentation and readiness to adopt ERP.

#### Data Collection:

- Structured interviews with owners and staff to capture perceptions of ERP usefulness.
- Direct observation of transaction flows and operational delays in manual systems.
- Questionnaires using a Likert scale (1–5) to measure business performance, inventory control, and entrepreneurial orientation.

#### Data Analysis:

- Validity tested using Pearson correlation.
- Reliability assessed with Cronbach's Alpha, all variables exceeding the threshold of 0.7, confirming internal consistency.
- Regression analysis conducted to evaluate the influence of ERP implementation, inventory management, and entrepreneurial orientation on business performance.
- A significance level of  $\alpha = 0.05$  was applied to all hypothesis testing.

This methodological approach ensures rigor by combining quantitative and qualitative techniques, validating instruments, and applying statistical tests to confirm the reliability and significance of findings.

4. Results and Discussion

The implementation of the Odoo-based ERP system in Batik XYZ produced measurable improvements in operational performance. Quantitative results showed stock accuracy increased from 75% to 96%, decision-making time decreased from more than one day to less than one hour, and on-time order fulfillment rose from 65% to 95%. These findings confirm that ERP adoption can directly address inefficiencies in manual systems and strengthen MSME competitiveness.

4.1. Business Process Analysis (Pre-Implementation)

Before the implementation of ERP, Batik XYZ relied on manual records to manage stock and sales data. This resulted in frequent discrepancies between materials purchased and outputs sold, leading to inefficient production planning and missed sales opportunities. Table 1 and Figure 2 illustrate these inconsistencies using inventory records from 2023.

Table 1. Inventory Fluctuations at Batik XYZ

Month	Raw Material Purchased (m)	Batik Sold (m)	Remaining Stock (m)
Jan-23	100	0	100
Feb-23	0	0	100
Mar-23	0	0	100
Apr-23	0	0	100
May-23	187	318	-31
Jun-23	31	31	0
Jul-23	210	0	210
Aug-23	0	0	210
Sep-23	0	0	210
Oct-23	356	396	170
Nov-23	0	20	150
Dec-23	0	0	155

This table shows monthly records of raw material purchases, batik sales, and remaining stock. The data highlights inefficiencies in manual inventory management, including discrepancies such as negative stock in May 2023, which indicates over-selling without proper stock control. These inconsistencies demonstrate the urgent need for structured inventory management through ERP.

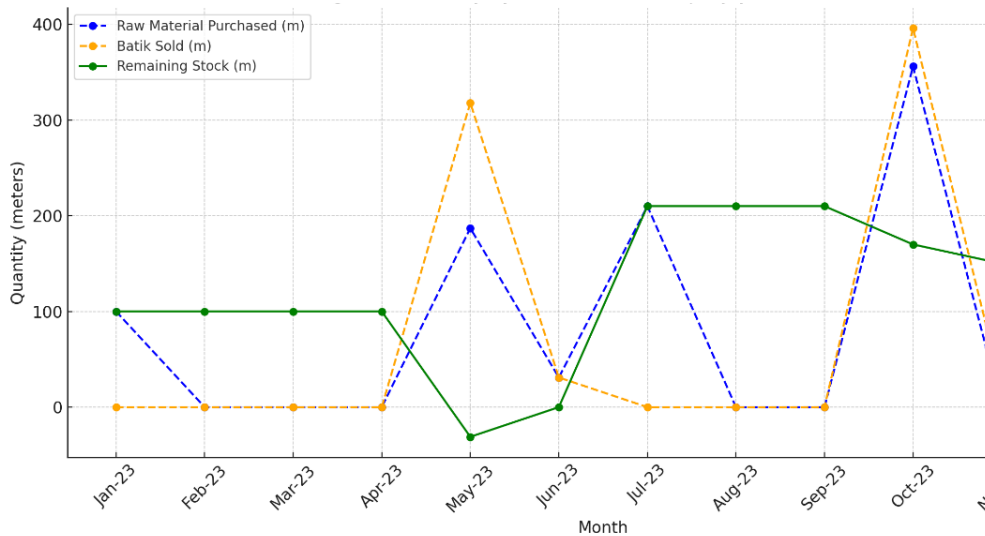


Figure 2. Inventory Dynamics of Batik XYZ

This figure illustrates the fluctuations in raw material purchases, batik sales, and remaining stock across the year. The graph clearly shows periods of inactivity (February–April, August–September) and sudden spikes in purchases (October), reflecting poor

