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Enterprise Resource Planning Implementation in Thailand's MSMEs for Enhancing Operational Performance

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Abstract

This study examines the factors that influence the successful implementation of Enterprise Resource Planning (ERP) systems and how these systems help improve operational performance among Micro, Small, and Medium-sized Enterprises (MSMEs) in Thailand. The research focuses on several variables: top management commitment, user involvement, business process reengineering, project management, ERP teamwork and composition, ERP implementation, and operational performance. The sample includes 496 employees with a bachelor's degree or higher and at least one year of experience working in MSMEs. A pilot test with 50 participants was conducted to check the questionnaire's reliability using the Item-Objective Congruence (IOC) index and Cronbach's alpha. Judgmental, convenience, and snowball sampling methods were used to recruit participants. Data were analyzed using Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM). The results show that top management commitment, user involvement, business process reengineering, and ERP teamwork and composition all have a significant effect on ERP implementation. ERP implementation, in turn, has a positive effect on operational performance. However, project management does not significantly influence ERP implementation. Overall, the study suggests that MSME managers in Thailand can strengthen business performance and competitiveness by focusing on the key factors that support effective ERP adoption.

Introduction

MSMEs and Enterprise Resource Planning Implementation

Micro, Small and Medium-sized Enterprises (MSMEs) constitute a crucial component of Thailand's economy, contributing significantly to employment generation, income generation, and overall economic growth. According to the Ministry of Industry in Thailand, MSMEs account for approximately 99% of all registered businesses in the country and play a vital role in various sectors such as manufacturing, services, and agriculture (Ministry of Industry, 2023). These enterprises are often characterized by limited resources, including financial, human, and technological capabilities, which

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can present challenges in competing with larger counterparts in both domestic and international markets (Radicic & Petković, 2023).

In the contemporary business landscape, where globalization and technological advancements are reshaping industries, MSMEs in Thailand are increasingly recognizing the importance of adopting modern management practices and technology-driven solutions to enhance their competitiveness and sustainability (Kraus et al., 2021). One such technology that holds promise for MSMEs is Enterprise Resource Planning (ERP) systems (Accelon Technologies, 2023).

ERP systems represent integrated software solutions designed to streamline business processes, enhance data visibility, and improve decision-making across various functional areas within an organization (Al-Mashari et al., 2003). While ERP systems have traditionally been associated with large corporations due to their high implementation costs and complex deployment processes, there is a growing trend towards the adoption of ERP systems among MSMEs globally (Ebirim et al., 2024).

In Thailand, the adoption of ERP systems among MSMEs is gaining traction as these enterprises seek to improve operational efficiency, optimize resource utilization, and adapt to changing market dynamics (Cherapanukorn et al., 2022). However, despite the potential benefits, the successful implementation of ERP systems in MSMEs poses unique challenges and requires careful consideration of factors such as organizational readiness, resource constraints, and technological capabilities (Katuu, 2020).

This research investigates the factors that influence the implementation of ERP systems in MSMEs in Thailand and examines their impact on operational performance. By analyzing key variables such as top management commitment, user involvement, business process reengineering, project management, ERP teamwork and composition, and ERP implementation, the study identifies the critical success factors that support effective ERP adoption within the context of Thai MSMEs.

Through a combination of quantitative analysis and empirical research, this study aims to contribute to the existing body of knowledge on ERP implementation in MSMEs and provide practical recommendations for policymakers, industry practitioners, and academic scholars. By understanding the determinants of successful ERP implementation in MSMEs, stakeholders can develop strategies to support MSMEs in harnessing the full potential of ERP systems to drive growth, innovation, and competitiveness in the Thai economy.

As Thailand embraces economic modernization and digital transformation, MSMEs face growing pressure to adopt technologies like ERP systems to remain competitive. The Thailand 4.0 initiative highlights the need for innovation and digital integration, yet many MSMEs struggle with financial constraints, limited technical expertise, and solutions that fail to address their specific needs. Tackling these challenges is essential to enabling ERP adoption as a strategic tool for growth and competitiveness. The next sections explore the key factors influencing ERP implementation in Thai MSMEs and practical strategies to overcome these barriers.

Objectives

1. To analyze the factors that impact the implementation of ERP systems and the operational performance of MSMEs in Thailand.

2. To provide practical recommendations for the key policymakers, managerial, academic and MSME stakeholders in Thailand based on the findings of the study.

Literature Review

Top Management Commitment

Top management commitment, crucial in ERP implementation, involves senior executives' dedication, support, resource allocation, and strategic direction (Garg & Agarwal, 2014). Rahmadani et al. (2020) stress the need for visible commitment from executives to allocate resources and provide direction. Similarly, Warrick (2023) emphasize top management's role in overcoming resistance to change. Furthermore, top management commitment fosters a culture of collaboration and cooperation among employees (Aladwani & Palvia, 2002). Active executive involvement signals the project's strategic importance and encourages employee engagement (Finney & Corbett, 2007). Hence, the hypothesis posits:

H1: Top management commitment has a significant impact on ERP implementation.

