Butarbutar, Zenfrison Tuah; Handayani, Putu Wuri; Suryono, Ryan Randy; Wibowo, Wahyu Setiawan

Article

Systematic literature review of Critical success factors on enterprise resource planning post implementation

Cogent Business & Management

Provided in Cooperation with:
Taylor & Francis Group

Suggested Citation: Butarbutar, Zenfrison Tuah; Handayani, Putu Wuri; Suryono, Ryan Randy; Wibowo, Wahyu Setiawan (2023) : Systematic literature review of Critical success factors on enterprise resource planning post implementation, Cogent Business & Management, ISSN 2331-1975, Taylor & Francis, Abingdon, Vol. 10, Iss. 3, pp. 1-29, https://doi.org/10.1080/23311975.2023.2264001

This Version is available at:
https://hdl.handle.net/10419/294663

Cogent Business & Management

ISSN: (Print) (Online) Journal homepage: www.tandfonline.com/journals/oabm20

Systematic literature review of Critical success factors on enterprise resource planning post implementation

Zenfrison Tuah Butarbutar, Putu Wuri Handayani, Ryan Randy Suryono & Wahyu Setiawan Wibowo

To cite this article: Zenfrison Tuah Butarbutar, Putu Wuri Handayani, Ryan Randy Suryono & Wahyu Setiawan Wibowo (2023) Systematic literature review of Critical success factors on enterprise resource planning post implementation, Cogent Business & Management, 10:3, 2264001, DOI: 10.1080/23311975.2023.2264001

To link to this article: https://doi.org/10.1080/23311975.2023.2264001

Published online: 08 Oct 2023.

Butarbutar et al., *Cogent Business & Management* (2023), 10: 2264001
https://doi.org/10.1080/23311975.2023.2264001

cogent business & management

INFORMATION & TECHNOLOGY MANAGEMENT | REVIEW ARTICLE

Systematic literature review of Critical success factors on enterprise resource planning post implementation

Zenfrison Tuah Butarbutar[1]*, Putu Wuri Handayani[1], Ryan Randy Suryono[2] and Wahyu Setiawan Wibowo[1]

Received: 16 June 2023
Accepted: 19 September 2023

*Corresponding author: Zenfrison Tuah Butarbutar, Faculty of Computer Science, Universitas Indonesia, Depok, West Java, 16424, Indonesia
E-mail: zenfrison.tuah@ui.ac.id

Reviewing editor:
Neelamegam Anbazhagan, Mathematics, Alagappa University, India

Additional information is available at the end of the article

Abstract: Following the implementation of Enterprise Resource Planning (ERP) systems, a myriad of challenges and issues may manifest, leading to inefficiencies and resistance from users, thereby impeding the anticipated benefits. While previous researchers have predominantly directed their attention toward the implementation phase, it is imperative to recognize the significance of the post-implementation phase in the ERP adoption process. This study aims to ascertain the critical success factors (CSFs) that contribute to the seamless integration of an ERP system into an organization's operational processes post-implementation. To achieve this objective, a systematic literature review (SLR) was conducted between September and December 2022, employing the Kitchenham approach (2007) as the guiding methodology. The SLR was meticulously structured and

Zenfrison Tuah Butarbutar

ABOUT THE AUTHORS

Zenfrison Tuah Butarbutar, a System Administrator at the Indonesian Bureau of Logistics (BULOG), holds a Bachelor's Degree in Computer Science from Telkom University. With a decade of ERP project experience in Logistics, he's pursuing a graduate degree in Computer Science at Universitas Indonesia, focusing on management information systems, particularly ERP.
Putu Wuri Handayani, a lecturer at Universitas Indonesia's Faculty of Computer Science, earned a master's degree in electronic business from Germany's University of Applied Science and a Ph.D. in Computer Science from Universitas Indonesia. Her research covers e-commerce, enterprise resource planning, and healthcare information systems.
Ryan Randy Suryono, a lecturer at Universitas Teknokrat Indonesia, holds master's and doctoral degrees in Computer Science, with research interests in Information Systems, Financial Technology, and Text Mining
Wahyu Setiawan Wibowo, a civil servant and a graduate student at Universitas Indonesia in Computer Science, contributes to government initiatives, focusing on software engineering, IT adoption, and open data.

PUBLIC INTEREST STATEMENT

This research aims to identify the primary determinants of ERP success during the post-implementation phase. This study thoroughly explores the elements that contribute to the seamless integration of an enterprise information system. It is worth noting that the insights from this inquiry may be applicable to a variety of information systems and applications adopted within organizations. The findings reveal a substantial statistical correlation between factors within the technological, organizational, and environmental contexts and the success of ERP post-implementation. Among the 13 CSFs identified, those related to the organizational dimension exerted a more pronounced influence than technical aspects. Understanding the factors elucidated in this research holds significant value as it can aid leaders in providing ongoing support and demonstrating commitment throughout both the implementation and subsequent post-implementation phases.

comprised three principal phases: planning, execution, and reporting. After thoroughly assessing 26 articles from reputable sources, we successfully pinpointed 13 CSFs relevant to ERP post-implementation and grouped into the Technology-Organization-Environment (TOE) framework. The three most pivotal CSFs emerged as continuous system integration, post-implementation training, and active user participation. Among these CSFs, a remarkable discovery surfaced, highlighting the predominance of environmental and organizational factors over technological ones. Consequently, this research offers both practical and theoretical implications for organizations, enabling them to proactively address potential challenges that may arise after ERP implementation.

Subjects: Information & Communication Technology (ICT); Business, Management and Accounting; Information Technology;

Keywords: enterprise resource planning; ERP; post-implementation; success factor; CSF; systematic literature review; TOE; Kitchenham

1. Introduction

ERP solutions represent off-the-shelf software packages that integrate various operational aspects of a company by utilizing shared and unified databases, along with standardized workflows (Malik & Khan, 2021; Osnes et al., 2018; Wortmann, 1998). Numerous companies have reaped the rewards of implementing enterprise resource planning (ERP) systems, which include increased efficiency by shortening process cycle times, expediting document generation, eliminating errors, and eradicating redundant processes (Wang et al., 2016). Nevertheless, many ERP implementations frequently surpass their allocated budgets, encounter delays in project schedules, and fall short of requirements, thereby posing substantial challenges, even for corporate giants, from FoxMeyer Drug, Dell Computers, Hershey Foods, Boeing, Nestle, Panasonic, Hewlett-Packard, and Cisco (Coşkun et al., 2022; Yu, 2005).

The implementation of an ERP system marks the beginning of the post-go-live phase, indicating that the ERP journey continues beyond this point. In fact, the post-implementation phase signifies the emergence of real challenges and other critical risks (Almajali et al., 2016; Pan et al., 2011; Peng & Nunes, 2009a, 2009b). Earlier scholars have effectively categorized post-ERP risks into four distinct groups: technical, operational, organizational, and analytical risks (Pan et al., 2011). Previous investigations have also adeptly identified factors that precipitate failures capable of disrupting ERP system implementation. These factors encompass insufficient training, inadequate user participation, limited attention from top management, module integration breakdowns, incorrect and duplicated data, and potential software or hardware crashes (Coşkun et al., 2022; Pan et al., 2011). An important strategy for mitigating ERP setbacks involves managing crucial factors that contribute to the success of ERP implementation (Sun et al., 2015).

However, there is a scarcity in finding articles that comprehensively discuss the appropriate framework that can explain the successful use of ERP in the post-implementation phase (Ha & Ahn, 2014; Law et al., 2010; Oseni et al., 2017; Osnes et al., 2018). In addition to that, many studies focused predominantly on the implementation phase (Ali & Miller, 2017; Li et al., 2017; Salih et al., 2022). The post-implementation phase assumes paramount importance, representing a stage where users actively engage with the system, as well as conducting upgrades and customizations to the ERP infrastructure in operation (Sommerville, 2016). Organizations therefore should direct their attention toward ERP systems not merely during the initial phase but throughout the entire lifecycle of the system (Barth & Koch, 2019; Domagała et al., 2021; Li et al., 2017). The post-implementation phase invariably presents technical hurdles associated with the underlying ERP

system infrastructure, and resistance from users remains a prevalent issue during this phase (Abu Ghazaleh et al., 2019; Barth & Koch, 2019; Osnes et al., 2018).

In this study, we direct our focus on identifying critical success factors (CSF) in post-implementation phases using a systematic literature review (SLR). Prior study postulates that CSFs become essential to wield the greatest influence on the success of ERP (Li et al., 2017). Consequently, diligent monitoring and control of these factors is imperative throughout ERP projects (Sun et al., 2015). Prior studies have employed various grounded theories to explore factors impacting ERP implementation, including the Theory of Planned Behavior (TPB) (Mullins & Cronan, 2021; Yu, 2005), Technological Frames of Reference (TFR) (Abu Ghazaleh et al., 2019), and Task—Technology Fit (TTF) (Eid & Abbas, 2017). Nonetheless, this study employs the TOE (Technology-Organization-Environment) framework as its basis. Previous scholars had effectively employed the TOE framework to chart out challenges associated with ERP during the implementation phase (Abu Ghazaleh et al., 2019; Awa et al., 2016; Zhu et al., 2010). The success of post-implementation in an ERP system depends on various factors related to technological, organizational-wide as well and environmental context, as identified through the application of the TOE theory.

The remainder of the paper is organized as follows. Section 1 expounds on the theoretical background used in this study. Section 2 explains the methodology. Section 3 presents Data Evaluation. Section 4 discusses about the results from this study. Section 5 offers an in-depth discussion. Section 6 concludes the study and pinpoints its implications. Section 7 acknowledges the limitations and proposes directions for future study. Finally, all tables and supplementary data of this study can be seen in the the Appendix.

2. Theoretical background

ERP systems consist of a collection of interconnected software modules and a central database, which have the potential to empower an organization to efficiently and effectively manage its resources (Malik & Khan, 2021; Vargas & Comuzzi, 2020). This is achieved through the process of reengineering and automation of business operations, facilitating data sharing, and providing real-time access to up-to-date information within the organizational environment (Laudon & Laudon, 2018; Mahmood et al., 2020). ERP systems thus have a common goal to consolidate all business processes within a single application all business processes within a single application (Alkraiji et al., 2022; Coşkun et al., 2022)

Attaining success in ERP relies not solely on a stable system-supporting infrastructure but also on various socio-technical factors that exert substantial influence (Abu Ghazaleh et al., 2019; Althonayan & Althonayan, 2017; Eid & Abbas, 2017). These factors encompass user-related elements, engagement of multiple stakeholders, and the prevailing organizational culture (Alkraiji et al., 2022; Ju et al., 2016).

