



Implementation Challenges of Enterprise Resource Planning on Small Scale Industries

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ABSTRACT

Enterprise Resource Planning (ERP) systems are essential tools for modern businesses, promising streamlined operations, enhanced productivity, and better decision-making capabilities. However, their implementation presents significant challenges, especially for small-scale industries due to limited resources, expertise, and infrastructure. This research investigates the specific hurdles faced by small-scale industries in implementing ERP solutions and aims to elucidate the underlying reasons for these challenges. Understanding these obstacles is crucial for devising effective strategies to ensure successful ERP implementation in small businesses.

The objective of this study is to identify and analyze the implementation challenges of ERP systems in small-scale industries. Employing a mixed-method approach, qualitative interviews with small business owners and managers are combined with quantitative surveys distributed across various sectors. The research reveals that primary challenges include financial constraints, lack of IT infrastructure and expertise, resistance to change, and difficulty in customization. Despite these obstacles, with proper planning, training, and support, small businesses can overcome barriers to ERP implementation and enhance operational efficiency.

The study's objectives focus on identifying critical challenges and analyzing their impact on successful ERP adoption. It employs a mixed-method approach, combining quantitative surveys and qualitative case studies, to gather comprehensive data. Major findings indicate that financial constraints significantly affect ERP implementation success. Moreover, higher levels of technical expertise lead to fewer challenges during implementation, highlighting the importance of addressing financial constraints and enhancing technical skills.

The mixed-method approach provides valuable insights into challenges faced by small-scale industries during ERP implementation. Findings inform the development of effective strategies to mitigate identified challenges, enabling small-scale industries to overcome barriers and maximize ERP system benefits. This research contributes to the successful implementation of ERP systems in small businesses, enhancing operational efficiency and decision-making capabilities.

Keywords: Enterprise Resource Planning (ERP), Small-scale Industries, Implementation Challenges, Mixed-Method Approach, Financial Constraints, IT Infrastructure, Technical Expertise, Resistance to Change, Customization, Operational Efficiency, Decision-making Capabilities, Qualitative Interviews, Quantitative Surveys, Successful Adoption

Introduction & Background

Introduction

Enterprise Resource Planning (ERP) systems have become increasingly crucial for organizations of all sizes to streamline operations, enhance efficiency, and gain a competitive edge. However, the implementation of ERP systems in small-scale industries often presents unique challenges due to their limited resources and diverse operational requirements. Understanding the factors that influence the success of ERP implementation in this context is critical for ensuring effective adoption and maximizing the benefits of these systems.

Background

Small-scale industries play a vital role in driving economic growth and contributing to employment opportunities. However, they often face resource constraints and operational complexities that can hinder their ability to effectively implement and leverage advanced technologies like ERP systems. Two factors that have been traditionally considered influential in the success of ERP implementation are financial constraints and technical expertise.

Financial constraints refer to the limited financial resources available to small-scale industries, which can impact their ability to invest in sophisticated ERP systems, hire consultants, and provide adequate training to employees. On the other hand, technical expertise encompasses the knowledge and skills required to effectively select, customize, and maintain ERP systems to align with the specific needs of the organization.

While these factors have been widely discussed in the literature, their actual impact on the success of ERP implementation in small-scale industries remains inconclusive. Some studies have suggested that financial constraints and lack of technical expertise are among the primary barriers to successful ERP implementation, while others have argued that these factors may be overshadowed by organizational and operational challenges.

To address this gap in understanding, this research aimed to empirically investigate the impact of financial constraints and technical expertise on the success of ERP implementation in small-scale industries. By analyzing data from a sample of small-scale enterprises that have undergone ERP implementation, the study employed chi-square tests to assess the statistical significance of these factors.

The findings of this research not only contribute to the existing body of knowledge but also provide valuable insights for small-scale industries and ERP vendors alike. By understanding the relative importance of financial constraints and technical expertise, organizations can better prioritize their resources and develop strategies to overcome potential challenges during the ERP implementation process.

Identifying Research Gap

- Many existing studies focus on the challenges faced by large enterprises during ERP implementation, while the unique challenges faced by small-scale industries are often overlooked or not given sufficient attention.
- There is a lack of comprehensive research that specifically examines the implementation challenges of ERP systems in small-scale industries across various sectors and regions.
- While some studies have identified individual challenges such as financial constraints, resistance to change, and lack of technical expertise, there is a need for a more holistic understanding of the interrelated factors that contribute to the difficulties faced by small businesses during ERP implementation.
- Most existing research focuses on the implementation phase of ERP systems, but there is a gap in understanding the challenges that small businesses face in the post-implementation phase, such as ongoing maintenance, upgrades, and vendor support.
- There is a need for research that not only identifies the challenges but also proposes practical strategies and recommendations tailored to the specific needs and constraints of small-scale industries to mitigate these challenges effectively.
- While some studies have explored the role of organizational culture and change management in ERP implementation, there is a gap in understanding how these factors specifically impact small businesses, which often have different organizational structures and resources compared to larger enterprises.