User Involvement

User involvement, spanning requirements gathering, system design, training, testing, and ongoing support, ensures ERP systems align with user needs, boosting acceptance and successful implementation (Zhang et al., 2003). Early engagement of end-user's

aids in requirement identification and buy-in (Garg & Agarwal, 2014). Fischer et al. (2020) noted user involvement's role in reducing resistance to change and enhancing system usability. Jo and Park (2023) highlighted its impact on ERP system quality, emphasizing involvement in design and testing. Additionally, Bano and Zowghi (2015) linked user involvement to system effectiveness and satisfaction, recommending a collaborative environment for user empowerment. Thus, the hypothesis suggests:

H2: User involvement has a significant impact on ERP implementation.

Business Process Reengineering

Business Process Reengineering (BPR) involves redesigning and optimizing existing business processes to improve performance, efficiency, and effectiveness. It includes reshaping workflows, technologies, and organizational culture to streamline processes and align with strategic goals (Garg & Agarwal, 2014). Erkan et al. (2012) found that BPR significantly influences ERP implementation success, leading to improved system integration and overall performance. Subramoniam et al. (2009) emphasized BPR's transformative potential, suggesting that ERP systems enable organizations to redesign processes for enhanced competitiveness. Dagher and Fayad (2023) highlighted BPR's role in driving organizational change and innovation, advocating for radical redesign to achieve significant performance gains. Additionally, Behera and Dhal (2020) concluded in a meta-analysis that BPR significantly contributes to ERP success, emphasizing factors such as process simplification and alignment with ERP functionalities. Accordingly, the hypothesis indicates:

H3: Business process reengineering has a significant impact on ERP implementation.

Project Management

Project management involves defining project scope, establishing goals, creating plans, allocating resources, managing risks, resolving issues, and communicating progress (Dezdar & Ainin, 2011). It is crucial for driving ERP implementation, ensuring timely completion, and staying within budget (Garg & Agarwal, 2014). Aubert et al. (2013) emphasized clear planning, leadership, and communication's role in ERP success. Similarly, Chen et al. (2021) highlighted planning, resource allocation, and risk management's importance. Behera and Dhal (2020) concluded from a meta-analysis that project management positively affects ERP project success, citing planning and stakeholder management as key practices. Additionally, Raymond and Bergeron (2008) found effective project management impacts system integration, user satisfaction, and organizational performance. Consequently, below hypothesis is proposed:

H4: Project management has a significant impact on ERP implementation.

ERP Teamwork and Composition

ERP teamwork and composition involve collaborative efforts among individuals and teams in implementing an Enterprise Resource Planning (ERP) system (Garg & Agarwal, 2014). It includes forming project teams, coordinating stakeholders, and collaborating across functional areas to ensure successful ERP deployment. Research highlights their crucial role in ERP implementation success. El-Baz et al. (2023) emphasized teamwork's importance in overcoming challenges and achieving project objectives. Similarly, Kozlowski (2018) found teamwork significantly influences project outcomes, stressing the importance of team composition and communication. Soja (2006) noted effective teamwork's positive impact on ERP success, leading to smoother implementations. Somers and Nelson (2001) highlighted teamwork's role, emphasizing strong leadership and clear communication for successful ERP implementations. Subsequently, the hypothesis posits:

H5: ERP teamwork and composition have a significant impact on ERP implementation.

ERP Implementation

ERP implementation involves deploying an Enterprise Resource Planning (ERP) system within an organization, which includes configuring software, migrating data, training users, and integrating systems. Its goal is to streamline operations, enhance collaboration, and drive organizational efficiency (Madapusi & D'Souza, 2012). Research by Chopra et al. (2022) in manufacturing firms found ERP implementation significantly improved key performance indicators such as production cycle time and inventory turnover. Similarly, Behera and Dhal (2020) concluded from a meta-analysis that successful ERP projects enhance operational performance through factors like process standardization and decision support. Motwani et al. (2005) observed significant improvements in order processing time and inventory accuracy in Indian organizations after ERP implementation. Hong et al. (2016) found sustained enhancements in productivity and quality in Korean firms over time due to ERP implementation. Thus, the literature consistently

demonstrates the positive impact of ERP implementation on operational performance:

H6: ERP implementation has a significant impact on operational performance.

Operational Performance

Operational performance, crucial for organizational success, encompasses efficiency, productivity, quality, and customer satisfaction. Studies show the positive impact of factors such as technology adoption, organizational culture, and leadership on operational performance (Awolusi & Fakokunde, 2014; Garg & Agarwal, 2014; Madapusi & D'Souza, 2012). Hassabelnaby et al. (2011) found significant improvements in manufacturing firms' key performance indicators post-ERP implementation, highlighting technology's role. Motwani et al. (2005) noted ERP implementation's benefits in Indian organizations, including enhanced order processing and inventory accuracy. Additionally, Hong et al. (2016) demonstrated the positive influence of effective Information Systems Planning (ISP), Business Process Reengineering (BPR), and customization on ERP performance in Korean SMEs. Organizational culture and leadership are also crucial; Soja (2006) emphasized their significance in successful ERP implementations. Thus, a multifaceted approach, considering technology adoption, organizational culture, and leadership, is essential for enhancing operational performance.