2.1. ERP project life cycle

There are three main phases in the ERP project life cycle as shown in Figure 1: Pre-implementation, Implementation, and Post-Implementation phase (Motiwalla, 2012; Shaul & Tauber, 2013; Xie et al., 2022). Pre-implementation phase consists of requirement planning activity, and vendor selection (Kirmizi & Kocaoglu, 2022; Motiwalla, 2012). The implementation phase consists of system rollout, system piloting and user training (Kirmizi & Kocaoglu, 2022; Motiwalla, 2012). Post-implementation phase consists of system maintenance, system tuning, system upgrade, knowledge transfer, and user internalization in using ERP in day-to-day operations (Kirmizi & Kocaoglu, 2022; Motiwalla, 2012). The installation of an ERP system does not signify the completion of the implementation process (Ha & Ahn, 2014; Hasan et al., 2019; Peng & Nunes, 2009a). Instead, implementing ERP in an organization is an ongoing process that aims to integrate technology into the organizational environment (Ha & Ahn, 2014; Hasan et al., 2019). ERP assimilation refers to the organization's progression from comprehending the potential and functionalities of the ERP

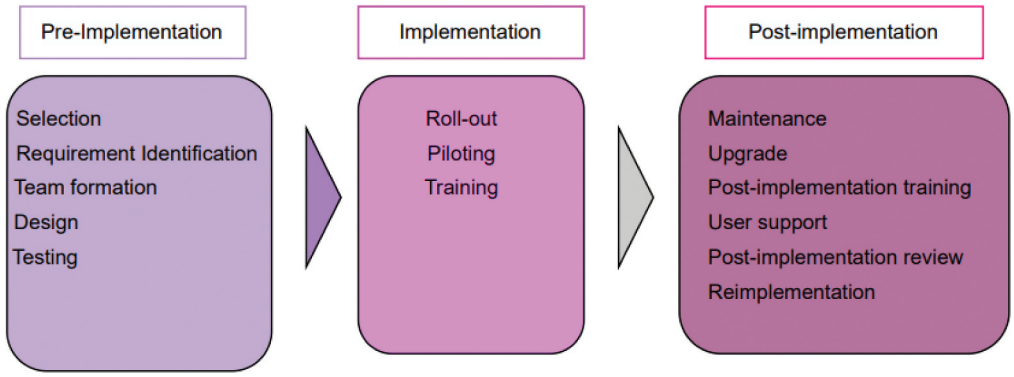


Figure 1. Activities in ERP stages (pre-implementation, implementation and post-implementation).

(Source: (Motiwalla, 2012; Oseni et al., 2017))

system to effectively implementing and utilizing them in their essential business processes (Ha & Ahn, 2014; Hasan et al., 2019).

The implementation phase aims to improve the performance of the ERP system using maintenance which includes requests for support packages or patches, ongoing system and help desk support, as well as bug fixes and is typically directed at minor corrections and further adjustments due to legal change (Oseni et al., 2017). Post-implementation training also facilitates knowledge dissemination related to the ERP system, particularly in scenarios where new provisions are introduced to mitigate errors and failures (Osnes et al., 2018). Notably, error and data correction hold an increasingly pivotal role in this phase (Amado & Belfo, 2021). Albeit advancements, users continue to encounter input errors during the post-implementation phase, highlighting the significance of the user support process at this stage (Oseni et al., 2017). The involvement of the technical department in aiding users also remains highly important during this stage (Amado & Belfo, 2021). Change management activities also hold a crucial position, as there remains a potential for user resistance towards adopting the ERP system even after the system's go-live phase (Comuzzi & Parhizkar, 2017). Post-implementation review activities are conducted periodically during this phase to thoroughly assess the implementation process and determine whether the benefits of the ERP system have been achieved (Nicolaou, 2004; Nicolaou & Bhattacharya, 2006). This is essential due to the potential for user resistance towards using the ERP system even after the go-live phase (Oseni et al., 2017).

2.2. Critical success factor

Prior study emphasizes that CSFs become a crucial aspect in ensuring the success of an ERP implementation, leading to advantageous outcomes and benefits for the company (Saade & Nijher, 2016). As delineated by Rockart in 1979, CSFs encompass the essential components required for attaining success in ERP projects, a concept that continues to be utilized in contemporary research studies (Cooper, 2008; Kuranga et al., 2021). The identification of CSFs assumes indispensable importance in guiding companies throughout their system development endeavors, given the significant role CSFs play in addressing challenges during ERP system implementation (Bokovec et al., 2015). Managers thus can effectively employ CSFs to navigate and identify the essential components necessary to fulfill their intended objectives (Li et al., 2017)

2.3. Technology-Organization-Environment (TOE) theory

The TOE theory proposed by Tornatzky and Fleischer in 1990, aims to explain how organizations adopt, implement, and use information systems (IS) (Abu Ghazaleh et al., 2019; Louis, 1990). Earlier studies have effectively employed the TOE framework to pinpoint critical success factors (CSFs), albeit primarily within the context of adoption rather than the subsequent post-adoption phase (Awa et al., 2016). TOE theory has also been utilized by other researchers (Abu Ghazaleh et al., 2019; Zhu et al., 2010) to recognize critical success factors (CSFs) in the context of post-adoption ERP.

The technological aspect primarily outlines the features of an information system that could impact the integration of the system (Abu Ghazaleh et al., 2019; Awa et al., 2017). Instances of factors encompassed within the technological dimension consist of infrastructure and technical know-how (Awa et al., 2016). The organizational aspect pertains to visible attributes like the size of the organization and its managerial framework, along with more subtle elements like the organization's preparedness to utilize the system and a favorable environment for implementing the system (Abu Ghazaleh et al., 2019; Awa et al., 2017). Illustrations of factors integrated within the organizational dimension pertain to interdepartmental communication and collaboration culture (Abu Ghazaleh et al., 2019; Ifinedo et al., 2010); and top management's commitment and support (Althonayan & Althonayan, 2017; Salih et al., 2022). The environmental aspect suggests that external entities could influence the integration of the system within the central organization (Abu Ghazaleh et al., 2019; Awa et al., 2017). Instances of factors covered within the environmental dimension encompass user participation (Althonayan & Althonayan, 2017; Eid & Abbas, 2017) and the engagement with vendor support or consultants (Salih et al., 2022)

2.4. Research gap

While extensive research has explored the pre-implementation and implementation phases, the post-implementation stage remains comparatively neglected by prior scholars (Abu Ghazaleh et al., 2019). This crucial period following Go-live is often underestimated, despite its undeniable significance, which, if overlooked, can lead to ERP implementation failures (Amado & Belfo, 2021). Post-implementation often entails ongoing maintenance expenses that—if not effectively managed—can potentially translate into financial losses (Li et al., 2017).

This study aims to offer fresh perspectives on Critical Success Factors (CSFs) with a specific emphasis on the frequently disregarded post-implementation phase—a domain often uncharted by previous researchers (Olson & Zhao, 2007; Saade & Nijher, 2016). While prior researchers have approached CSFs from various angles, some have formulated taxonomies of CSFs (Dezdar & Sulaiman, 2009; Finney & Corbett, 2007). Notably, prior investigations into the success factors of ERP implementation have predominantly concentrated on the pre-implementation and go-live stages, often sidelining the crucial post-implementation phase (Coşkun et al., 2022; Kirmizi & Kocaoglu, 2022; Mahmood et al., 2020; Oseni et al., 2017). The rationale behind the significance of the post-implementation phase lies in the fact that ERP has entered a saturation period: small to large companies that have adopted ERP systems over the years (Domagała et al., 2021; Pan et al., 2011).

3. Methodology

For this study, we administer a systematic literature review (SLR) as a form of secondary investigation, involving an impartial and iterative analysis of primary studies to elucidate, interpret, and deliberate upon evidence pertinent to the research queries (Kitchenham, 2007). As elucidated by (Kitchenham, 2007), an SLR unfolds through three principal stages: main phases: planning, conducting and reviewing the review. The SLR methodology has been applied to pinpoint success factors in ERP systems (Dezdar & Sulaiman, 2009; Finney & Corbett, 2007; Saade & Nijher, 2016; Shaul & Tauber, 2013).

3.1. Process for systematic literature review (SLR)

The systematic literature review (SLR) process entails a structured and phased approach to sorting and reviewing articles from an extensive collection of publications. SLR approach was employed since it is proven to be an effective method for obtaining a comprehensive understanding of the available literature within a specific research field (Kitchenham, 2007). It simplifies the process of recognizing deficiencies in current research, thereby enabling the identification of potential areas for future research (Brereton et al., 2007; Kitchenham, 2004, 2007). This method consists of planning, conducting, and reporting stages. In the planning phase, the focus was on determining the research questions for the SLR. In conducting, we emphasize the approach employed for searching, including the identification of target databases, the establishment of a specific time

frame, the definition of search terms, and the selection and assessment of articles based on predefined quality criteria. The data extraction process also took place in this phase. Finally, in the reporting phase, the existing research findings were synthesized, and the SLR results, discussion, and conclusion were presented.

3.1.1. Review protocol

In the first stage, which is planning, the review protocol was formulated using the Population, Intervention, Comparison, Results, and Context formula (Kitchenham, 2007) as demonstrated below:

- Population: enterprise resource planning, ERP system
- Intervention: CSF, success factor
- Comparison: implementation and post-implementation
- Outcomes: CSFs of ERP post-implementation
- Context: Academia (scientific literature) and practical

The next step is to determine the research questions in the SLR, which will guide the search for relevant literature. The keyword search, or search string, was chosen according to our research interest in reviewing CSFs on ERP post-implementation. The search string was related to "CSF" (including terms such as "factors", "drivers", and "success"), and post-implementation (including terms such as "post-ERP", and "post-go-live"). In this stage, the researcher also establishes criteria for selecting research articles to be used (inclusion & exclusion criteria).

