Identification of Critical Success Factors for the Implementation of Mandarin-language ERP Software: A Case Study in a Manufacturing Company in Batam

[1]Eryc, [2]Didi Santoso
[1,2]Computer Science/Universitas International Batam
[1,2]Baloi-Sei Ladi, Jl. Gajah Mada, Tiban Indah, Kec. Sekupang, Kota Batam, Kepulauan Riau 29426
email : [1]eryc@uib.edu, [2]2031083.didi@uib.edu

ABSTRACT
As businesses increasingly adopt Enterprise Resource Planning (ERP) systems for improved performance, challenges associated with the implementation of Mandarin-language ERP software in a manufacturing company in Batam, Indonesia, have garnered significant attention. Using a qualitative research approach, this study conducted in-depth interviews with 27 employees familiar with the Mandarin-based ERP system. Thematic analysis was employed to understand the implications of language barriers and their impact on user performance. The research highlights key factors influencing the usability of Mandarin-language ERP systems, providing valuable insights for companies facing similar multilingual implementation challenges. The analysis emphasizes the crucial role of internal factors, including management involvement, commitment, training, and IT skills, in the successful implementation of Mandarin-language ERP systems. These findings serve as a practical guide for companies seeking to optimize internal processes and strengthen technological capabilities, facilitating smooth integration and utilization of ERP systems.

Keywords **–** Enterprise Resource Planning (ERP), Critical Success Factors (CSF), Interview, NVIVO Software

1. Introduction

As the number of businesses worldwide continues to rise, global competition is also increasing. Due to intense global competition, less competitive, slow, and low-quality businesses will see a decline in their market share, ultimately leading to bankruptcy [1]. Many large companies in Indonesia, due to high costs and lengthy procedures, have yet to integrate all their business activities into computerized systems. Furthermore, adopting ERP in small businesses, even with the idea of implementing a new integrated system, proves challenging [2].

Currently, technological advancements have a significant impact, compelling businesses to upgrade their systems. This forces businesses to upgrade their software and shift to ERP-based systems [3]. Businesses competing on a global scale must maintain their competitive advantage. Implementing and integrating information systems is one strategy for business success. Information systems are essential to help enhance business performance [1].

Today, information systems are crucial due to the growth and volume of information in a business. The technological revolution compels businesses and institutions to adopt information systems. One such information system implemented in many businesses is ERP [4]. Enterprise Resource Planning (ERP) is the most commonly used integrated business solution worldwide, spanning almost all industries and utilized by nearly 90% of the largest 500 companies [5].

Information technology (IT) and information systems are often used to enhance efficiency, timeliness, and cost-effectiveness. Because of its benefits for the corporate sector, Enterprise Resource Planning (ERP) in this case becomes a focal point in business technology development [6].

ERP is a system designed to assist in integrating company activities, including marketing, production, procurement, and accounting. It also stores all transactions in a database used by the case study company and offers management reporting capabilities [2]. The program allows users to obtain accurate information that only needs to be entered once into a specific system. Software, process flows, change management, and customer thinking are some elements that shape the program. Moreover, the software, which is the most visible component of the program, consists of other components, including business intelligence, finance, human resources, supply chain management, and customer relationship management [7]. The ERP system also monitors, maintains, and manages company data and various business processes in a coordinated and centralized manner. Recognized as an essential tool, this system enables companies to achieve their goals effectively in the evolving global market [8].

The company utilizes software known as "HXERP," a name that may suggest it is an English-language program. However, it operates only in Mandarin, posing a significant challenge for the predominantly Indonesian workforce that is not proficient in Mandarin. To address this, company leaders approached the author to instruct local Indonesian employees to learn Mandarin to operate the software effectively. Given the significant difficulty in learning a second language, this issue is considered worthy of investigation and exploration by the authors.

After four years of implementing the Mandarin-based ERP system in the company, the authors aim to explore whether this system has had a positive impact on user performance and whether it meets user requirements in this environment. Additionally, this study aims to gain insights into the challenges and obstacles faced by Indonesian employees in the company as they adapt to using the ERP system in Mandarin. The research aims to determine whether, despite the lengthy implementation period, employees continue to face difficulties with the system. The goal is to identify ways to improve the usability of the ERP system, especially for those newly joining the company.