planning and lack of synchronization between sales and production. Such irregularities emphasize the importance of ERP integration for real-time monitoring.

4.2. Gap Analysis

These businesses faced various challenges including inventory mismanagement, fragmented business processes, and delayed decision-making due to manual systems. The implementation of an Odoo-based ERP system aimed to address these issues. The table below compares key business processes before and after ERP implementation.

Table 2. Business Process Comparison Before and After ERP Implementation

Process	Before ERP	After ERP (Odoo)
Inventory	Manual records, prone to errors	Real-time, automated, well-structured
Purchasing	Unsystematic, prone to delays	Integrated: RFQ, PO, vendor billing
Production	Poor planning, undocumented	Includes BoM, work centers, and routings
Sales	Manual, susceptible to data loss	Automated quotations, sales orders, invoicing

This table compares key processes—inventory, purchasing, production, and sales—before and after ERP adoption. The results show a shift from manual, error-prone systems to automated, integrated workflows. For example, inventory management moved from manual records to real-time tracking, while purchasing became structured with RFQ and PO features. These changes highlight ERP’s role in improving efficiency and reducing delays.

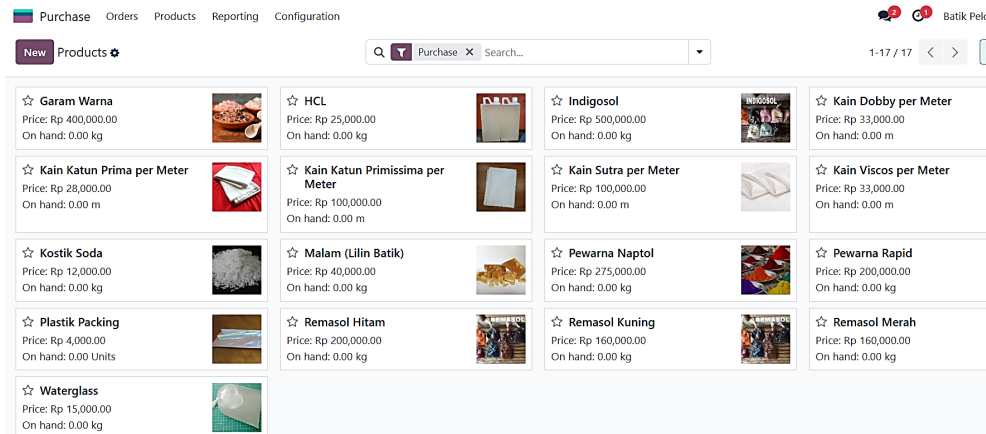


Figure 3. ERP Interface Implementation at Batik XYZ

This figure presents the Odoo ERP interface used by Batik XYZ. It demonstrates how modules such as purchasing and inventory are digitized, enabling structured data entry and monitoring. The interface provides transparency in procurement and stock management, reducing errors and supporting faster decision-making.

4.3. ERP Readiness and Reliability Testing

The validity and reliability tests confirm that all research instruments are both valid and reliable. Cronbach's Alpha values for each variable are Business Performance, Entrepreneurial Orientation, and Inventory Management, indicating high internal consistency.

Table 3. Reliability Test Results

Variable	Cronbach Alpha	Status
Business Performance	0.8774	Reliable
Entrepreneurial Orientation	0.8565	Reliable
Inventory Management	0.7764	Reliable

This table reports Cronbach’s Alpha values for Business Performance, Entrepreneurial Orientation, and Inventory Management. All variables exceed the reliability threshold (>0.7), confirming strong internal consistency of the measurement instruments. This validates the robustness of the data used in the study.