3.1.2. Research question and digital resources (libraries/databases)

Our research question is "What are the critical success factors (CSFs) that were identified in the literature concerning CSFs in ERP post-implementation?". We aimed to investigate what most affecting factors toward the success of ERP Post-implementation. The database utilized is a digital library database that comprises numerous journals that are classified within the realm of business and information systems, namely: Emerald Insight, Scopus, Taylor & Francis, IEEE Access, and Science Direct as also suggested by prior scholar (Dezdar & Sulaiman, 2009). These databases house complete and comprehensive collections of academic literature with enhanced search capabilities, allowing for more efficient and refined search process. We have utilized the Boolean search technique, incorporating keywords derived from our research question alongside relevant synonyms.

Customized search settings are employed, particularly within the IEEE database, where search terms are tailored to yield effective search results. It is important to highlight that the search configurations differ among various databases. In the case of IEEE, search term customization is implemented. Divergent search outcomes are observed across the databases. Notably, the Emerald Insight Database stands out for providing a higher number of pertinent articles, resulting in the selection of 11 articles. On the contrary, the IEEE database appears to be less relevant in terms of the yielded results.

The exact phrase used for the search process in this study is as follows for Science Direct, Taylor and Francis and Scopus. We used the Advanced Search menu to execute this search process by executing search terms: (ERP OR *Enterprise Resource Planning*) AND (*Post-implementation* OR *Go-live*) AND (CSF OR *Critical success factor*). Since IEEE could not display the search results for previous search terms, we modified the search term into: (ERP OR *Enterprise Resource Planning*) AND (*Post-implementation*) AND (CSF OR *Critical success factor*). As for Science Direct, we customed the search term as follows since it results in 18,000 search results. We modified the search term into: (ERP OR *Enterprise Resource Planning)* AND (*Post-implementation*) AND (CSF OR *Critical success factor*) AND (*failure* OR *challenge*).

3.1.3. Extraction criteria

To evaluate each primary study candidate in SLR, it is necessary to consider specific criteria for inclusion and exclusion. These criteria were defined during the drafting of the protocol. We employ these criteria to select potential primary studies by carefully examining their relevance. The following criteria were utilized and adhered to in identifying the most pertinent articles:

- The selected articles originate from Quartile-1 and Quartile-2 Journal (based on Scimago Journal Rank) (Lei & Sun, 2020);
- Conference papers, which were not peer-reviewed, were excluded;
- Only publications written in English were included;
- Only papers/articles that addressed ERP post-implementation phases were included in this study.

Initially, the literature search yielded a pool of 947 papers that had been accessed from September to December 2022 (as shown in Appendix 1 Table A1). To prevent continuous revisions of the article, the cut-off date of 20 December 2022, was chosen. Through a selection process based on title and abstract, 55 articles were obtained. Further assessment of these articles for relevance to the present study resulted in a total of 43 papers. As a result of adhering to strict extraction criteria, a total of 26 articles were selected (as shown in Appendix 1 Table A2).

We assessed the articles for their relevance by examining the titles of the publications that remained after duplicates were removed and by evaluating the quality of the publication outlets, as per the set criteria. For each article, we recorded details such as authors, publication year, title, publishing source, citation count, research methodology, research context, study objectives, main findings, and recommendations for future research.

Subsequently, we thoroughly reviewed a subset of articles that appeared to align with our predetermined criteria and were pertinent to the research questions. The tollgate method recommended by prior scholars is employed to revisit the research articles identified during the primary collection phase of the study (Afzal et al., 2009; Khan et al., 2022). Following this rigorous screening process as depicted in Figure 2 below, a total of 26 articles met the established criteria and were included in the selection.

3.2. Data extraction and data analysis method

After selecting the articles through SLR, we employed Mendeley as a tool to arrange and manage the collected articles. Essential information including the name of the author, journal publisher, publication year, research methods, and CSFs was recorded in an Excel spreadsheet. Each article underwent a comprehensive review to extract CSFs that were identified in the selected literature. When conducting the extraction of Critical Success Factors (CSFs), the approach of content analysis and frequency analysis was utilized, following the guidance of previous researchers (Ayat et al., 2021; Dezdar & Sulaiman, 2009; Finney & Corbett, 2007; Saade & Nijher, 2016), as detailed below.

3.2.1. Content analysis

Content analysis plays a pivotal role in our study by extracting vital information from chosen articles and recognizing essential themes and concepts, thereby facilitating the acquisition of insights, the organization of information, and the identification of patterns within the literature (Ayat et al., 2021; Dezdar & Sulaiman, 2009). The first step is text selection. The second one is the unit of analysis. Third is assigning codes to condensed meaning units to label them. Lastly, we categorize similar codes into groups.

Initially, we selected 26 articles chosen based on the criteria outlined in the previous section. The initial phase involved reviewing these preferred articles to acquire a comprehensive understanding of each publication. Next, we determined “units of meaning,” which represented the CSF of ERP specified by different researchers. In this instance, the meaning units were concise to the extent

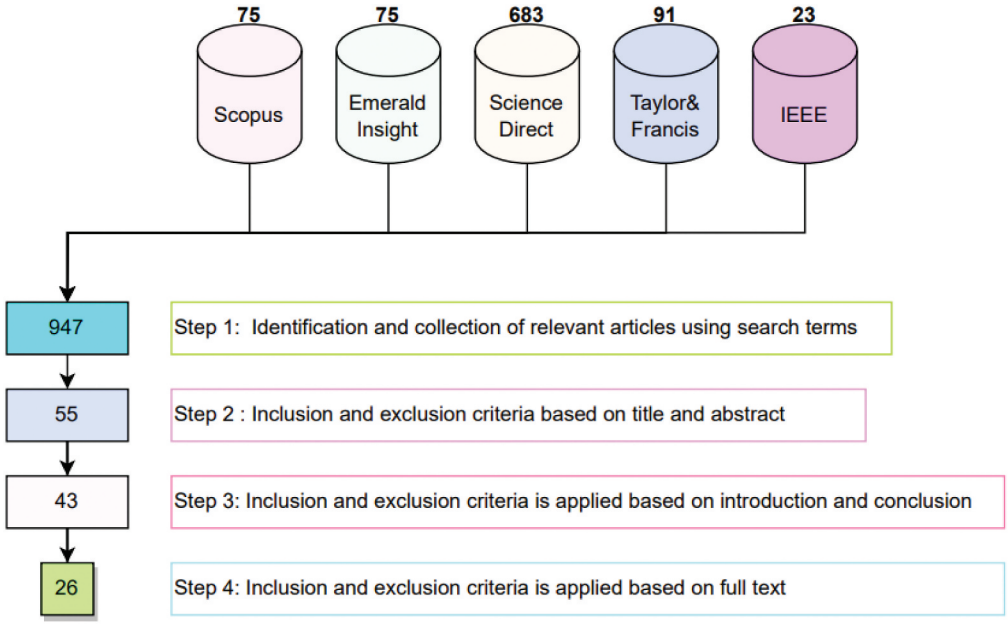


Figure 2. Articles filtration process.

that they did not necessitate further condensation. From the chosen articles, there were 74 meaning units collected which represent identified CSFs (See Appendix 2)

Subsequently, we formulated codes that acted as succinct descriptors for the units of meaning, guaranteeing the preservation of the fundamental essence of each unit. For example, units of meaning associated with the project team's expertise and the capabilities of the IT team were designated as "team competencies." Likewise, designations such as "top leaders' commitment" and "top leaders' support" were grouped within the classification of "top management commitment." This iterative process was replicated for all the factors identified, mirroring methodologies employed in prior research endeavors (Ayat et al., 2021; Dezdar & Sulaiman, 2009; Nasir & Sahibuddin, 2011)

A total of 13 codes were identified and are referred to as ERP Post-implementation CSFs in later/subsequent sections. It is worth noting that content analysis is not a one-time event but an ongoing, dynamic, and iterative process that involves repeated revision and refinement until the codes effectively convey the core meanings of the condensed units. Afterward, we established categories by combining related codes, specifically grouping them into three categories: Technological, Organizational, and Environmental.

3.2.2. Frequency analysis

Frequency analysis proves valuable in quantifying the occurrence and prevalence of specific events (Finney & Corbett, 2007; Saade & Nijher, 2016). In our study, we employed this method to determine the frequency of occurrence for each success factor across the selected studies. Using the computed frequencies, we organized all the factors in a tabular format, with the articles ranked higher having the highest frequencies. Subsequently, we analyzed and discussed the significance and criticality of each factor. Our use of frequency analysis to pinpoint critical success factors aligns with prior research (Ayat et al., 2021; Dezdar & Sulaiman, 2009; Mahmood et al., 2020).

4. Data evaluation

The data obtained from the analyzed articles in this SLR allowed us to identify the CSFs that have been discussed in previous research. These findings have been summarized and presented in

Appendix 2. To categorize the CSFs found in previous studies, we performed a thematic analysis of the factors by using Atlas.ti software 23.1.0 version. The subsequent section outlines the procedural stages involved in thematic analysis. Initially, the most pertinent papers, derived from the outcomes of the literature search, are gathered and organized in a designated folder. Following this, a compilation of the 26 chosen papers is created within an Excel spreadsheet (See Appendix 5 Table A6). The subsequent steps are executed using Atlas.ti software.

The initial stage involves starting the coding process to identify common themes. In this phase, we assign labels as a crucial part of the coding procedure. Many labels are used in this first coding phase. We use an "Aim" label to indicate the objectives of each paper. We then categorize issues under the "Problem" label. Factors that positively affect ERP post-implementation success receive the label "CSF." For instance, previous researchers found that continuous process improvement significantly impacts ERP performance (Ha & Ahn, 2014, p. 1075). Consequently, we classify "continuous process improvement" as a CSF and assign it the corresponding label "CSF".

Following that, the subsequent action involves categorizing CSFs into groups when they share a common purpose. This entails assembling each CSF from the selection of 26 papers by evaluating similarities in the wording or terminology used in the CSF codes. For instance, phrases like "Executive support" and "Management support" fall under the category "Top management commitment", which is deemed the most suitable and conveys the researcher's interpretation, similar to what was undertaken in previous studies (Dezdar & Sulaiman, 2009; Finney & Corbett, 2007).