2. Research Method

A. Methodology

This study employs a qualitative research approach to gain a comprehensive understanding of the implications of the Mandarin-based ERP system in the company's context. In-depth interviews will be conducted to grasp the experiences and perspectives of the 27 ERP system users. The qualitative research aims to identify critical success factors related to the implementation of Enterprise Resource Planning (ERP) systems. The study relies on primary data, information collected directly from sources through surveys, interviews, questionnaires, and field observations. The author, serving as the ERP administrator, assists users in the company when they encounter issues, using methods involving open and in-depth interviews to understand their experiences and provide support.

The author initiates the research by conducting observations and interviews, reviewing documents, and studying existing literature. After gaining a thorough understanding of the case study and various perspectives on the subject, the author starts developing a list of questions based on these insights. This list becomes the foundation for the instruments used to collect information from respondents during interviews [9].

B. Data Collection

During the data collection phase, I conducted interviews with employees using the ERP system in the company in English. These interviews were strategically scheduled during lunch breaks or other periods when they were not fully occupied with their daily responsibilities. This approach allowed for more relaxed and honest discussions, contributing to the creation of a conducive environment for in-depth insights into their experiences with the ERP system. Each interviewed user was asked to respond to the following questions:

1. How effective is the training and education program provided for the Mandarin-language HXERP system in preparing users for its utilization?
2. To what extent does the role of department heads influence the day-to-day usage of the Mandarin-language HXERP system within their respective departments?
3. How does the active involvement of department heads affect the use of the Mandarin-language HXERP system in the daily operations of the company?
4. What types of incentives are provided to employees to encourage their effective engagement with the Mandarin-language HXERP system and support its successful implementation in the company?
5. Are there rules or policies in the company that affect the day-to-day usage of the Mandarin-language HXERP system?
6. How does the allocation of the company's technology budget affect the ease of access and usage of the Mandarin-language HXERP system for employees in their daily tasks?
7. How does the performance and reliability of the infrastructure managed by the IT/ERP Administrator affect employees' ability to use the Mandarin-language HXERP system in their daily tasks?
8. What is the role of the IT/ERP Administrator in assisting users in the daily use of the Mandarin-language HXERP system, especially in problem-solving and guidance?
9. To what extent are you involved in the use of the Mandarin-language HXERP system in your daily tasks?
10. How does users' confidence in their ability to use the Mandarin-language HXERP system affect their overall performance and productivity?
11. How well can you adapt to learning the usage of HXERP in your daily activities, such as data input and understanding reports?

C. Data Analysis

In this study, we employed thematic analysis to comprehensively examine various aspects of a phenomenon and gather data from diverse sources. This approach allowed the author to attain a more profound understanding of the significance of a particular issue [9]. In qualitative research, data analysis is conducted both during and after the data collection process within a specific timeframe. The author scrutinized user responses during the interviews [10]. Transcription details of the interviews are provided in this section. As users' memories were still fresh, the interviews were transcribed immediately after the meetings took place. Thematic analysis was used to analyze the transcription data in this study. Thematic analysis provides rich details to help identify crucial components that enable this study to achieve its goals. Six stages are necessary to complete thematic analysis. The author can switch between these stages when analyzing qualitative data as these procedures are non-linear [9].

Phase 1 involves the process of becoming familiar with the data, where the author deepens their understanding of data patterns through thematic analysis since the data collection. By transcribing data from users, the author could validate concepts by finding similarities between current and previous data. This step allowed the author to better understand the data, requiring repeated readings and immediate transcription after the interviews. Through this approach, the author successfully gathered comprehensive data from 27 interviews, reaching a saturation point where additional interviews were not necessary [9].

Phase 2 entails writing the first codes. In the theme analysis process, writing code is not just a step in the data analysis process; it also establishes a close relationship between code development and a more thorough comprehension of the topic being studied. Three major research topics served as the foundation for the coding procedure in this study. The firm elements impacting the effectiveness of ERP

after installation in different sectors were the subject of the codes for the first research question. In a similar vein, the codes pertaining to the second study question concentrated on the technological aspects influencing ERP success after adoption. Finally, several individual elements contributing to the ERP's effectiveness after deployment were identified using codes associated with the third study question. Systematic grouping of codes based on relevant research questions is crucial to maintaining accuracy and ensuring comprehensive data analysis.