Conceptual Framework

This study adopts the conceptual framework suggested by Garg and Agarwal (2014) and Madapusi and D'Souza (2012). This framework delineates the causal relationships among top management commitment, user involvement, business process reengineering, project management, ERP teamwork and composition, ERP implementation, and operational performance, as illustrated in Figure 1.

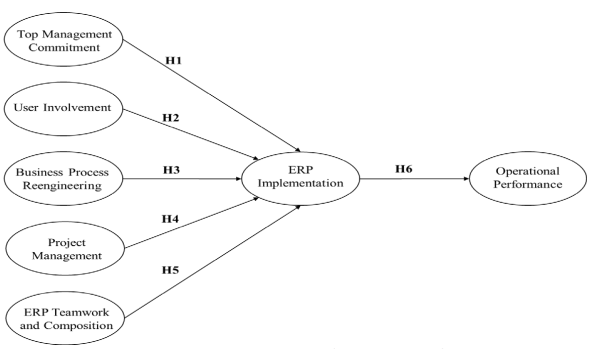

Figure 1 Conceptual Framework

Research Methodology

1. Population and Samples

The study targeted employees with a bachelor's degree or higher and at least one year of experience in Micro, Small, and Medium-sized Enterprises (MSMEs) in Thailand. Soper (2023) was chosen for determining the minimum sample size due to its widely accepted guidelines for ensuring statistical power and robustness in structural equation modeling (SEM). The recommended sample size of 425 was calculated using Soper's online SEM calculator, incorporating key parameters such as the number of observed variables, latent constructs, desired statistical power (0.80), and significance level (0.05). The questionnaire was distributed to 1,000 participants to ensure a sufficiently large pool of responses, accounting for potential non-responses, incomplete answers, or disqualifications. Upon reaching the desired sample size and validating the data, 496 qualified participants were selected for further analysis.

2. Research Instrument

The study utilized a quantitative approach with online distribution. The survey comprised three sections: an initial screening question, 34 items rated on a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree), and demographic inquiries. To ensure participant relevance, a screening question was included: "Are you employed in an MSME and have at least one year of work experience there?" Additionally, demographic questions covered gender, age, education level, and firm size.

3. Collection of Data

1) Survey distribution facilitated the collection of primary data, with participants selected based on specific criteria outlined during the sample selection process. Data collection spanned from September to December 2023, employing a mixed sampling approach comprising judgmental, and snowball sampling techniques. Judgmental sampling targeted employees with a bachelor's degree or higher and at least one year of experience in working in an MSME in Thailand. As MSMEs typically have a limited number of employees (Microenterprises: 1 to 9 employees, small enterprises: 10 to 49 employees, and Medium-sized enterprises: 50 to 249 employees), this study intended to engage participants who were readily accessible. Recruitment efforts primarily targeted individuals through HR references, LinkedIn connections, and other relevant social media platforms (e.g., Email, Chat Applications, LinkedIn, and Facebook), and referrals. An online survey

via Google Forms solicited voluntary responses, without assurance of proportional representation. Snowball sampling encouraged participants to share the survey within their networks.

2) The secondary data collected for this study was obtained from a variety of reputable sources, including academic articles, research journals, textbooks, statistical information, reliable online sources, previously conducted studies, dissertations, and documents. These sources were selected to provide comprehensive insights and background information relevant to the research topic. Academic articles and research journals offered peer-reviewed research findings and theoretical frameworks related to the study's focus. Textbooks provided foundational knowledge and theoretical perspectives on relevant concepts. Statistical information from reliable sources contributed empirical data and trends relevant to the study's context. Additionally, previously conducted studies, dissertations, and documents offered insights from similar research efforts, helping to contextualize findings and identify gaps in existing literature. Overall, the secondary data collection process aimed to ensure a well-rounded understanding of the research area and support the study's objectives.

4. Data Analysis

Before the data collection, this study ensured content validity using the Item-Objective Congruence (IOC) index and assessed reliability through Cronbach's alpha in a pilot test involving 40 participants. For IOC assessment, three experts rated each item on a scale of 0, -1, or 1, where 1 indicated alignment with the intended objective, -1 signified irrelevance, and 0 indicated uncertainty. The average IOC index score surpassed 0.67, indicating high content validity (Rovinelli & Hambleton, 1977), leading to retaining all scale items in the questionnaire. Additionally, the pilot test with 40 participants showed Cronbach's alpha coefficient values exceeding the acceptable threshold of 0.7 (Nunnally, 1978).

After the data collection, Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM) were employed for data analysis and hypothesis testing. CFA validated measurement scales, ensuring the reliability and validity of constructs. SEM assessed the structural relationships among variables, allowing for hypothesis testing and providing insights into the complex interplay of factors influencing operational performance.