5. Results

5.1. Demography of selected studies

The manufacturing sector has been extensively studied due to its early adoption of technology dating back to the 1960s (Zhu et al., 2010). The concept of ERP originated from Manufacturing Resource Planning (MRP) II, which evolved from MRP I in the 1960s. Over the past 30 years, manufacturing has transitioned from basic material requirements calculation to full company automation. Other highly researched sectors include Utility and services, Health Care, Education, and the Public Sector, followed by Financial, Technology, Telecommunication, and Retail sectors. A diagram of the company sector is displayed in Figure 3

The subject of ERP post-implementation has been extensively covered in 22 international journals. Out of these journals, Industrial Management & Data Systems boasts the highest publication count, featuring 4 articles, while the International Journal of Information Management and Kybernetes trail behind with 2 articles each. The distribution of studies selected is presented in Figure 4

We analyzed the articles in the collection to identify the methodology utilized in each study (See Appendix 3). Out of the total, 15 studies adopt a quantitative approach, relying on survey data. Furthermore, 10 studies opt for a qualitative method, incorporating focus group discussions (FGD), interviews, case studies, desktop studies, and design science research. Only one study employed a mixed methods approach, combining surveys and interviews.

5.2. ERP Post-implementation CSFs

Through a thorough examination of the existing literature, we have identified a comprehensive list of CSFs that impact project outcomes. The process involved employing both frequency analysis and content analysis in identifying, documenting, and then classifying the CSFs mentioned in the selected articles. From previous studies, we identified 53 factors that impact ERP success during the post-implementation phase and then grouped these factors based on their meanings. For this study, we consider factors as CSFs if at least two articles highlight them as significant in ERP post-implementation. If only one study mentions a factor, it fails to qualify as a CSF in our research. This evaluation and consolidation process led to the identification of 13 primary factors. Appendix 4

cogent business & management

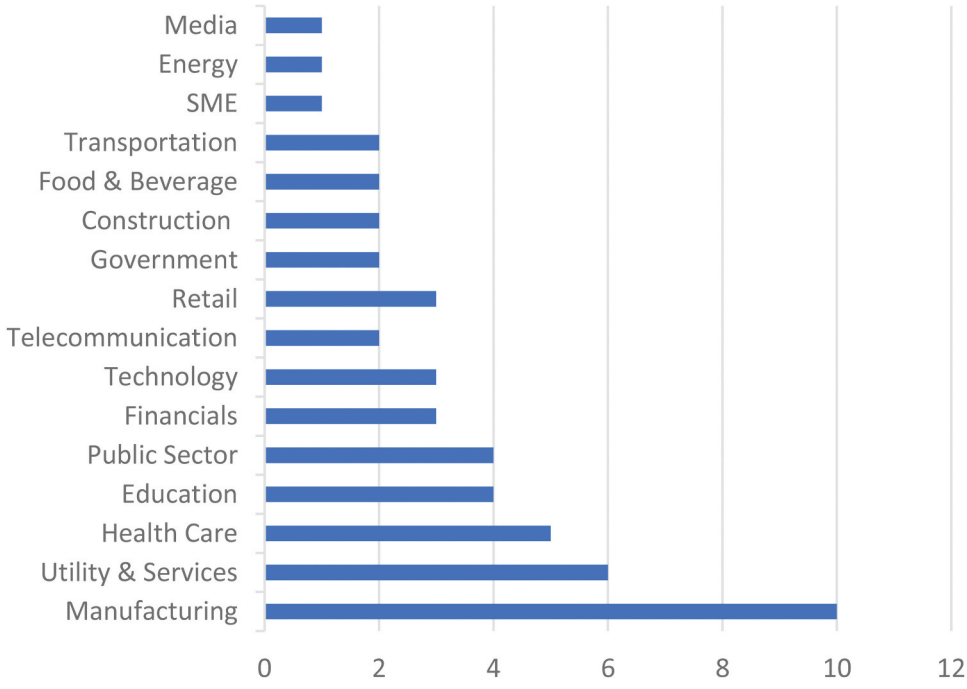


Figure 3. Diagram of the company sector from previous studies.

Table A5 also presents the result of frequency analysis. To determine the top three CSFs, moreover, we used a ranking process to identify the factors with the highest percentages. The frequency analysis results show that the top-ranking factor has a percentage of 17.56%, while the second and third rankings have percentages of 14.86% and 10.81%, respectively.

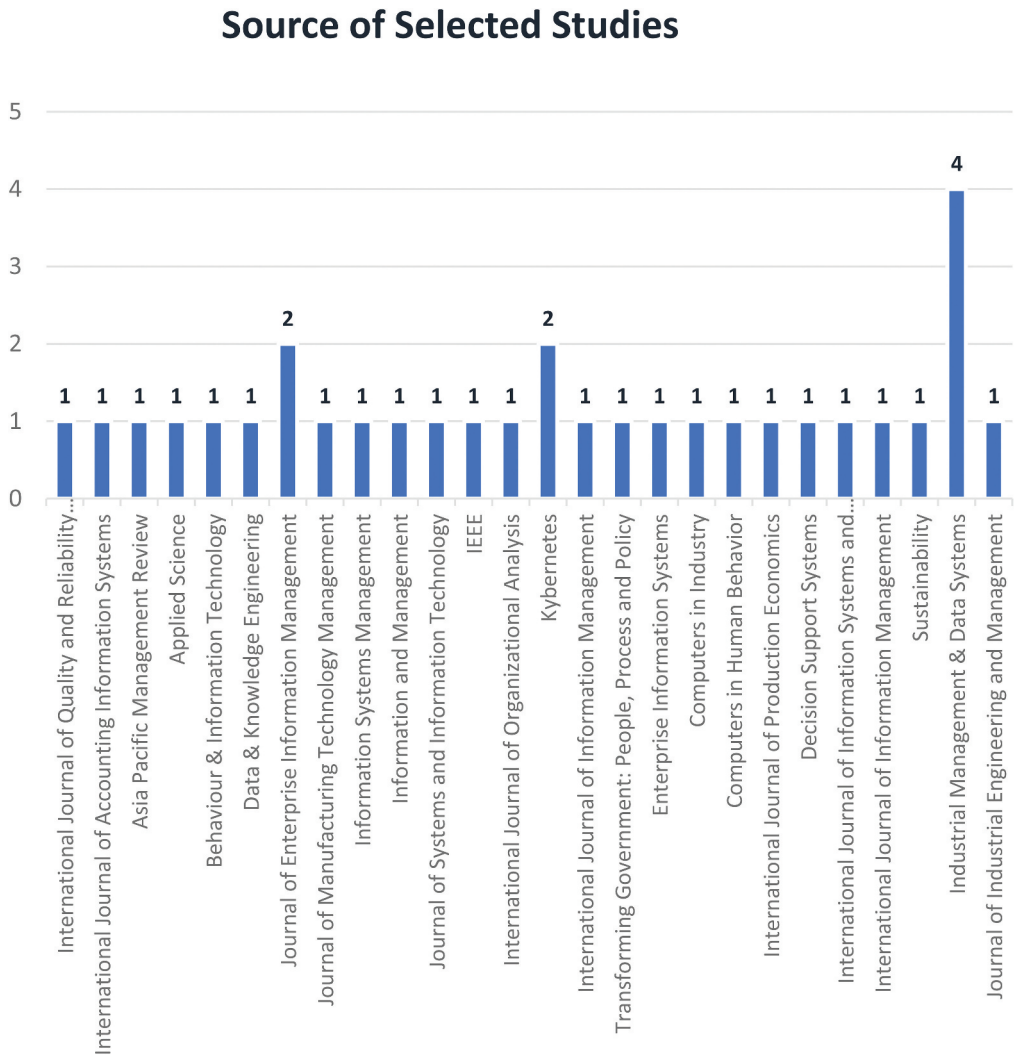
Through our analyses, we have identified a specific set of CSFs along with detailed insights into these findings in the following sections Figure 5 displays the mapping diagram of ERP Post-implementation CSFs based on the TOE framework. We also categorized factors related to technology, including user interface, system testing, continuous process improvement, data and code cleansing, and continuous system integration, into a single dimension known as the "Technology" dimension. Factors associated with the organization, such as project management, team competencies, change management, interdepartmental communication and collaboration, top management commitment, and post-implementation training, have been consolidated into the "Organization" dimension. Factors related to the environment, such as user participation and consultant vendor support, have been assigned to the "Environment" dimension. These defined dimensions and their corresponding CSFs serve as guidance for both practitioners and researchers, directing their focus towards the significant roles played by each identified CSF.

6. Discussion

We conducted content analysis to chart the keywords present in all the chosen studies. We identified the most frequently recurring keywords, including but not limited to ERP, project, system, success, implementation, management, training, communication, commitment, support, knowledge, integration, and evaluation (See Figure 6).

All three dimensions—technological, organizational, and environmental—have proven to be valuable in our study. The TOE model that promotes those dimensions has gained an advantage over other adoption models when it comes to examining technology adoption and product capabilities due to its inclusion of technological, environmental, and organizational aspect (Awa et al., 2017). Consequently, it offers a comprehensive perspective on both system capabilities and

Figure 4. Source of selected studies.



user acceptance of technology, while also aiding in the enhancement of organizational system capabilities through the utilization of technology (Abu Ghazaleh et al., 2019).

6.1. CSF in TOE framework

6.1.1. Technological context

The seamless functioning of ERP necessitates a technological foundation. This foundation includes essential factors like continuous process enhancement, data and code cleaning, optimization of user interfaces, continuous system testing, and improvements in user interfaces (Barth & Koch, 2019; Domagała et al., 2021). The identification of technological dimension thus has proven to be highly predictive in post-implementation phase and provided in-depth understanding of the required criteria to achieve success (Maas et al., 2018; Zhu et al., 2010).