Phase 3 involves grouping similar codes into appropriate themes. This study produced three different sets of codes. The careful reading process played a crucial role in identifying similar concept expressions from the users, with some codes requiring in-depth analysis before extraction. Codes that did not fit potential themes were placed in a separate category to prevent data loss and were then re-evaluated for possible reclassification. In evaluating emerging themes, software was used to calculate summary statistics to assess the significance of the emerging themes.

Phase 4 is a crucial stage in finalizing the themes, involving a thorough analysis of codes within each theme to determine patterns and coherence. In this study, the author pragmatically validated findings by confirming them with research users, who agreed on several technological, company, and environmental factors influencing post-implementation ERP success. These factors were then grouped into relevant themes.

The following phase is Phase 5, which entails dissecting each topic to identify its constituent parts. Rather than consulting previously published works, the users' data and codes were used to determine the names of each theme. The study's author and several other writers utilized technical terms to label the themes since the information being addressed was very technical. This highlighted the legitimacy of the findings.

Phase 6 is the final step involving the formal report compilation after clearly establishing the themes. In this study, findings are outlined in the upcoming chapter, using direct quotations from the attendees to support identified themes and provide a comprehensive response to the three main questions posed in this study.

This study utilized NVivo 14 software for data analysis, implementing specific queries to extract results from transcribed data. Coding queries played a central role in the execution of thematic analysis, where text data was quoted to highlight user perspectives as evidence for identified themes. Additionally, coding query matrices were used to present various themes in rows and users in columns [9].

Tabel 1. Qualitative Users Characteristics

User Code	Gender	Age (Years)	Education		ERP Experience (Years)	Position
U1	Female	20	Bachelor's Degree / S1	<1	Sales Representatives	20
U2	Female	21	SMK	<1	Operator	21
U3	Female	24	Bachelor's Degree / S1	2	Purchasing Clerk	24
U4	Female	25	Bachelor's Degree / S1	4	Customer Service	25
U5	Female	27	Bachelor's Degree / S1	2	Account Officer	27
U6	Male	27	Bachelor's Degree / S1	<1	QA Administrator	27
U7	Female	27	Bachelor's Degree / S1	<1	finance officer	27
U8	Female	28	Bachelor's Degree / S1	4	Customer service	28
U9	Male	28	SMK	<1	Assistant leader	28
U10	Male	28	SMK	<1	Forklift driver	28
U11	Male	30	SMK	3	Operator	30
U12	Female	30	Master's degree / S2	4	Finance Manager (HOD)	30
U13	Male	31	Bachelor's Degree / S1	2	Supervisor	31
U14	Male	32	SMK	<1	Sales Executive	32
U15	Female	35	Bachelor's Degree / S1	4	Senior executive planning (HOD)	35
U16	Female	35	SMA	<1	Logistic coordinator	35
U17	Male	35	SMK	<1	Translator	35
U18	Male	35	SMA	4	Planning coordinator	35
U19	Female	36	SMK	4	Sales assistant manager (HOD)	36
U20	Female	36	Associate's degree / D3	4	logistic coordinator	36

U21	Female	36	SMA	4	Planning coordinator	36
U22	Male	39	SMK	<1	Forklift driver	39
U23	Female	41	Bachelor's Degree / S1	4	Purchasing Executive (HOD)	41
U24	Female	42	SMA	4	Logistic Coordinator (HOD)	42
U25	Male	45	SMK	<1	HOD Of Operation	45
U26	Female	50	SMA	4	Accounting executive	50
U27	Female	53	SMA	<1	Sales Executive	53

3. Result and Analysis

A. Company Internal Factors

The internal firm success factors, as gleaned from qualitative interviews, are depicted in Figure 1 below. These elements include corporate rules, employee incentives, managerial commitment, active management participation, and training and education [9]. The primary affirmative reactions are ascribed to Training & Education, Management Commitment, and Management Involvement, as seen in Figure 1.