Results

Table 1 provides demographic and general data from a sample size of 496 participants. The majority of participants were male, accounting for 59.3%, while 40.7% were female. Participants were distributed across different age groups, with the highest percentage (34.3%) falling in the 30-39 age category. This was followed by 28.6% in the 40-49 age category, 20.6% below 30 years old, and 16.5% over 49 years old. The majority of participants held a Bachelor's degree (60.3%), followed by those with a Master's degree (30.6%), and a smaller proportion with a Doctoral degree (9.1%). Participants were employed across various sizes of enterprises, with the highest percentage (49.8%) working in medium-sized enterprises (50 to 249 employees). This was followed by 39.3% in small enterprises (10 to 49 employees), and 10.9% in microenterprises (1 to 9 employees).

Table 1 Demographical Results

	Demographic and General Data (N=496)	Frequency	Percentage
1. Gender	Male	294	59.3%
	Female	202	40.7%
2. Age	Below 30 Years Old	102	20.6%
	30-39 Years Old	170	34.3%
	40-49 Years Old	142	28.6%
	Over 49 Years Old	82	16.5%
3. Education Level	Bachelor's Degree	299	60.3%
	Master's Degree	152	30.6%
	Doctoral Degree	45	9.1%
4. Firm Size	Microenterprises: 1 to 9 employees	54	10.9%
	Small enterprises: s 10 to 49 employee	195	39.3%
	Medium-sized enterprises: 50 to 249 employees	247	49.8%

In the Confirmatory Factor Analysis (CFA), the assessment of data included evaluations of convergence validity and discriminant validity. Internal consistency was measured using Cronbach's alpha, with a threshold of 0.70 or higher (Nunnally, 1978). Additionally, the pilot test results, using Cronbach's alpha with 40 participants showed that Top Management Commitment (TMC) scored 0.851, User Involvement (UI) 0.823, Business Process Reengineering (BPR) 0.884, Project Management (PM) 0.844, ERP Teamwork and Composition (TWC) 0.872, ERP Implementation (ERP) 0.813, and Operational Performance (OPF) 0.861. In addition, after the large-scale questionnaire distribution for 496 participants, Cronbach's alpha results indicated strong internal consistency and support the instrument's

suitability for the main study. Acceptability criteria comprised t-values > 1.98, p-values < 0.5, and factor loadings > 0.5. Additionally, Composite Reliability (CR) values > 0.7 were considered significant. Following Fornell and Larcker's (1981) guidance, if the Average Variance Extracted (AVE) fell below 0.5 but the Composite Reliability (CR) exceeded 0.6, the convergent validity of the construct remained satisfactory. The criteria ensured robust estimates, confirming both convergence and discriminant validity within the measurement model, as shown in Table 2.

Table 2 Confirmatory Factor Analysis Result, Composite Reliability (CR) and Average Variance Extracted (AVE)

Variables	Source of Questionnaire	No. of Items	Cronbach's Alpha (n=40) Pilot Test	Cronbach's Alpha (n=496)	Factors Loading	CR	AVE
Top Management Commitment (TMC)	Garg and Agarwal (2014)	5	0.851	0.838	0.698-0.742	0.838	0.509
User Involvement (UI)	Garg and Agarwal (2014)	5	0.823	0.847	0.649-0.790	0.848	0.528
Business Process Reengineering (BPR)	Garg and Agarwal (2014)	4	0.884	0.813	0.653-0.788	0.817	0.529
Project Management (PM)	Garg and Agarwal (2014)	5	0.844	0.850	0.659-0.787	0.851	0.534
ERP Teamwork and Composition (TWC)	Garg and Agarwal (2014)	5	0.872	0.817	0.596-0.758	0.821	0.480
ERP implementation (ERP)	Garg and Agarwal (2014)	4	0.813	0.898	0.778-0.886	0.900	0.692
Operational Performance (OPF)	Awolusi and Fakokunde (2014)	6	0.861	0.847	0.534-0.921	0.837	0.480

Hair et al. (2010) emphasized the importance of discriminant validity in structural equation modeling (SEM), stressing that constructs should show lower correlations with other constructs compared to their own indicators. As outlined in Table 3, Fornell and Larcker (1981) recommended using the square root of the Average Variance Extracted (AVE) for each construct to assess discriminant validity. They proposed that correlations between constructs should be lower than the square roots of their respective AVEs.

Table 3 Discriminant Validity

	ERP	TMC	UI	BPR	PM	TWC	OPF
ERP	**0.832**						
TMC	0.581	**0.714**					
UI	0.340	0.259	**0.727**				
BPR	0.521	0.541	0.180	**0.727**			
PM	0.375	0.231	0.191	0.415	**0.731**		
TWC	0.647	0.533	0.313	0.630	0.519	**0.692**	
OPF	0.530	0.467	0.161	0.557	0.318	0.558	**0.693**

Note: The diagonally listed value is the AVE square roots of the variables.

Goodness of fit indices are statistical measures used to assess how well a model fits the observed data. These indices provide information about the overall fit of the model to the data, indicating whether the model adequately represents the relationships among variables (Hair et al., 2010). For the measurement model (no model modification), the goodness of fit indices generally suggests an acceptable model fit, with values within acceptable ranges for most indices. However, for the structural model before model modification, some goodness of fit indices indicates an unacceptable model fit, particularly GFI, AGFI, NFI, and TLI, which fall below their respective thresholds. After model modification, the structural model shows improvement in the goodness of fit, with most indices now indicating an acceptable model fit, except for RMSEA which slightly exceeds the threshold but is still within an acceptable range. Overall, the model modification resulted in a more acceptable fit for the structural model, aligning better with the desired thresholds for most goodness of fit indices, as shown in Table 4.