6.1.2. Organizational context

This dimension has yielded the most CSFs among other dimensions: six CSFs. Essential organizational elements for successful ERP post-implementation include the commitment of top management, adept project management, effective change management, interdepartmental communication and collaboration, team competencies, and comprehensive post-implementation training (Abu Ghazaleh et al., 2019; Althonayan & Althonayan, 2017). Past studies have shown that

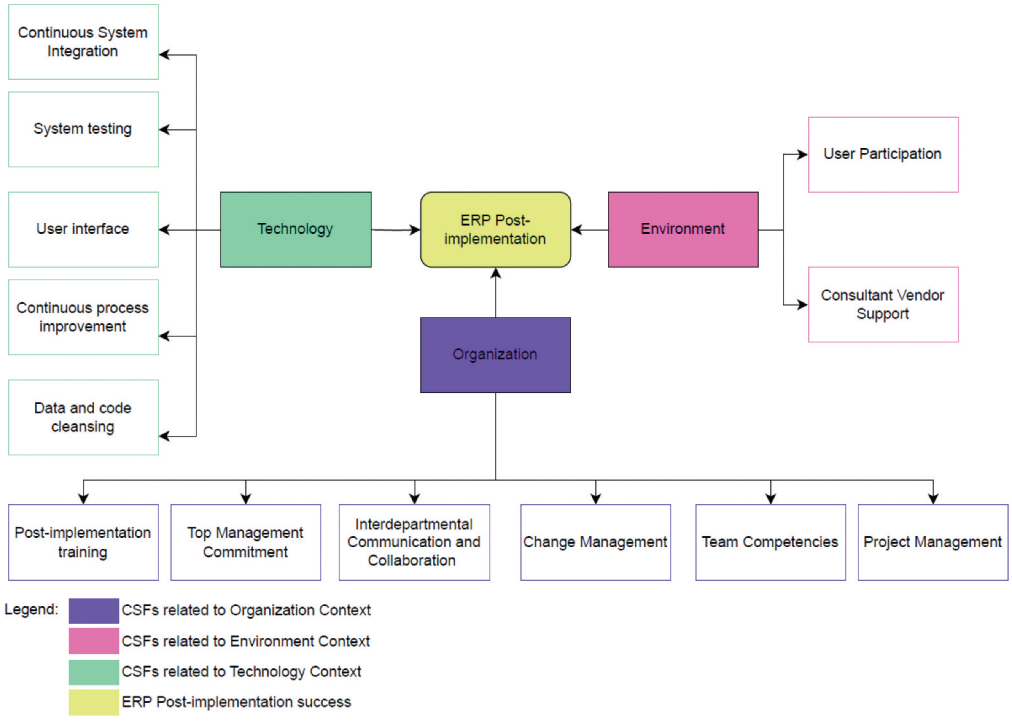


Figure 5. Mapping diagram CSFs in ERP post-implementation.

Figure 6. Word cloud of CSFs in ERP post-implementation.

organizations that adopt ERP systems generally engage in comprehensive preparations. This may involve tasks such as procuring essential resources and engaging organizational members in the integration process (Zhu et al., 2010).

6.1.3. Environmental context

The post-implementation phase of ERP is significantly influenced by environmental dynamics. However, in this dimension, only CSFs become evident. These factors encompass adept consultant vendor support and active user participation (Maas et al., 2018; Salih et al., 2022). Previous studies

have discovered that external entities can contribute to enhancing the external connections within the focal organization, thereby engendering synergistic effects (Zhu et al., 2010).

6.2. ERP Post-implementation CSFs

6.2.1. Continuous system integration (CSI)

Among all CSFs, *CSI* holds the top rank, mentioned in 13 articles affirming its substantial influence on ERP post-implementation. Continuous system integration is also recognized as a CSF during the deployment phase of ERP (Osnes et al., 2018; Ram et al., 2013). This discovery underscores the significance of ensuring that all ERP modules are interconnected to enable the smooth functioning of ERP systems, thereby facilitating a successful implementation (Barth & Koch, 2019). Companies could potentially encounter a risk where the attainment of seamless integration might be compromised either between existing modules or between existing and new modules within the ERP system (Peng & Nunes, 2009a).

6.2.2. Post-implementation training (PIT)

PIT holds the second rank, with 11 articles emphasizing its significant impact on ERP post-implementation processes. User training and knowledge transfer become paramount throughout the implementation and post-implementation phases (Ha & Ahn, 2014). Training improves user understanding of ERP, motivates active communication and collaboration among departments, and indicates employees' grasp of ERP concepts (Abu Ghazaleh et al., 2019). Sufficient training programs before, during, and after implementation remain necessary to shorten the learning cycle, prevent data integrity issues, and enhance productivity (Althonayan & Althonayan, 2017)

6.2.3. User participation (UP)

UP, ranked third among the CSFs, 8 articles highlight this factor, indicating its significant influence on post-implementation ERP outcomes. User participation plays a vital role in facilitating efficient and effective ERP implementation (Abu Ghazaleh et al., 2019; Nicolaou, 2004). Positive behaviors and activities exhibited by users during the systems development process enhance the system's quality by providing developers with the necessary information (Ju et al., 2016). To enhance user engagement and mitigate the risk of low participation in ERP system usage, offering rewards to employees who achieve satisfactory results can serve as a motivating solution (Maas et al., 2018).

6.2.4. Interdepartmental communication and collaboration (ICC)

Ranked fourth among the CSFs identified in previous literature, *ICC* is mentioned in seven articles. Previous study argues that enhancing communication efficiency within the complete ERP team and the broader organization can lead to improved strategic decision-making and the bolstering of ERP capabilities (Abu Ghazaleh et al., 2019). Additionally, ERP systems require seamless integration, often giving rise to conflicts and necessitating the coordination of shared resources (Ram et al., 2013). This, in turn, calls for effective collaboration and communication. One viable solution entails regular consultations between IT and business managers, facilitating the exchange of ideas, information, and resources across departments, and making collective decisions to enhance overall operational efficiency during the post-implementation phase (Salih et al., 2022).

6.2.5. Top management commitment (TMC)

TMC holds the same number of references as the previous CSF, with seven articles mention it. Top management support emerges as a pivotal determinant in the assessment of both success and failure (Abu Ghazaleh et al., 2019). Their contributions emphasize how top management can enhance team competence and facilitate the development of an information-sharing system, in line with the findings of prior scholar (Hasan et al., 2019). In a broader context, the actions undertaken by top management exert significant influence on overall employee motivation and their capacity to assimilate information, thereby shaping the successful integration of ERP within the organization (Ha & Ahn, 2014; Salih et al., 2022).

6.2.6. Team competencies (TC)
Seven articles have identified *TC* as a CSF. In the post-implementation phase, many companies may face a shortage of ERP knowledge due to declining interest in and support for the ERP system, or the disbandment of ERP project teams after system launch (Ha & Ahn, 2014; Salih et al., 2022). The absence of a proficient and dedicated ERP team can significantly impede ERP proficiency and understanding (Ha & Ahn, 2014). To put it differently, having expertise within the internal ERP team can impact the ongoing training and education of end-users, facilitating the preservation and dissemination of ERP knowledge. Moreover, there is a consensus that the project team should consist of a carefully chosen mix of members with expertise in business processes and technical aspects (Barth & Koch, 2019).

6.2.7. System testing (ST)
ST, ranked fifth among the CSFs in prior literature, with four articles mentioning it as a CSF, is a critical step to ensure the seamless operation of the upgraded ERP system. This testing should encompass not only functional evaluations but also considerations related to performance and reliability (Barth & Koch, 2019).

6.2.8. Change management (CM)
CM, also ranked fifth among the CSFs in previous literature and mentioned in four articles, is crucial for ensuring a smooth transition from an old system to a new one. It involves studying suitable strategies for communities and assessing how these strategies influence resistance to change during ERP system implementation (Salih et al., 2022).

6.2.9. User interface (UI)
UI, ranked sixth among the CSFs in prior literature and mentioned in three articles, is a significant topic in modern system programming. It involves dealing with challenges such as software screen management, small font sizes, and menu overlapping within ERP systems (Salih et al., 2022).

6.2.10. Consultant vendor support (CVS)
Ranked sixth among the CSFs in previous literature and mentioned in three articles, *CVS* support plays a vital role in enhancing the effectiveness of ERP systems during both the implementation and post-implementation phases. The role of the ERP system vendor is crucial, as they possess the capability to offer elevated levels of support and expert knowledge in system management (Salih et al., 2022; Barth & Koch, 2019). ERP vendors provide top-notch service through continuous support, such as comprehensive assistance for software upgrades, backup support, software repair, and replacement (Salih et al., 2022; Salih et al., 2022).

6.2.11. Project management (PM)
Ranked sixth among the CSFs in previous literature and mentioned in three articles, *PM* is not just about achieving project objectives; it also influences the attainment of project benefits, including improved performance and cost reduction. The success of project management is instrumental in realizing the values sought by stakeholders in a specific project (Ram et al., 2013).

6.2.12. Continuous process improvement (CPI)
Ranked seventh with two articles mentioning it as a CSF, *CPI* in ERP systems requires consistent and long-term efforts and appropriate expertise. ERP implementation projects rarely have a fixed conclusion, necessitating ongoing enhancement efforts to extend the lifespan of these valuable systems (Ha & Ahn, 2014; McGinnis & Huang, 2007).

6.2.13. Data migration and code cleansing (DMC)
Ranked seventh with two articles mentioning it as a CSF, *DMC* is advisable when upgrading an ERP system. This process prevents the migration of inaccurate or outdated data to the new system (Barth & Koch, 2019).

7. Conclusion and implication

ERP solutions, which integrate various operational aspects through shared databases and standardized workflows, have delivered benefits such as enhanced efficiency, reduced cycle times, streamlined documentation, error elimination, and process consolidation. However, ERP implementations often exceed budgets and encounter delays, even in multinational companies. The post-go-live phase marks the continuation of the ERP journey, bringing forth new challenges and risks. To address ERP failures, managing CSFs becomes pivotal. Despite this, there is a scarcity of comprehensive articles discussing successful post-implementation frameworks. Many studies focus predominantly on the implementation phase, while the post-implementation phase remains a critical stage demanding ongoing attention.

This study employs the Kitchenham method for conducting SLR to thoroughly examine the existing literature regarding ERP post-implementation phase. A review protocol has been established to guide the SLR process, encompassing the definition of search terms to extraction criteria. This study was carried out in 2022 and culminated in the selection of 26 articles. Subsequently, we conducted content and frequency analyses to augment our study. From these selected articles, we have identified 13 CSFs that can be categorized within the TOE framework, contributing to a comprehensive understanding of the subject. Notably, the organizational dimension emerges as the most prolific, encompassing six CSFs, while the environmental dimension comprises two CSFs. We have also pinpointed three of the most influential CSFs in the post-implementation stage: continuous system integration, post-implementation training, and user participation.

In summary, this study bridges a gap in research in the following dimensions:

- Concentrating on technical elements, an area that has been underrepresented in delineating success factors of ERP in post-implementation.
- Additionally, our study delves into sociotechnical factors, including organizational considerations and the impact of user participation on ERP success in the post-implementation phase.

Our research findings have practical implications for organizations aiming to anticipate challenges following ERP system implementation by maximizing post-implementation success factors.