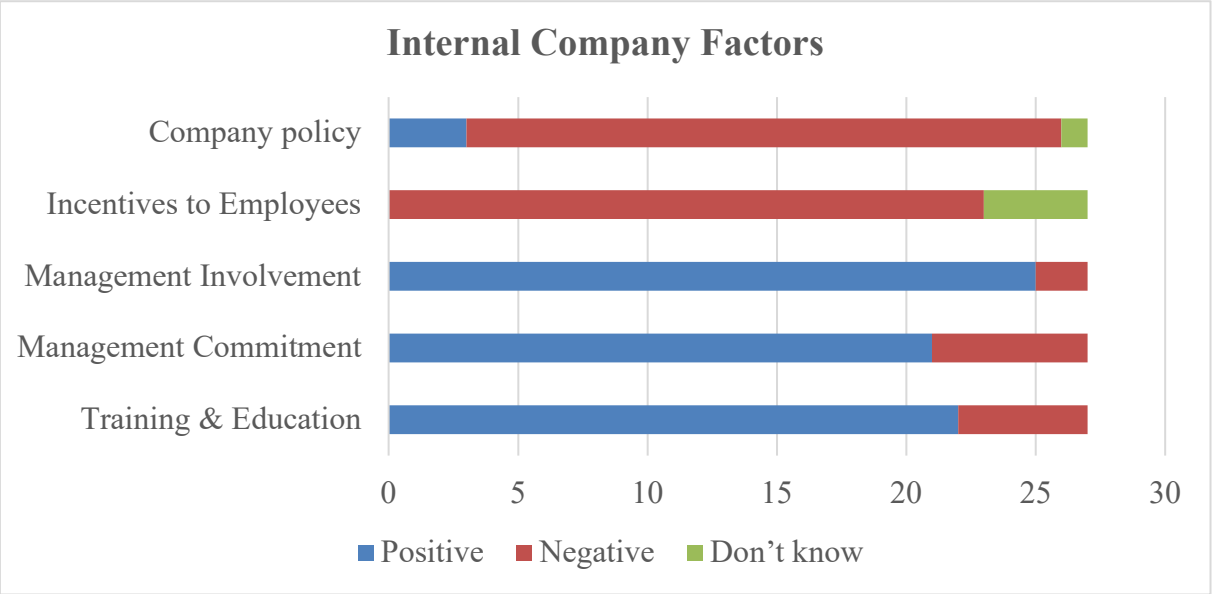

Figure 1. Results of Qualitative Analysis (Internal Company Factors)

B. Technology Factors

Figure 2 illustrates critical technology success factors identified in the qualitative interview analysis, including IT budget, IT infrastructure, and IT skills. As shown in Figure 2, the main positive responses are attributed to IT Skills.

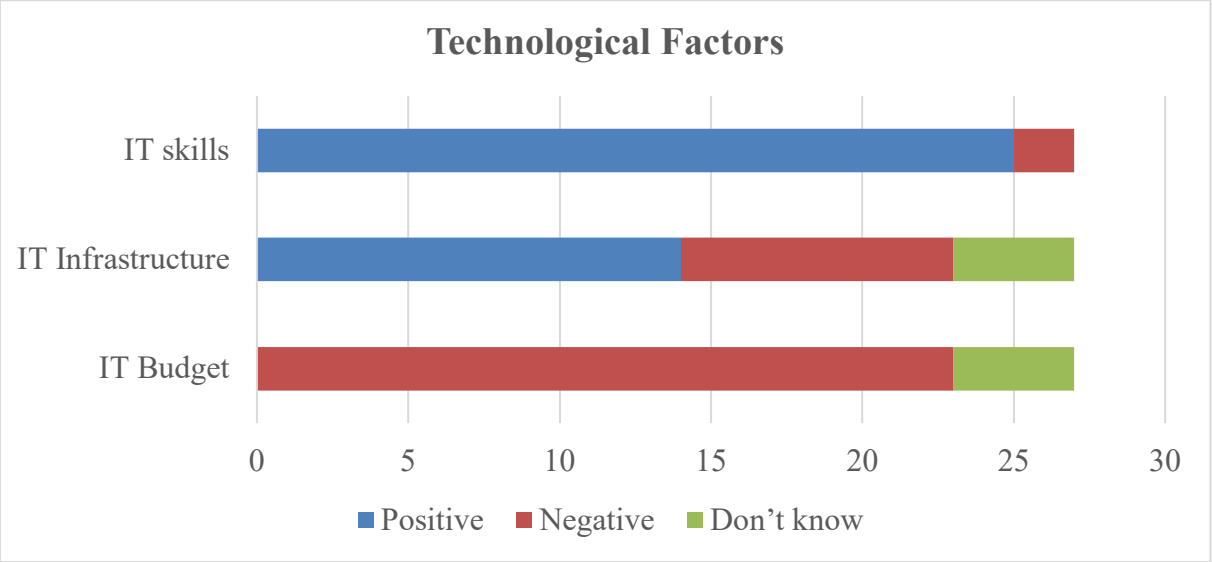

Figure 2. Results of Qualitative Analysis (Technological Factors)

C. Individual Factors

Figure 3 presents critical individual success factors identified in the qualitative interview analysis, including user involvement, confidence, and learning capacity. Figure 3 indicates that the main positive responses are attributed to Confidence.