Table 4 Goodness of Fit for Measurement and Structural Models

Index	Acceptable Values	Statistical Values		
		Measurement Model (No Model Modification)	Structural Model (Before Model Modification)	Structural Model (After Model Modification)
CMIN/DF	< 3.00 (Hair et al., 2006)	1094.107/506 = 2.162	1629.379/521 = 3.127	1283.138/519 = 2.472
GFI	≥ 0.85 (Kline, 2011)	0.869	0.805	0.858
AGFI	≥ 0.80 (Sica & Ghisi, 2007)	0.846	0.778	0.837
NFI	≥ 0.85 (Kline, 2011)	0.875	0.814	0.853
CFI	≥ 0.85 (Kline, 2011)	0.928	0.865	0.907
TLI	≥ 0.85 (Kline, 2011)	0.920	0.854	0.899
RMSEA	≤ 0.08 (Hooper et al., 2008)	0.048	0.066	0.055
Model summary		**Acceptable Model Fit**	**Model Fit Acceptable**	**Unacceptable Model Fit**

Remark: CMIN/DF = The ratio of the chi-square value to degree of freedom, GFI = goodness-of-fit index, AGFI = adjusted goodness-of-fit index, NFI = normalized fit index, CFI = comparative fit index, TLI = Tucker-Lewis index, and RMSEA = root mean square error of approximation.

The results of hypothesis testing, derived from the Standardized Path Coefficients and t-values, are presented in Table 5 and graphically depicted in Figure 2. Statistical significance, indicating the acceptance of the hypotheses, is determined at a significance level of $p = 0.05$, in line with the recommendation by Hair et al. (2010).

Table 5 Research Hypothesis Testing Result

Hypotheses	Paths	Standardized Path Coefficients (β)	S.E.	T-Value	Tests Result
H1	ERP<---TMC	0.363	0.045	7.733*	Supported
H2	ERP<---UI	0.145	0.037	3.398*	Supported
H3	ERP<---BPR	0.157	0.052	3.564*	Supported
H4	ERP<---PM	0.077	0.043	1.819	Not Supported
H5	ERP<---TWC	0.528	0.058	9.799*	Supported
H6	OPF<---ERP	0.680	0.056	9.973*	Supported

Remark: *p<0.05

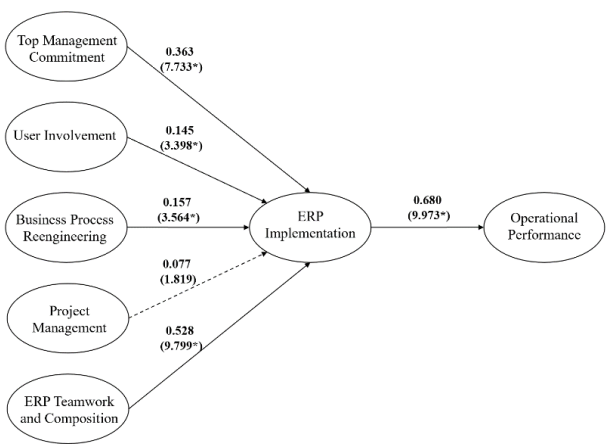

Figure 2 The Results of Structural Model
Remark: Dashed lines, not significant; solid lines, significant. *p<0.05.

The analysis examined six hypotheses regarding the impact of various factors on ERP implementation and operational performance, as demonstrated in Table 5, and Figure 2.

Hypothesis 1 (H1): Top management commitment has a significant impact on ERP implementation. The standardized path coefficient (β) is 0.363, with a t-value of 7.733, indicating a strong positive relationship. This hypothesis is supported, suggesting that higher levels of top management commitment led to more successful ERP implementation.

Hypothesis 2 (H2): User involvement has a significant impact on ERP implementation. The β coefficient is 0.145, with a t-value of 3.398, indicating a positive relationship. This hypothesis is supported, indicating that greater user involvement contributes to more effective ERP implementation.

Hypothesis 3 (H3): Business process reengineering has a significant impact on ERP implementation. The β coefficient is 0.157, with a t-value of 3.564, indicating a positive relationship. This hypothesis is supported, suggesting that organizations that engage in business process reengineering experience better ERP implementation outcomes.

Hypothesis 4 (H4): Project management has a significant impact on ERP implementation. The β coefficient is 0.077, with a t-value of 1.819, indicating a weak positive relationship. This hypothesis is not supported, suggesting that project management may not significantly influence ERP implementation outcomes.

Hypothesis 5 (H5): ERP teamwork and composition have a significant impact on ERP implementation. The β coefficient is 0.528, with a t-value of 9.799, indicating a strong positive relationship. This hypothesis is supported, indicating that effective teamwork and composition are crucial for successful ERP implementation.