- Firstly, it is crucial for top management or leaders to be actively engaged in ERP projects from its inception to post-implementation. Many underestimate their role beyond implementation, erroneously believing it is solely the IT department's responsibility. However, our research highlights the significant impact of top management commitment on ERP success.
- Secondly, companies embarking on ERP system implementation should prioritize effective and interactive communication for post-implementation oversight. The ERP project management team should engage in comprehensive communication, covering aspects like aligning business requirements, resource allocation, improvements, and the strategic direction of the post-implementation ERP plan.
- Thirdly, assessing the ERP system post-implementation allows for the collection of valuable data to address anticipated challenges. This is particularly critical given the prolonged, multi-year nature of ERP system adoption.
- Lastly, senior management must remain attentive and avoid overlooking subsequent stages post-implementation, such as maintenance and upgrades, which are essential for technical progress. Neglecting these aspects could necessitate costly re-implementation.

8. Limitations and future study

We acknowledge the presence of several limitations within this study. Specifically, our study was constrained by its focus on a selected database. Therefore, we propose that future research endeavors encompass a broader array of databases to encompass a more comprehensive range of articles. Additionally, this study has a limited scope in terms of providing CSFs in a general context. Consequently, we encourage researchers to leverage our findings and adapt them to specific industries, such as manufacturing, government, or the private sector. Moreover, we

determined our top CSFs through frequency analysis. As a result, we advocate for future studies to employ Multi-Criteria Decision-Making methods like Fuzzy AHP, Technique for Order Preference by Similarity to Ideal Solutions (TOPSIS), or other methodologies to establish a more robust and reliable ranking of these factors

Acknowledgments
The authors would like to thank the Editor, Neelamegam Anbazhagan and appreciate for valuable comments received from anonymous reviewers of an earlier draft of this paper. This work was funded by the Ministry of Communication and Informatics of Indonesia (KEMENKOMINFO RI) under Grants #B-301/BLSDM.1/LT.02.03/2/2023..

Funding
This research was funded through Grants #B-301/BLSDM.1/LT.02.03/2/2023 from the Ministry of Communication and Informatics of Indonesia (KEMENKOMINFO RI)

Author details
Zenfrison Tuah Butarbutar[1]
E-mail: zenfrison.tuah@ui.ac.id
ORCID ID: http://orcid.org/0009-0004-7022-2220
Putu Wuri Handayani[1]
ORCID ID: http://orcid.org/0000-0001-5341-3800
Ryan Randy Suryono[2]
ORCID ID: http://orcid.org/0000-0001-9378-8148
Wahyu Setiawan Wibowo[1]
ORCID ID: http://orcid.org/0000-0002-1327-0072
[1] Faculty of Computer Science, Universitas Indonesia, Depok, West Java, Indonesia.
[2] Faculty of Engineering and Computer Science, Universitas Teknokrat, Bandar Lampung, Indonesia.

Disclosure statement
No potential conflict of interest was reported by the author(s).

Citation information
Cite this article as: Systematic literature review of Critical success factors on enterprise resource planning post implementation, Zenfrison Tuah Butarbutar, Putu Wuri Handayani, Ryan Randy Suryono & Wahyu Setiawan Wibowo, *Cogent Business & Management* (2023), 10: 2264001.

References

Abu Ghazaleh, M., Abdallah, S., & Khan, M. (2019). Critical internal organization's forces influencing sustainability of post ERP in UAE service industry: A confirmatory factor analysis approach. *International Journal of Organizational Analysis*, *27*(3), 759–785. https://doi.org/10.1108/IJOA-03-2018-1375

Abu Ghazaleh, M., Abdallah, S., & Zabadi, A. (2019). Promoting successful ERP post-implementation: A case study. *Journal of Systems & Information Technology*, *21*(3), 325–346. https://doi.org/10.1108/JSIT-05-2018-0073

Afzal, W., Torkar, R., & Feldt, R. (2009). A systematic review of search-based testing for non-functional system properties. *Information and Software Technology*, *51*(6), 957–976. https://doi.org/10.1016/j.infsof.2008.12.005

Ali, M., & Miller, L. (2017). ERP system implementation in large enterprises – a systematic literature review. *Journal of Enterprise Information Management*, *30*(4), 666–692. https://doi.org/10.1108/JEIM-07-2014-0071

Alkraiji, A. I., Jayawickrama, U., Olan, F., Asaduzzaman, M., Subasinghage, M., & Gallage, S. (2022). The perspective of national ERP vendors in achieving ERP project success in government organisations: A case of Saudi Arabia. *Enterprise Information Systems*, *16*(1), 71–104. https://doi.org/10.1080/17517575.2020.1845811

Almajali, D. A., Masa'deh, R., & Tarhini, A. (2016). Antecedents of ERP systems implementation success: A study on Jordanian healthcare sector. *Journal of Enterprise Information Management*, *29*(4), 549–565. https://doi.org/10.1108/JEIM-03-2015-0024

Althonayan, M., & Althonayan, A. (2017). E-government system evaluation: The case of users' performance using ERP systems in higher education. *Transforming Government: People, Process and Policy*, *11*(3), 306–342. https://doi.org/10.1108/TG-11-2015-0045

Amado, A., & Belfo, F. P. (2021). Maintenance and support model within the ERP systems lifecycle: Action research in an implementer company. *Procedia Computer Science*, *181*, 580–588. https://doi.org/10.1016/J.PROCS.2021.01.205

Awa, H. O., Ukoha, O., Emecheta, B. C., & Liu, S. (2016). Using T-O-E theoretical framework to study the adoption of ERP solution. *Cogent Business & Management*, *3*(1), 1196571. https://doi.org/10.1080/23311975.2016.1196571

Awa, H. O., Ukoha, O., & Igwe, S. R. (2017). Revisiting technology-organization-environment (T-O-E) theory for enriched applicability. *The Bottom Line*, *30*(1), 2–22. https://doi.org/10.1108/BL-12-2016-0044

Ayat, M., Imran, M., Ullah, A., & Kang, C. W. (2021). Current trends analysis and prioritization of success factors: A systematic literature review of ICT projects. *International Journal of Managing Projects in Business*, *14*(3), 652–679. https://doi.org/10.1108/IJMPB-02-2020-0075

Barth, C., & Koch, S. (2019). Critical success factors in ERP upgrade projects. *Industrial Management and Data Systems*, *119*(3), 656–675. https://doi.org/10.1108/IMDS-01-2018-0016

Bokovec, K., Damij, T., & Rajkovič, T. (2015). Evaluating ERP projects with multi-attribute decision support systems. *Computers in Industry*, *73*, 93–104. https://doi.org/10.1016/J.COMPIND.2015.07.004

Brereton, P., Kitchenham, B. A., Budgen, D., Turner, M., & Khalil, M. (2007). Lessons from applying the systematic literature review process within the software engineering domain. *Journal of Systems and Software*, *80*(4), 571–583. https://doi.org/10.1016/j.jss.2006.07.009

Chou, S.-W., & Chang, Y.-C. (2008). The implementation factors that influence the ERP (enterprise resource planning) benefits. *Decision Support Systems*, *46*(1), 149–157. https://doi.org/10.1016/j.dss.2008.06.003

Comuzzi, M., & Parhizkar, M. (2017). A methodology for enterprise systems post-implementation change management. *Industrial Management and Data Systems*, *117*(10), 2241–2262. https://doi.org/10.1108/IMDS-11-2016-0506

Cooper, V. A. (2008). The Critical success factor method: A review and practical example. *CONF-IRM 2008 Proceedings*. https://aisel.aisnet.org/confirm2008/53

Coşkun, E., Gezici, B., Aydos, M., Tarhan, A. K., & Garousi, V. (2022). ERP failure: A systematic mapping of the literature. *Data and Knowledge Engineering*, *142*, 102090. https://doi.org/10.1016/j.datak.2022.102090

Dezdar, S., & Sulaiman, A. (2009). Successful enterprise resource planning implementation: Taxonomy of critical factors. *Industrial Management & Data Systems*, *109*(8), 1037–1052. https://doi.org/10.1108/02635570910991283

Domagała, A., Grobler-Dębska, K., Wąs, J., & Kucharska, E. (2021). Post-implementation ERP software development: Upgrade or reimplementation. *Applied Sciences*, *11*(11), 4937. https://doi.org/10.3390/app11114937

Eid, M. I. M., & Abbas, H. I. (2017). User adaptation and ERP benefits: Moderation analysis of user experience with ERP. *Kybernetes*, *46*(3), 530–549. https://doi.org/10.1108/K-08-2015-0212

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

Goyette, S., Cassivi, L., Courchesne, M., & Elia, E. (2015). The ERP post-implementation stage: A knowledge transfer challenge. *International Journal of Information Systems & Project Management*, *3*(2), 5–19. https://doi.org/10.12821/ijispm030201

Ha, Y. M., & Ahn, H. J. (2014). Factors affecting the performance of enterprise resource planning (ERP) systems in the post-implementation stage. *Behaviour and Information Technology*, *33*(10), 1065–1081. https://doi.org/10.1080/0144929X.2013.799229

Hasan, N., Miah, S. J., Bao, Y., & Hoque, M. R. (2019). Factors affecting post-implementation success of enterprise resource planning systems: A perspective of business process performance. *Enterprise Information Systems*, *13*(9), 1217–1244. https://doi.org/10.1080/17517575.2019.1612099

Ifinedo, P., Rapp, B., Ifinedo, A., & Sundberg, K. (2010). Relationships among ERP post-implementation success constructs: An analysis at the organizational level. *Computers in Human Behavior*, *26*(5), 1136–1148. https://doi.org/10.1016/j.chb.2010.03.020

Ju, P. H., Wei, H. L., & Tsai, C. C. (2016). Model of post-implementation user participation within ERP advice network. *Asia Pacific Management Review*, *21*(2), 92–101. https://doi.org/10.1016/j.apmrv.2015.11.001

Khan, R. A., Khan, S. U., Khan, H. U., & Ilyas, M. (2022). Systematic literature review on security risks and its practices in secure software development. In *IEEE Access* (Vol. 10, pp. 5456–5481). Institute of Electrical and Electronics Engineers Inc. https://doi.org/10.1109/ACCESS.2022.3140181

Kirmizi, M., & Kocaoglu, B. (2022). The influencing factors of enterprise resource planning (ERP) readiness stage on enterprise resource planning project success: A project manager's perspective. *Kybernetes*, *51*(3), 1089–1113. https://doi.org/10.1108/K-11-2020-0812

Kitchenham, B. (2004). *Procedures for Undertaking Systematic Reviews* (TR/SE-0401). Keele University. https://www.researchgate.net/publication/228756057

Kitchenham, B. (2007). *Kitchenham, B.: Guidelines for performing systematic literature reviews in software engineering*. https://www.researchgate.net/publication/258968007

Kuranga, A., Maslin, M., & Maarop, N. (2021). Critical implementation factors for Cloud-based Enterprise Resources planning in the Nigerian Maritime Transport and supply chain. *IOP Conference Series: Materials Science and Engineering*, *1051*, 012022. https://doi.org/10.1088/1757-899X/1051/1/012022

Laudon, K. C., & Laudon, J. P. (2018). *Management information systems : Managing the digital firm (15th ed.)* (15th ed.). Pearson.