4.4. *The Integration of ERP*

The integration of ERP using Odoo was carried out across four core modules: Inventory, Purchase, Manufacturing, and Sales. Each module was configured based on the specific business processes and needs of Batik XYZ.

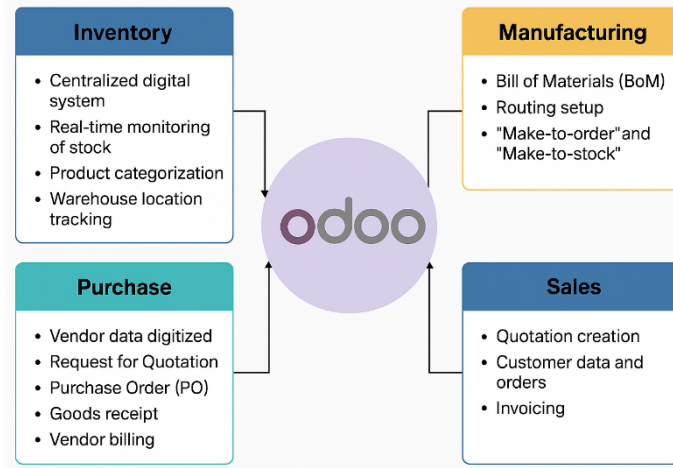


Figure 4. ERP Integration using Odoo

This figure illustrates the integration of ERP modules (Inventory, Purchase, Manufacturing, and Sales) into a unified system. It shows how digitization connects different business functions, enabling real-time monitoring and seamless workflow. The integration ensures that production planning, procurement, and sales are aligned, reducing inefficiencies common in manual systems.

Inventory tracking was shifted from manual spreadsheets to a centralized digital system. The module enabled real-time monitoring of stock levels, product categorization, and warehouse location tracking. Safety stock and reordering rules were also automated. Vendor data was digitized, and procurement processes were streamlined through features such as Request for Quotation (RFQ), Purchase Order (PO) generation, goods receipt, and vendor billing. The system automatically triggered reorders based on minimum stock levels. The Batik production process, although largely manual, benefited from the use of the Bill of Materials (BoM) and routing setup. This helped in production planning, especially for "make-to-order" and "make-to-stock" strategies. Sales operations were integrated from quotation creation to invoicing. Customer data, orders, and transactions were digitized, allowing business owners to monitor sales performance in real time and reduce errors in invoicing and delivery.

4.5. *Post-Implementation Efficiency Gains*

Based on regression analysis and field observations, the study found are ERP significantly improved data accuracy and operational efficiency, automated inventory management reduced the frequency of stockouts, high entrepreneurial orientation facilitated faster ERP adoption.

Table 4. Impact of ERP Implementation on Performance Indicators

Indicator	Before ERP	After ERP	Change
Stock accuracy	75%	96%	Improved
Decision-making time	>1 day	<1 hour	Significantly faster
On-time order fulfillment	65%	95%	Improved

This table compares performance indicators before and after ERP adoption. Stock accuracy improved from 75% to 96%, decision-making time decreased from more than one day to less than one hour, and on-time order fulfillment rose from 65% to 95%. These quantitative improvements demonstrate ERP's effectiveness in enhancing MSME performance.

4.6. *Business Process Improvements*

Before ERP adoption, Batik XYZ experienced frequent stock discrepancies, delayed procurement cycles, and poor production planning. The ERP system introduced automated inventory tracking, structured purchasing workflows, and integrated sales management. These changes reduced errors, improved transparency, and enabled real-time monitoring. Such improvements align with prior studies (Zahra, Syaifuddin, & Siswanto, 2023; Nugroho et al., 2023), which highlight ERP's role in enhancing efficiency and responsiveness.