Hypothesis 6 (H6): ERP implementation has a significant impact on operational performance. The β coefficient is 0.680, with a t-value of 9.973, indicating a strong positive relationship. This hypothesis is supported, suggesting that successful ERP implementation leads to improved operational performance.

Overall, the results highlight the importance of top management commitment, user involvement, business process reengineering, ERP teamwork, and effective ERP implementation in driving operational performance. However, the role of project management in ERP implementation may be less influential based on these findings. These results provide valuable insights for organizations seeking to optimize their ERP implementation processes and enhance operational performance.

Discussion

To address the research objective of identifying the factors that influence ERP implementation and operational performance in MSMEs in Thailand, the findings of this study show strong alignment with established theoretical frameworks and prior empirical research. The results highlight key success factors that contribute to effective ERP implementation and subsequent improvements in operational performance among Thai MSMEs. Top management commitment emerged as a vital determinant, resonating with findings

from Al-Mashari et al. (2003) and Finney and Corbett (2007), who emphasized leadership's role in driving ERP projects by setting a vision and allocating resources effectively. User involvement, another significant factor, aligns with systematic reviews by Bano and Zowghi (2015) and Fischer et al. (2020), demonstrating that engaging end-users in design and implementation ensures alignment with organizational needs, improving usability and satisfaction. The positive influence of business process reengineering (BPR) on ERP success supports insights from Dagher and Fayad (2023) and Hong et al. (2016), highlighting that restructured processes enhance ERP integration. Conversely, while project management practices are traditionally seen as critical, this study found limited direct impact, warranting further exploration, as noted by Raymond and Bergeron (2008). Effective ERP teamwork significantly impacted outcomes, reinforcing the importance of cross-functional collaboration (Kozlowski, 2018). Finally, the study affirmed the transformative effect of ERP implementation on operational performance, echoing Behera and Dhal's (2020) meta-analysis, which links successful ERP adoption to enhanced efficiency and competitive advantage. These findings provide a holistic understanding of ERP success within MSMEs, offering practical and theoretical contributions to ERP literature. Overall, these findings underscore the multi-faceted nature of ERP implementation success within MSMEs in Thailand. They emphasize the significance of leadership commitment, user involvement, business process reengineering, teamwork, and successful implementation in driving operational performance improvements. These insights can inform MSMEs in Thailand and similar contexts in optimizing their ERP initiatives for enhanced business outcomes.

Recommendations

In line with the research objective of offering practical guidance for key policymakers, managers, academics, and MSME stakeholders in Thailand, the following recommendations are proposed based on the study's findings:

ERP systems are essential for enhancing the operational performance of MSMEs, particularly in Thailand, where MSMEs constitute a significant portion of the economy. To promote effective ERP adoption, policymakers should implement targeted incentives such as subsidies, tax benefits, or low-interest loans to alleviate the financial burden on MSMEs. Additionally, the government could establish regional ERP knowledge hubs to provide expertise and support for system implementation and management. Standardized ERP training programs, developed in collaboration with educational institutions and industry, can further ensure that employees across MSMEs possess the requisite skills for leveraging ERP functionalities. These policy measures can create an enabling environment for ERP adoption and contribute to technological advancement in the sector.

On a managerial level, the success of ERP systems hinges on robust top management commitment, which involves dedicating resources, setting strategic goals, and addressing resistance to change. Managers should also prioritize user involvement by engaging end-users in every phase of the ERP implementation process, from requirement analysis to training, to ensure system alignment with organizational needs. Business process reengineering is another critical factor, requiring organizations to streamline and optimize their workflows to fully exploit ERP capabilities. Building cross-functional ERP teams enhances communication and knowledge sharing, helping navigate implementation challenges. Moreover, while project management practices in MSMEs require improvement, adopting structured methodologies such as Agile can improve planning and execution, thereby increasing the likelihood of successful ERP deployment.

Academically, future research should focus on longitudinal studies to analyze the long-term impact of ERP systems on operational performance, while expanding sample sizes to enhance the generalizability of findings across diverse contexts. Comparative analyses across industries and countries can offer deeper insights into the factors that drive ERP success, while investigations into emerging technologies such as AI and IoT integration with ERP systems could highlight avenues for innovation. Researchers should also explore the cultural factors influencing ERP adoption in Thailand, providing a nuanced understanding of challenges and opportunities specific to the region. By addressing these policy, managerial, and academic dimensions, MSMEs in Thailand can improve ERP implementation success, fostering greater operational efficiency, competitiveness, and sustained economic growth.