Law, C., Chen, C., & Wu, J. (2010). Managing the full ERP life-cycle: Considerations of maintenance and support requirements and IT governance practice as integral elements of the formula for successful ERP adoption. *Computers in Industry*, *61*(3), 297–308. https://doi.org/10.1016/j.compind.2009.10.004

Lei, L., & Sun, Y. (2020). Should highly cited items be excluded in impact factor calculation? The effect of review articles on journal impact factor. *Scientometrics*, *122*(3), 1697–1706. https://doi.org/10.1007/s11192-019-03338-y

Li, H. J., Chang, S. I., & Yen, D. C. (2017). Investigating CSFs for the life cycle of ERP system from the perspective of IT governance. *Computer Standards and Interfaces*, *50*, 269–279. https://doi.org/10.1016/J.CSI.2016.10.013

Louis, G. T. (1990). *The processes of technological innovation*. Lexington Books.

Maas, J.-B., Van Fenema, P. C., & Soeters, J. (2018). Post-implementation ERP usage: A longitudinal study of the impact of Control and empowerment. *Information Systems Management*, *35*(4), 330–347. https://doi.org/10.1080/10580530.2018.1503804

Mahmood, F., Khan, A. Z., & Bokhari, R. H. (2020). ERP issues and challenges: A research synthesis. *Kybernetes*, *49*(3), 629–659. https://doi.org/10.1108/K-12-2018-0699

Malik, M. O., & Khan, N. (2021). Analysis of ERP implementation to develop a strategy for its success in developing countries. *Production Planning & Control*, *32*(12), 1020–1035. https://doi.org/10.1080/09537287.2020.1784481

McGinnis, T. C., & Huang, Z. (2007). Rethinking ERP success: A new perspective from knowledge management and continuous improvement. *Information & Management*, *44*(7), 626–634. https://doi.org/10.1016/j.im.2007.05.006

Motiwalla, L. F. (2012). *Enterprise system for management*. Pearson Education.

Mullins, J. K., & Cronan, T. P. (2021). Enterprise systems knowledge, beliefs, and attitude: A model of informed technology acceptance. *International Journal of Information Management*, *59*, 102348. https://doi.org/10.1016/j.ijinfomgt.2021.102348

Nasir, M. H. N., & Sahibuddin, S. (2011). Critical success factors for software projects: A comparative study. *Scientific Research and Essays*, *6*(10), 2174–2186. https://doi.org/10.5897/SRE10.1171

Nicolaou, A. (2004). Quality of postimplementation review for enterprise resource planning systems. *International Journal of Accounting Information Systems*, *5*(1), 25–49. https://doi.org/10.1016/j.accinf.2004.02.002

Nicolaou, A. I., & Bhattacharya, S. (2006). Organizational performance effects of ERP systems usage: The impact of post-implementation changes. *International Journal of Accounting Information Systems*, *7*(1), 18–35. https://doi.org/10.1016/j.accinf.2005.12.002

Olson, D. L., & Zhao, F. (2007). CIOs' perspectives of critical success factors in ERP upgrade projects. *Enterprise Information Systems*, *1*(1), 129–138. https://doi.org/10.1080/17517570601088364

Oseni, T., Foster, S., Rahim, M., & Smith, S. P. (2017). A framework for ERP post-implementation amendments: A literature analysis. *Australasian Journal of Information Systems*, *21*. https://doi.org/10.3127/ajis.v21i0.1268

Osnes, K. B., Olsen, J. R., Vassilakopoulou, P., & Hustad, E. (2018). ERP systems in multinational enterprises: A literature review of post-implementation challenges. *Procedia Computer Science*, *138*, 541–548. https://doi.org/10.1016/j.procs.2018.10.074

Pan, K., Nunes, M. B., & Peng, G. C. (2011). Risks affecting ERP post-implementation: Insights from a large Chinese manufacturing group. *Journal of Manufacturing Technology Management*, *22*(1), 107–130. https://doi.org/10.1108/17410381111099833

Peng, G. C., & Nunes, M. B. (2009a). Identification and assessment of risks associated with ERP post-implementation in China. *Journal of Enterprise Information Management*, *22*(5), 587–614. https://doi.org/10.1108/17410390910993554

Peng, G. C., & Nunes, M. B. (2009b). Surfacing ERP exploitation risks through a risk ontology. *Industrial Management and Data Systems*, *109*(7), 926–942. https://doi.org/10.1108/02635570910982283

Ram, J., Corkindale, D., & Wu, M.-L. (2013). Implementation critical success factors (CSFs) for ERP: Do they contribute to implementation success and post-implementation performance? *International Journal of Production Economics*, *144*(1), 157–174. https://doi.org/10.1016/j.ijpe.2013.01.032

Saade, R. G., & Nijher, H. (2016). Critical success factors in enterprise resource planning implementation. *Journal of Enterprise Information Management*, *29*(1), 72–96. https://doi.org/10.1108/JEIM-03-2014-0028

Salih, S. H., Abdelsalam, S., Hamdan, M., Abdelmaboud, A., Hamzah, M., Hilal, A. M., & Motwakel, A. (2022). Critical success factors for ERP systems' post-implementations of SMEs in Saudi Arabia: A top management and vendors' perspective. *IEEE Access*, *10*, 108004–108020. https://doi.org/10.1109/ACCESS.2022.3202954

Salih, S., Abdelsalam, S., Hamdan, M., Ibrahim, A. O., Abulfaraj, A. W., Binzagr, F., Husain, O., & Abdallah, A. E. (2022). The CSFs from the perspective of users in achieving ERP system implementation and post-implementation success: A case of Saudi Arabian food industry. *Sustainability*, *14*(23), 15942. *Switzerland)*, *14*(23. https://doi.org/10.3390/su142315942

Shaul, L., & Tauber, D. (2013). Critical success factors in enterprise resource planning systems: Review of the Last Decade. *ACM Computing Surveys*, *45*(4), 1–39. https://doi.org/10.1145/2501654.2501669

Singh, S., Singh, S., & Misra, S. C. (2022). Post-implementation challenges of ERP system in pharmaceutical companies. *International Journal of Quality and Reliability Management*, *40*(4), 889–921. https://doi.org/10.1108/IJQRM-10-2020-0333

Sommerville, I. (2016). *Software engineering* (*10th* ed.). Pearson Education Limited.

Sun, H., Ni, W., & Lam, R. (2015). A step-by-step performance assessment and improvement method for ERP implementation: Action case studies in Chinese companies. *Computers in Industry*, *68*, 40–52. https://doi.org/10.1016/J.COMPIND.2014.12.005

Vargas, M. A., & Comuzzi, M. (2020). A multi-dimensional model of enterprise resource planning critical success factors. *Enterprise Information Systems*, *14*(1), 38–57. https://doi.org/10.1080/17517575.2019.1678072

Wang, Y., Greasley, A., & Albores, P. (2016). Do manufacturing firms need informality in ERP post-implementation? A study of Chinese manufacturing sites. *Journal of Manufacturing Technology Management*, *27*(1), 100–123. https://doi.org/10.1108/JMTM-09-2015-0077

Wortmann, J. C. (1998). *Evolution of ERP systems, in strategic management of the manufacturing value chain*. Springer US. https://doi.org/10.1007/978-0-387-35321-0_2

Xie, Y., Allen, C., & Ali, M. (2022). Critical success factor based resource allocation in ERP implementation: A nonlinear programming model. *Heliyon*, *8*(8), e10044. https://doi.org/10.1016/J.HELIYON.2022.E10044

Yu, C. S. (2005). Causes influencing the effectiveness of the post-implementation ERP system. *Industrial Management and Data Systems*, *105*(1), 115–132. https://doi.org/10.1108/02635570510575225

Zhu, Y., Li, Y., Wang, W., & Chen, J. (2010). What leads to post-implementation success of ERP? An empirical study of the Chinese retail industry. *International Journal of Information Management*, *30*(3), 265–276. https://doi.org/10.1016/j.ijinfomgt.2009.09.007

Appendix 1

Table A1. Total research papers/articles after rigorous research

ScienceDirect	Emerald	IEEE	Scopus	Taylor&Francis	Total
683	75	23	75	91	947

Table A2. Papers/Articles selected for review

ScienceDirect	Emerald	IEEE	Scopus	Taylor&Francis	Total
4	11	1	7	3	26

Appendix 2

Table A3. CSFs of ERP post-implementation from past studies (2004–2022)

CSF	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21	P22	P23	P24	P25	P26	∑
TMC	x		x						x		x		x					x						x			7
PIT					x			x		x	x			x		x	x			x			x	x		x	11
ICC	x			x							x						x	x	x							x	7
TC	x		x								x	x	x				x	x									7
PM			x											x				x									3
CVS									x			x						x									3
UP				x			x	x				x						x	x						x	x	8
DMC																		x		x							2
ST		x	x										x					x									4
CSI	x	x	x	x		x					x	x	x	x	x		x	x				x					13
UI									x								x			x							3
CM																	x	x			x			x			4
CPI	x															x											2
Meaning Unit																											74

Legend:TMC: Top Management Commitment, PIT: Post Implementation Training, ICC: Interdepartmental Communication and Collaboration, TC: Team Competencies, PM: Project Management, CVS: Consultant Vendor Support, UP: User Participation, DMC: Data Migration and Code Cleansing, ST: System Testing, CSI: Continuous System Integration, UI: User Interface, CM: Change Management, CPI: Continuous Process Improvement.