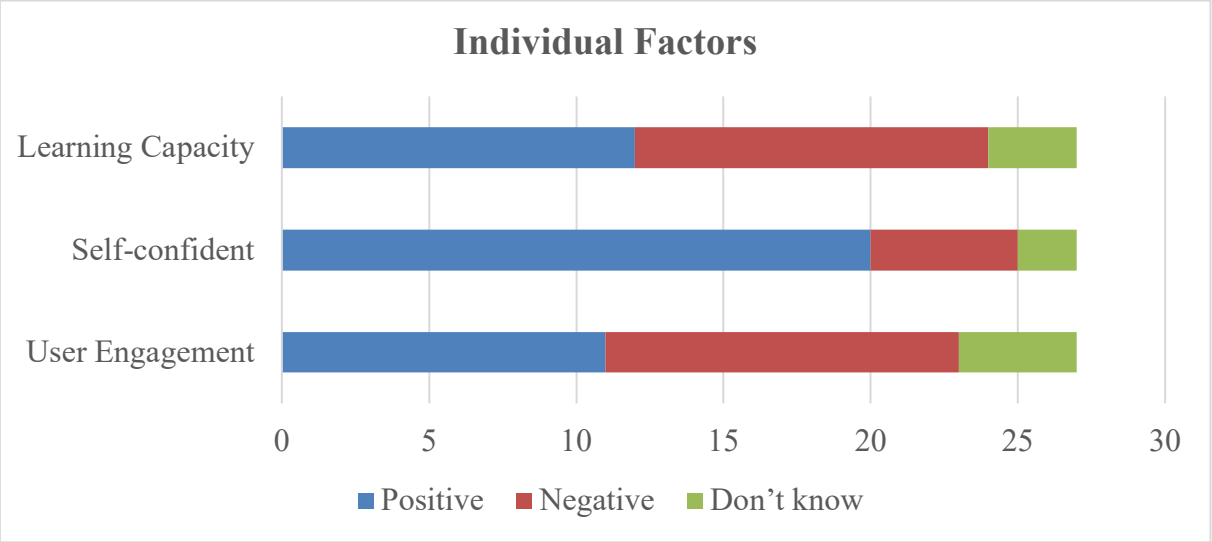

Figure 3. Results of Qualitative Analysis (Individual Factors)