References

Accelon Technologies. (2023). Unleashing growth: The power of ERP for MSMEs. Retrieved March 24, 2024, from https://medium.com/@accelontech/unleashing-growth-the-power-of-erp-for-msmes-f0487eb7c22c

Aladwani, A. M., & Palvia, P. C. (2002). Developing and validating an instrument for measuring user-perceived web quality. *Information & Management, 39*(6), 467–476. https://doi.org/10.1016/S0378-7206(01)00113-6

Al-Mashari, M., Al-Mudimigh, A., & Zairi, M. (2003). Enterprise resource planning: A taxonomy of critical factors. *European Journal of Operational Research, 146*(2), 352–364. https://doi.org/10.1016/S0377-2217(02)00554-4

Aubert, B., Hooper, V., & Schnepel, A. (2013). Revisiting the role of communication quality in ERP project success. *American Journal of Business, 28*(1), 64–85. https://doi.org/10.1108/19355181311314770

Awolusi, O., & Fakokunde, T. (2014). Enterprise resource planning in Nigerian service firms: a structural equation modelling approach. *International Journal of Management and Network Economics, 3*(2), 123–143. https://doi.org/10.1504/IJMNE.2014.060868

Bano, M., & Zowghi, D. (2015). A systematic review on the relationship between user involvement and system success. *Information and Software Technology, 58,* 148–169. https://doi.org/10.1016/j.infsof.2014.06.011

Behera, R. K., & Dhal, S. K. (2020). A meta-analysis of impact of ERP implementation. In S. Borah, V. E. Balas, & Z. Polkowski (Eds.), *Advances in data science and management* (Lecture Notes on Data Engineering and Communications Technologies, Vol. 37, pp. 123–135). Singapore: Springer. https://doi.org/10.1007/978-981-15-0978-0_12

Chen, X., Chong, W. F., Feng, R., & Zhang, L. (2021). Pandemic risk management: Resources contingency planning and allocation. *Insurance: Mathematics and Economics, 101,* 359–383. https://doi.org/10.1016/j.insmatheco.2021.08.001

Cherapanukorn, V., Suriyamanee, G., & Wanchaem, S. (2022). Enterprise resources planning framework for Thai agriculture SMEs. In *2022 Joint International Conference on Digital Arts, Media and Technology with ECTI Northern Section Conference on Electrical, Electronics, Computer and Telecommunications Engineering (ECTI DAMT & NCON)* (pp. 41–45). Chiang Rai, Thailand. https://doi.org/10.1109/ECTIDAMTNCON53731.2022.9720319

Chopra, R., Sawant, L., Kodi, D., & Terkar, R. (2022). Utilization of ERP systems in manufacturing industry for productivity improvement. *Materials Today: Proceedings, 62*(Part 2), 1238–1245. https://doi.org/10.1016/j.matpr.2022.04.529

Dagher, J., & Fayad, L. (2023). Business process reengineering: A crucial approach for enhanced organizational sustainability. In H. El-Chaarani, I. El Dandachi, S. El Nemar, & Z. EL Abiad (Eds.), *Navigating the Intersection of Business, Sustainability and Technology* (pp. 25–59). Singapore: Springer. https://doi.org/10.1007/978-981-99-8572-2_2

Dezdar, S., & Ainin, S. (2011). Examining enterprise resource planning implementation success from a project environment perspective. *Business Process Management Journal, 17*(6), 919–939. https://doi.org/10.1108/14637151111182693

Ebirim, G., Unigwe, I., Asuzu, O. F., Odonkor, B., Oshioste, E., & Okoli, U. (2024). A critical review of ERP systems implementation in multinational corporations: Trends, challenges, and future directions. *International Journal of Management & Entrepreneurship Research, 6*(2), 281–295. https://doi.org/10.51594/ijmer.v6i2.770

El-Baz, K., El-Midany, T., Ghattas, M., & Abou Eleaz, M. (2023). The impact of Enterprise Resource Planning (ERP) implementation on performance of firms: A case to support production process improvement. *MEJ Mansoura Engineering Journal, 48*(6), 1–12. https://doi.org/10.58491/2735-4202.3092

Erkan, T., Baç, U., & Erdebilli, B. (2012). Effects of BPR on ERP implementation success and supply chain performance. In *Proceedings of the 3rd International Conference on Information Management and Evaluation* (pp. 89–95). Ankara, Turkey: Academic Conferences and Publishing International Limited.

Finney, S., & Corbett, M. (2007). ERP implementation: A compilation and analysis of critical success factors. *Business Process Management Journal, 13*(3), 329–347. https://doi.org/10.1108/14637150710752272

Fischer, B., Peine, A., & Östlund, B. (2020). The importance of user involvement: A systematic review of involving older users in technology design. *The Gerontologist, 60*(7), e513–e523. https://doi.org/10.1093/geront/gnz163

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research, 18*(1), 39–50. https://doi.org/10.2307/3151312

Garg, P., & Agarwal, D. (2014). Critical success factors for ERP implementation in a Fortis hospital: an empirical investigation. *Journal of Enterprise Information Management, 27*(4), 402–423. https://doi.org/10.1108/JEIM-06-2012-0027

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. (2006). *Multivariate data analysis* (6th ed.). Harlow, England: Pearson Education.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis* (7th ed.). Harlow, England: Pearson Education.