Appendix 3

Table A4. Distribution of studies' method

Method	Technique used	Number of publications	Total
Quantitative	PLS-SEM (Partial Least Square-Structural Equation Modeling)	7	15
	Regression Linear	2	
	DANP (DEMATEL-based Analytic Network Process)	1	
	Pearson Correlation	1	
	Risk Score	2	
	Exploratory factor analysis (EFA), Confirmatory factor analysis (CFA)	2	
Qualitative	Focus Group Discussion (FGD)	1	10
	Interview	5	
	Case-study	1	
	Desktop study	1	
	Design Science Research (DSR)	2	
Mixed	Survey and Interview	1	1

Appendix 4

Table A5. Frequency analysis of CSFs for ERP post-implementation used in the literature (2004–2022)

CSF	Operational definition	Reference	Frequency (out of 26 articles)	Percent (%)	Ranking
Data migration and code cleansing (DMC)	Process of reviewing, identifying, and rectifying any errors, inconsistencies, or redundancies in the data and code of the implemented ERP system	Barth and Koch (2019); Salih et al. (2022)	2	2,70	Ranked 7
System testing (ST)	Phase of testing that involves evaluating the system's functionality, performance, and reliability to ensure that it meets the intended requirements and functions as expected	Barth and Koch (2019); Peng and Nunes (2009b); Singh et al. (2022); Zhu et al. (2010)	4	5,40	Ranked 5
Continuous process improvement (CPI)	An ongoing effort to enhance and optimize the implemented ERP system and associated business processes	Ha and Ahn (2014); McGinnis and Huang (2007)	2	2,70	Ranked 7
Continuous system integration (CSI)	The practice of regularly and seamlessly integrating updates, enhancements, and modifications into the ERP system to ensure its ongoing functionality, stability, and alignment with business requirements	Barth and Koch (2019); Chou and Chang (2008); Domagała et al. (2021); Ha and Ahn (2014); Hasan et al. (2019); Ifinedo et al., (2010); Pan et al. (2011); Peng and Nunes (2009a, 2009b); Ram et al. 2013; Salih et al. (2022); Singh et al. (2022); Zhu et al. (2010)	13	17,56	Ranked 1

(Continued)

Table A5. (*Continued*)

CSF	Operational definition	Reference	Frequency (out of 26 articles)	Percent (%)	Ranking
User interface (UI)	The graphical interface or the visual presentation through which users interact with the ERP system	Althonayan and Althonayan (2017); Salih et al. (2022); Salih et al. (2022)	3	4,05	Ranked 6
Post-implementation training (PIT)	The activities and processes carried out after the initial training sessions to ensure that users have a solid understanding of the implemented ERP system and possess the necessary knowledge and skills to effectively utilize the system in their day-to-day operations.	Abu Ghazaleh et al. (2019); Althonayan and Althonayan (2017); Goyette et al. (2015); Hasan et al. (2019); McGinnis and Huang (2007); Mullins and Cronan (2021); Nicolaou (2004); Ram et al. (2013); Salih et al. (2022); Salih et al. (2022); Yu (2005))	11	14,86	Ranked 2
Change Management (CM)	Systematic approach and set of strategies implemented to manage the transition and adoption of the newly implemented ERP system within an organization	Althonayan and Althonayan (2017); Barth and Koch (2019); Comuzzi and Parhizkar (2017); Salih et al. (2022)	4	5,40	Ranked 5
Top Management Commitment (TMC)	The active involvement, endorsement, and commitment of senior executives and leaders within an organization in the successful adoption and ongoing use of the implemented ERP system	Althonayan and Althonayan (2017); Barth and Koch (2019); Ha and Ahn (2014); Hasan et al. (2019); Peng and Nunes (2009b); Salih et al. (2022); Zhu et al. (2010)	7	9,45	Ranked 4

(*Continued*)

Table A5. (*Continued*)

CSF	Operational definition	Reference	Frequency (out of 26 articles)	Percent (%)	Ranking
Team competencies (TC)	The knowledge, skills, and capabilities required by the project team members involved in managing and maintaining the ERP system after its implementation	Barth and Koch (2019); Ha and Ahn (2014); Hasan et al. (2019); Pan et al. (2011); Peng and Nunes (2009b); Salih et al. (2022); Zhu et al. (2010)	7	9,45	Ranked 4
Interdepartmental Communication Collaboration (ICC)	the ongoing exchange of information, ideas, and knowledge among stakeholders involved in the ERP system to ensure its successful operation, continuous improvement, and alignment with business goals.	Abu Ghazaleh et al. (2019); Barth and Koch, (2019); Ha and Ahn, (2014); Hasan et al., (2019); Ifinedo et al. (2010); Ju et al. (2016); Salih et al. (2022)	7	9,45	Ranked 4
Project Management (PM)	the ongoing management and coordination of activities related to the ERP system after its initial implementation.	Barth and Koch, (2019); Ram et al., (2013); Zhu et al., (2010)	3	4,05	Ranked 6
Consultant and Vendor Support (CVS)	the involvement of external professionals, consultants, and vendor resources to provide expertise, guidance, and technical assistance in managing and maintaining the ERP system after its implementation.	Barth and Koch, (2019); Peng and Nunes, (2009a); Salih et al. (2022)	3	4,05	Ranked 6
User participation (UP)	refers to the positive behaviors and activities exhibited by users during the systems development process, which aim to enhance the efficiency and effectiveness of ERP system implementation	Abu Ghazaleh et al. (2019); Althonayan and Althonayan, (2017); Barth and Koch, (2019); Ifinedo et al. (2010); Ju et al. (2016); Maas et al. (2018); Mullins and Cronan, (2021); Salih et al. (2022)	8	10,81	Ranked 3

Appendix 5

Table A6. Selected studies

Code	Authors	Title	Database	Quartile	Theoretical Perspective	Methodology
P1	Ha and Ahn (2014)	Factors affecting the performance of Enterprise Resource Planning (ERP) systems in the post-implementation stage	Taylor & Francis	Q1	-	Quantitative
P2	Singh et al. (2022)	Post-implementation challenges of ERP system in pharmaceutical companies	Emerald Insight	Q2	-	Quantitative
P3	Zhu et al. (2010)	What leads to post-implementation success of ERP? An empirical study of the Chinese retail industry	Science Direct	Q1	Technology Organization Environment (TOE)	Quantitative
P4	Ifinedo et al. (2010)	Relationships among ERP post-implementation success constructs: An analysis at the organizational level	Science Direct	Q1	Delone & McLean IS Success Model (ISSM) & Workgroup Impact	Quantitative
P5	Nicolaou (2004)	Quality of postimplementation review for enterprise resource planning systems	Scopus	Q1	-	Qualitative

(*Continued*)

Table A6. (*Continued*)

Code	Authors	Title	Database	Quartile	Theoretical Perspective	Methodology
P6	Peng and Nunes (2009a)	Identification and assessment of risks associated with ERP post-implementation in China	Emerald Insight	Q1	-	Quantitative
P7	Maas et al. (2018)	Post-Implementation ERP Usage: A Longitudinal Study of the Impact of Control and Empowerment	Taylor & Francis	Q1	-	Quantitative
P8	Abu Ghazaleh et al. (2019)	Promoting successful ERP post-implementation: a case study	Emerald Insight	Q2	Technological Frames of Reference (TFR)	Qualitative
P9	Salih et al. (2022)	Critical Success Factors for ERP Systems' Post-Implementations of SMEs in Saudi Arabia: A Top Management and Vendors' Perspective	IEEE Access	Q1	-	Quantitative
P10	Mullins and Cronan (2021)	Enterprise systems knowledge, beliefs, and attitude: A model of informed technology acceptance	Science Direct	Q1	Theory of Planned Behavior (TPB)	Quantitative

(*Continued*)

Table A6. (*Continued*)

Code	Authors	Title	Database	Quartile	Theoretical Perspective	Methodology
P11	Hasan et al. (2019)	Factors affecting post-implementation success of enterprise resource planning systems: a perspective of business process performance	Taylor & Francis	Q1	-	Quantitative
P12	Pan et al. (2011)	Risks affecting ERP post-implementation: Insights from a large Chinese manufacturing group	Emerald Insight	Q1	-	Quantitative
P13	Peng and Nunes (2009b)	Surfacing ERP exploitation risks through a risk ontology	Emerald Insight	Q1	-	Qualitative
P14	Ram et al. (2013)	Implementation critical success factors (CSFs) for ERP: Do they contribute to implementation success and post-implementation performance?	Scopus	Q1	-	Quantitative
P15	Chou and Chang (2008)	The implementation factors that influence the ERP (enterprise resource planning) benefits	Scopus	Q1	-	Quantitative

(*Continued*)

Table A6. (*Continued*)

Code	Authors	Title	Database	Quartile	Theoretical Perspective	Methodology
P16	McGinnis and Huang (2007)	Rethinking ERP success: A new perspective from knowledge management and continuous improvement	Scopus	Q1	-	Qualitative
P17	Salih et al. (2022)	The CSFs from the Perspective of Users in Achieving ERP System Implementation and Post-Implementation Success: A Case of Saudi Arabian Food Industry	Scopus	Q1	-	Quantitative
P18	Barth and Koch (2019)	Critical Success Factors in ERP upgrade projects	Emerald Insight	Q1	-	Qualitative
P19	Ju et al. (2016)	Model of post-implementation user participation within ERP advice network	Science Direct	Q1	-	Quantitative
P20	Yu (2005)	Causes influencing the effectiveness of the post-implementation ERP system	Emerald Insight	Q1	Theory of Planned Behavior (TPB)	Qualitative
P21	Comuzzi and Parhizkar (2017)	A methodology for enterprise systems post-implementation change management	Emerald Insight	Q1	-	Qualitative

(*Continued*)

Table A6. (Continued)

Code	Authors	Title	Database	Quartile	Theoretical Perspective	Methodology
P22	Domagala et al. (2021)	Post-Implementation ERP Software Development: Upgrade or Reimplementation	Scopus	Q2	-	Qualitative
P23	Goyette et al. (2015)	The ERP post-implementation stage: A knowledge transfer challenge	Scopus	Q2	-	Qualitative
P24	Althonayan and Althonayan, (2017)	E-government system evaluation: The case of users' performance using ERP systems in higher education	Emerald Insight	Q2	Delone & McLean IS Success Model (ISSM), Task Technology Fit (TTF), End User Computing Satisfaction (EUCS)	Mixed-method
P25	Eid abd Abbas (2017)	User adaptation and ERP benefits: moderation analysis of user experience with ERP			Adaptive Structuration Theory (AST), Task—Technology Fit (TTF)	Quantitative
P26	Abu Ghazaleh et al. (2019)	Critical internal organization's forces influencing sustainability of post ERP in UAE service industry	Emerald Insight	Q2	Technology-Organization-Environment (TOE)	Quantitative