#### 4.7. *Role of Entrepreneurial Orientation*

Entrepreneurial orientation (EO) was found to be a critical factor in ERP adoption. The owner's willingness to innovate, act proactively, and take risks facilitated smooth digital transformation. This supports Riana (2019) and Ramadhan (2024), who argue that EO enables MSMEs to adapt more effectively to technological change. In Batik XYZ, EO amplified the benefits of ERP, ensuring that digital tools were not only adopted but also fully utilized to improve performance.

#### 4.8. *Practical Implications*

- For MSME Owners: The study demonstrates that ERP adoption, even with limited resources, can deliver significant efficiency gains. Owners should cultivate entrepreneurial orientation to maximize ERP benefits and sustain competitiveness.
- For Policymakers: Digital empowerment programs should prioritize training, grants, and technical support for ERP adoption in creative industries. Policies that lower barriers to technology adoption will accelerate MSME digital transformation.
- For ERP Developers and Consultants: ERP solutions must be user-friendly, customizable to artisanal workflows, and supported by strong training modules. Flexible systems like Odoo show that ERP can be adapted to small-scale creative enterprises, challenging the perception that ERP is only suitable for large corporations.

#### 4.9. *Theoretical Contributions*

This study enriches ERP literature by integrating inventory management and entrepreneurial orientation as mediating and moderating factors in performance outcomes. It demonstrates that ERP adoption is most effective when combined with structured operational practices and strategic posture, offering a holistic framework for MSME digital transformation.

### 5. **Conclusion**

This study examined the implementation of an Odoo-based ERP system in Batik MSMEs in Medan City, with Batik XYZ as the case study. The results demonstrate that ERP adoption, when aligned with operational needs and supported by entrepreneurial orientation, can significantly improve business performance. Key improvements included enhanced inventory accuracy, faster decision-making, and higher order fulfillment rates.

Practically, ERP adoption enhances MSME competitiveness and efficiency by reducing manual errors, streamlining workflows, and enabling real-time monitoring. MSME owners benefit from structured processes that improve productivity and customer satisfaction, while policymakers can use these insights to design targeted digital empowerment programs. ERP developers and consultants are encouraged to create flexible, user-friendly systems tailored to artisanal workflows, ensuring accessibility for small enterprises.

Theoretically, this study contributes to ERP literature by integrating entrepreneurial orientation and inventory management as mediating factors in performance outcomes. It highlights that ERP adoption is most effective when combined with strategic posture and operational discipline, offering a holistic framework for analyzing MSME digital transformation.

In conclusion, ERP implementation is not merely a technological upgrade but a strategic enabler of sustainable growth, resilience, and competitiveness in creative industries. Future research should expand to multiple MSMEs across regions and conduct longitudinal studies to capture long-term impacts on financial performance, customer satisfaction, and scalability.

### 6. **Limitation**

While this study provides valuable insights into the implementation of ERP systems within Batik MSMEs, several limitations must be acknowledged. This research was conducted on a single Batik MSME (Batik XYZ) in Medan City, which may limit the generalizability of the findings. Although the case was representative of typical operational challenges faced by similar enterprises, broader studies involving multiple MSMEs across different regions and industry scales are required to validate and enrich the findings. The post-implementation assessment was conducted within a relatively short time frame. This limited the ability to evaluate the long-term impacts of ERP on financial performance, customer satisfaction, and strategic growth. Future longitudinal studies are needed to assess ERP's sustainability and its contribution to firm competitiveness over time. Although the Odoo ERP system is designed to be user-friendly, the research did not quantitatively assess the learning curve or training effectiveness among staff. Adoption success is heavily dependent on user engagement, digital literacy, and change management, variables that should be further investigated in future research. The study did not fully explore the effect of external infrastructure factors such as internet reliability, software localization, and device compatibility, all of which could influence the ERP system's performance and accessibility, especially in MSMEs located in rural or underdeveloped areas.

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