Hassabelnaby, H., Hwang, D., & Vonderembse, M. (2011). The impact of ERP implementation on organizational capabilities and firm performance. *Benchmarking: An International Journal, 19,* 1–16. https://doi.org/10.1108/14635771211258043

Hong, S.-G., Siau, K., & Kim, J.-W. (2016). The impact of ISP, BPR, and customization on ERP performance in manufacturing SMEs of Korea. *Asia Pacific Journal of Innovation and Entrepreneurship, 10*(1), 39–54. https://doi.org/10.1108/APJIE-12-2016-008

Hooper, D., Coughlan, J., & Mullen, M. R. (2008). Structural equation modelling: Guidelines for determining model fit. *The Electronic Journal of Business Research Methods, 6,* 53–60.

Jo, H., & Park, D. H. (2023). Mechanisms for successful management of enterprise resource planning from user information processing and system quality perspective. Scientific Reports, 13(1), 12678. https://doi.org/10.1038/s41598-023-39787-y

Katuu, S. (2020). Enterprise resource planning: Past, present, and future. *New Review of Information Networking, 25*(1), 37–46. https://doi.org/10.1080/13614576.2020.1742770

Kline, R. B. (2011). *Principles and practice of structural equation modeling* (3rd ed.). New York: The Guilford Press.

Kozlowski, S. W. J. (2018). Enhancing the effectiveness of work groups and teams: A reflection. *Perspectives on Psychological Science, 13*(2), 205–212. https://doi.org/10.1177/1745691617697078

Kraus, S., Jones, P., Kailer, N., Weinmann, A., Chaparro-Banegas, N., & Roig-Tierno, N. (2021). Digital transformation: An overview of the current state of the art of research. *Sage Open, 11*(3), 1–15. https://doi.org/10.1177/21582440211047576

Madapusi, A., & D'Souza, D. (2012). The influence of ERP system implementation on the operational performance of an organization. *International Journal of Information Management, 32*(1), 24–34. https://doi.org/10.1016/j.ijinfomgt.2011.06.004

Ministry of Industry. (2023). MSMEs in Thailand. Retrieved March 24, 2024, from https://www.industry.go.th/en/information/msme

Motwani, J., Subramanian, R., & Gopalakrishna, P. (2005). Critical factors for successful ERP implementation: Exploratory findings from four case studies. *Computers in Industry, 56,* 529–544. https://doi.org/10.1016/j.compind.2005.02.005

Nunnally, J. C. (1978). *Psychometric theory* (2nd ed.). New York, NY: McGraw-Hill.

Radicic, D., & Petković, S. (2023). Impact of digitalization on technological innovations in small and medium-sized enterprises (SMEs). *Technological Forecasting and Social Change, 191,* 122474. https://doi.org/10.1016/j.techfore.2023.122474

Rahmadani, V. G., Schaufeli, W. B., Stouten, J., Zhang, Z., & Zulkarnain, Z. (2020). Engaging leadership and its implication for work engagement and job outcomes at the individual and team level: A multi-level longitudinal study. *International Journal of Environmental Research and Public Health, 7*(3), 776. https://doi.org/10.3390/ijerph17030776

Raymond, L., & Bergeron, F. (2008). Project management information systems: An empirical study of their impact on project managers and project success. *International Journal of Project Management, 26*(2), 213–220. https://doi.org/10.1016/j.ijproman.2007.06.002

Rovinelli, R. J., & Hambleton, R. K. (1977). On the use of content specialists in the assessment of criterion-referenced test item validity. *Tijdschrift voor Onderwijsresearch, 2*(2), 49–60.

Sica, C., & Ghisi, M. (2007). The Italian versions of the Beck Anxiety Inventory and the Beck Depression Inventory-II: Psychometric properties and discriminant power. In M. A. Lange (Ed.), *Leading - edge psychological tests and testing research* (pp. 27–50). New York, NY: Nova Science Publishers.

Soja, P. (2006). Success factors in ERP systems implementations: Lessons from practice. *Journal of Enterprise Information Management, 19*(4), 418–433. https://doi.org/10.1108/17410390610708517

Somers, T. M., & Nelson, K. (2001). The impact of critical success factors across the stages of enterprise resource planning implementations. In *Proceedings of the 34th Annual Hawaii International Conference on System Sciences* (p. 10). Los Alamitos, CA: IEEE Computer. https://doi.org/10.1109/HICSS.2001.927129

Soper, D. (2023). *Calculator: A-priori Sample Size for Structural Equation Models*. Retrieved March 24, 2024, from https://www.danielsoper.com/statcalc/calculator.aspx?id=89

Subramoniam, S., Tounsi, M., & Krishnankutty, K. V. (2009). The role of BPR in the implementation of ERP systems. *Business Process Management Journal, 15*(5), 653–668. https://doi.org/10.1108/14637150910987892

Warrick, D. D. (2023). Revisiting resistance to change and how to manage it: What has been learned and what organizations need to do. *Business Horizons, 66*(4), 433–441. https://doi.org/10.1016/j.bushor.2022.09.001

Zhang, L., Lee, M. K. O., Zhang, Z., & Banerjee, P. (2003). Critical success factors of enterprise resource planning systems implementation success in China. In *Proceedings of the 36th Annual Hawaii International Conference on System Sciences* (pp. 136–143). Los Alamitos, CA: IEEE Computer. https://doi.org/10.1109/HICSS.2003.1174613