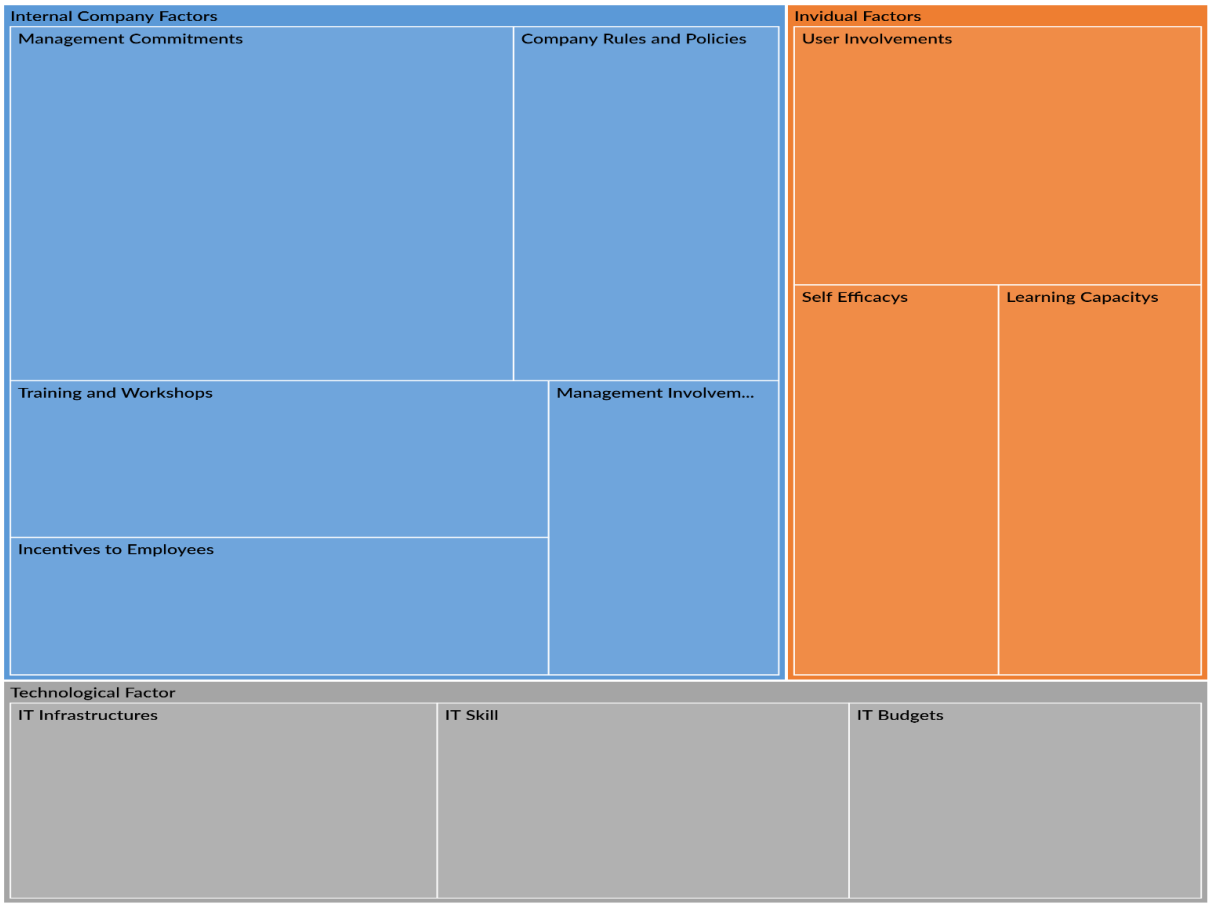

Figure 4. Frequency Search Results

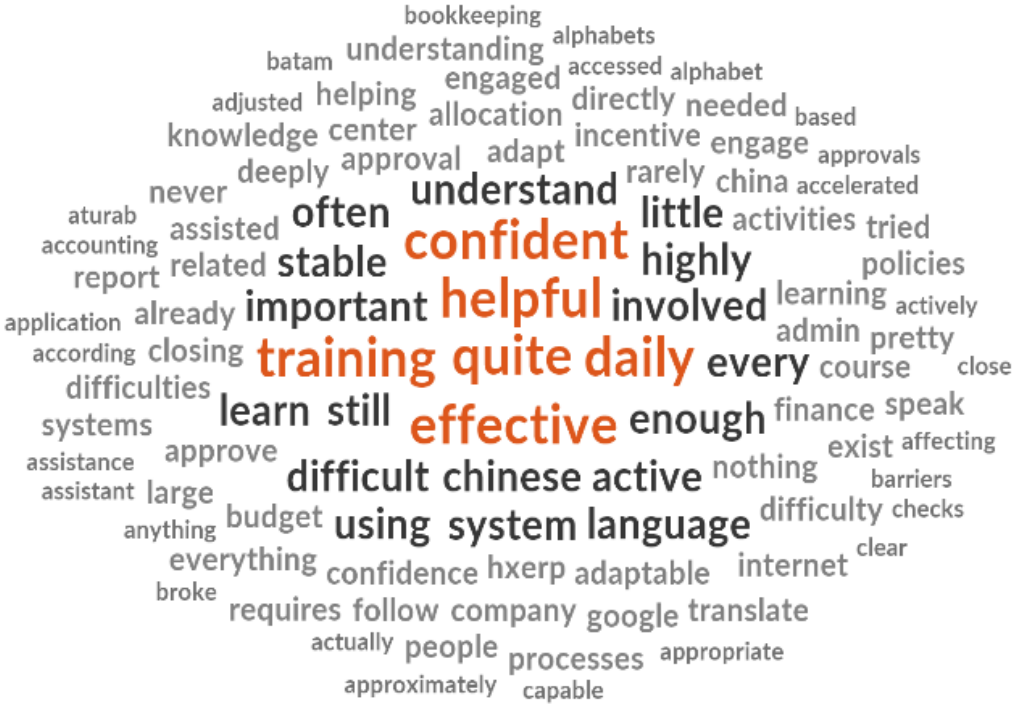

Figure 5. Word Search Results

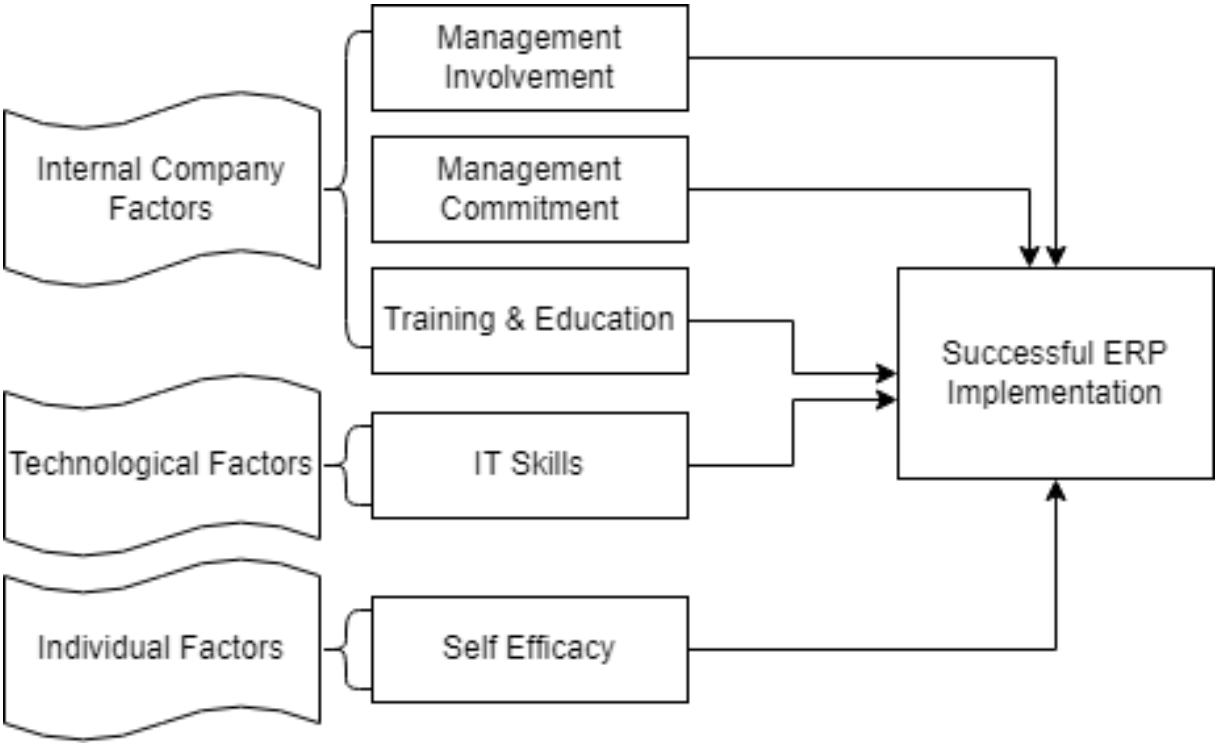

Figure 6. Conceptual Model

As seen in Figures 4 and 5, the conceptual model presented in Figure 6 is the result of qualitative data analysis. Five essential elements are highlighted by interviews with respondents at the organization: management commitment, management engagement, and internal company component training and education. The discussion mostly centers on the significance of IT skills when it comes to technological concerns. The importance of confidence is emphasized by responders when it comes to individual issues.

4. Conclusion

The analysis results indicate that management involvement, commitment, training, and IT skills play a crucial role in the success of ERP system implementation. However, this study faces limitations in terms of a restricted number of respondents, highlighting the need to broaden the sample scope for a more comprehensive understanding. Therefore, to deepen the understanding of ERP system implementation, it is recommended that further research be conducted with a more comprehensive approach, including in-depth studies on the related financial impacts. Additionally, extending the research timeframe would help comprehend changes and developments in the use of ERP systems within the corporate environment. Consequently, future research could provide a more holistic and comprehensive insight into the success and effectiveness of ERP systems in a corporate setting.

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