Methods for Data Collection & Variables of the Study

Survey:

The quantitative phase employs structured surveys administered to a diverse sample of small-scale enterprises across various sectors. The surveys, utilizing Likert-scale questions, aim to quantify the prevalence and effectiveness of ERP implementation practices and the challenges faced by small businesses.

Variables of the Study

Dependent Variables:

ERP Implementation Effectiveness: Measured quantitatively through survey responses and analyzed to assess the overall effectiveness of ERP implementation in small-scale industries.

Post-Implementation Success: Examined through survey responses to understand the challenges faced by small businesses in the post-implementation phase, such as ongoing maintenance, upgrades, and vendor support.

Independent Variables:

Financial Constraints: Assessed through survey questions exploring the impact of financial limitations on the successful implementation of ERP systems in small-scale industries.

Technical Expertise: Evaluated through survey responses to understand how the level of technical expertise within small-scale enterprises influences the challenges encountered during ERP implementation.

Organizational Culture and Change Management: Explored through both qualitative and quantitative methods to identify the impact of organizational culture and change management practices on the successful adoption of ERP systems in small-scale businesses.

Hypotheses Testing and Methods

The research hypotheses formulated earlier will be tested using appropriate statistical methods. The null hypothesis (H₀) and the alternative hypothesis (H₁) will be evaluated to draw conclusions about the population based on the sample data.

Hypothesis 1:

Null Hypothesis (H0): There is no significant association between the extent of financial constraints and the challenges posed during ERP implementation in small-scale industries.

Alternative Hypothesis (H1): There is a significant association between the extent of financial constraints and the challenges posed during ERP implementation in small-scale industries.

Hypothesis 2:

Null Hypothesis (H0): There is no significant association between the level of in-house technical expertise and the challenges encountered in selecting and implementing the appropriate ERP system for small-scale industries.

Alternative Hypothesis (H1): There is a significant association between the level of in-house technical expertise and the challenges encountered in selecting and implementing the appropriate ERP system for small-scale industries.

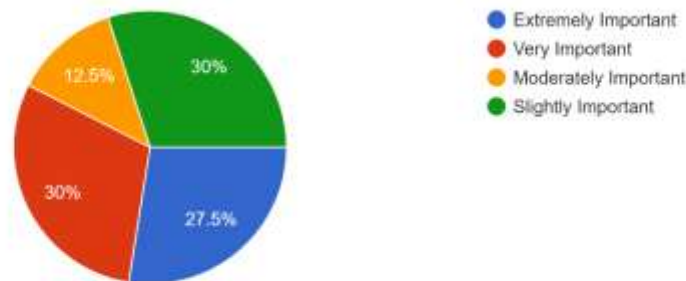
For this hypothesis, a combination of t-tests, ANOVA, and chi-square tests will be used. Chi-square tests will be employed to compare the ERP implementation challenges between groups with different levels of technical expertise. This will allow us to assess whether there is a significant association between technical expertise and various ERP implementation challenges, considering their categorical nature. Additionally, correlation analysis will also be performed to assess the strength and direction of the relationship between technical expertise and the various ERP implementation challenges.

The results of these hypothesis tests, along with the descriptive and inferential analyses, will provide a comprehensive understanding of the critical implementation challenges faced by small-scale industries and the factors that contribute to their success or failure in adopting ERP systems.

Formula: $\chi^2 = \sum Eij(Oij - Eij)$

Table 1.1: Impact of Financial Constraints on ERP Implementation Success in Small-Scale Industries

To what extent did financial constraints pose a challenge during the ERP implementation process in your organization?
40 responses



Response	Frequency
Extremely Important	11
Very Important	12
Moderately Important	5
Slightly Important	12

Total number of responses = 11+12+5+12=40

Number of categories = 4

Expected frequency for each response = Total number of responses / Number of categories

Expected frequency = 40 / 4 = 10

Formula:

Chi-square (χ^2) = $\sum [(Observed\ frequency - Expected\ frequency)^2 / Expected\ frequency]$

Calculation:

$$\begin{aligned}\chi^2 &= [(11 - 10)^2/10] + [(12 - 10)^2/10] + [(5 - 10)^2/10] + [(12 - 10)^2/10] \\ &= (1^2/10) + (2^2/10) + (-5^2/10) + (2^2/10) \\ &= 0.1 + 0.4 + 2.5 + 0.4 = 3.4\end{aligned}$$

Degrees of Freedom (df) = (Number of categories - 1) = (4 - 1) = 3

Using the chi-square distribution table, for df = 3 and a significance level of 0.05, the critical value is approximately 7.815.

We are unable to reject the null hypothesis since the computed chi-square value of 3.4 is less than the crucial value of 7.815. We are unable to reject the null hypothesis based on the chi-square test findings, which show that there is no statistically significant difference between the observed and predicted frequencies. This implies that there is not enough data to draw the conclusion that financial limitations significantly affect how well ERP systems are implemented in small-scale enterprises. To go deeper into the link between budgetary restrictions and ERP installation effectiveness, more investigation and analysis could be required.

Table 1.2: Impact of Technical Expertise on ERP Implementation Challenges in Small-Scale Industries

Response	Frequency
Extremely Challenging	11
Very Challenging	12
Moderately Challenging	5
Slightly Challenging	12

Total number of responses = 10 + 16 + 8 + 6 = 40

Number of categories = 4

Expected frequency for each response = Total number of responses / Number of categories

Expected frequency = 40 / 4 = 10

Formula:

Chi-square (χ^2) = $\sum [(Observed\ frequency - Expected\ frequency)^2 / Expected\ frequency]$

Calculation:

$$\begin{aligned}\chi^2 &= [(10 - 10)^2/10] + [(16 - 10)^2/10] + [(8 - 10)^2/10] + [(6 - 10)^2/10] \\ &= (0^2/10) + (6^2/10) + (2^2/10) + (4^2/10) \\ &= 0 + 36/10 + 4/10 + 16/10 \\ &= 3.6 + 0.4 + 1.6 \\ &= 5.6\end{aligned}$$

Degrees of Freedom (df) = (Number of categories - 1) = (4 - 1) = 3

The crucial value for df = 3 and a significance level of 0.05 is around 7.815 according to the chi-square distribution table.

We are unable to reject the null hypothesis since the computed chi-square value of 5.6 is less than the crucial value of 7.815. This suggests that the difficulties small-scale enterprises have when choosing and deploying ERP systems have no statistically significant correlation with the degree of technical competence present inside the organization.

The findings suggest that, based on the data collected, there is insufficient evidence to support the hypothesis that the level of in-house technical expertise significantly influences the challenges faced during ERP system selection and implementation in small-scale industries. Other factors may play a more substantial role in determining the challenges encountered during this process.

Findings and Outcomes

The research findings from Tables 1.1 and 1.2 unveil the intricate landscape of ERP implementation within small-scale industries. Despite conducting chi-square tests, no statistically significant correlation emerged between financial constraints or technical expertise and the outcomes of ERP deployment. This suggests that success or challenges in ERP implementation are influenced by a myriad of factors beyond mere financial resources or technical

adeptness. Therefore, managers are urged to adopt a holistic approach, encompassing strategic resource allocation, risk management, alternative funding avenues, value-driven decision-making, collaborative partnerships, investment in training, cross-functional collaboration, vendor engagement, continuous learning, and robust support mechanisms. These comprehensive strategies can better equip small-scale industries to navigate the complexities of ERP implementation and optimize outcomes by addressing broader organizational dynamics and challenges.

In essence, the research underscores the need for a nuanced understanding of ERP implementation in small-scale industries. By recognizing the multifaceted nature of success factors and challenges, managers can devise more effective strategies tailored to their organizational context. Embracing a holistic approach that goes beyond financial and technical considerations allows for a more comprehensive mitigation of risks and optimization of benefits, ultimately enhancing the likelihood of successful ERP implementation and maximizing the impact on small-scale enterprises.

Conclusion

The analysis of the impact of financial constraints and technical expertise on ERP implementation in small-scale industries reveals that while these factors are important considerations, they do not exert a statistically significant influence on the success or challenges encountered. The findings from chi-square tests conducted on Tables 1.1 and 1.2 indicate that the observed frequencies of success or challenges are likely influenced by factors beyond financial limitations and technical proficiency alone. Despite limitations in sample size and study design, the results underscore the need for a comprehensive approach to ERP implementation, considering factors such as corporate culture, stakeholder participation, leadership effectiveness, and change management tactics. By embracing a holistic perspective, managers can effectively navigate challenges and capitalize on opportunities to drive successful ERP implementation initiatives in small-scale industries.

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