

## FIRM OPERATIONAL PERFORMANCE AND ERP USAGE: ROLE OF INTERNAL/EXTERNAL, INDIVIDUAL AND ERP FACTORS

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**Abstract:** In the rapidly evolving landscape of modern technology, the convergence of diverse technological advancements is reshaping how ERP systems function and perform. This transformation aims to bolster the utilization of ERP systems, ultimately leading to improved organizational performance. Despite these developments, limited insights are available regarding the factors that both foster ERP system usage and impede organizational performance. Consequently, the present study strives to gain a deeper comprehension of the determinants influencing ERP system utilization, consequently contributing to organizational advancement. Specifically, the study seeks to explore how ERP system usage acts as a mediator within the framework of internal and external factors, individual characteristics, ERP-specific elements, and overall organizational performance. To achieve this objective, survey questionnaires were administered to employees within Saudi Arabian companies, utilizing the convenience sampling technique. The subsequent analysis was conducted using Structural Equation Modelling (SEM) through Amos-16. The study's outcomes highlight the significance of User Support, Top Management Support, IT Expert/Consultant Support, Computer Self Efficacy, and Communication Effectiveness in driving increased ERP system utilization, thereby fostering organizational performance enhancement. The outcomes of this study enrich the existing knowledge base by deepening researchers' comprehension of the various elements that impact both ERP utilization and overall firm performance. Furthermore, the study's findings provide valuable insights for industry practitioners, enabling them to strategically incorporate these factors to optimize ERP usage and consequently enhance firm performance. Notably, the examination of these interrelationships among variables, particularly within the context of Saudi Arabian organizations, remains a relatively underexplored area within the current body of research, based on the researchers' available information.

**Keywords:** User Support, IT Expert/Consultant Support, Computer Self Efficacy, ERP Usage, Firm Operational Performance.

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## 1. Introduction

Despite the extensive implementation of off-the-shelf enterprise systems (ES) in many organisations, the existing literature often highlights instances of ES failures resulting from incompatibilities between the ES and organisational processes. While some misfits may be identified at the early stages of the ES (Enterprise System) lifecycle, others may emerge at a later stage following the implementation and hence require occasional resolution ([Morquin et al., 2023](#)). Enterprise Resource Planning (ERP) is widely recognised as a crucial instrument in contemporary corporate administration. The fundamental principle of this approach entails the division of a company's internal framework into interconnected subsystems, resulting in the perception of business operations as interdependent supply and demand chains that are in alignment with the enterprise's value chain. Enterprises operating within the feed industry have a range of obstacles, including an unfavourable economic environment, increasing costs of raw materials, poor management practises, and limited profit margins. Therefore, it is crucial to prioritise the improvement of management efficiency and competitive advantage. One of the key techniques for efficient management of feed companies involves the implementation of Enterprise Resource Planning (ERP) systems, which provide the seamless integration of various duties like as procurement, sales, financial operations, and other aspects of business administration ([Huang & Huang, 2019](#)).

The complex nature of the corporate environment is compelling organisations to embrace efficient technology as a means to prosper. Enterprise Resource Planning (ERP) or Enterprise Systems (ES) have become indispensable investments for enterprises seeking to thrive and maintain a competitive advantage in the contemporary digitalized landscape. Enterprise systems (ES) are predominantly recognised as computer-based systems that are designed to facilitate the integration of several corporate functions inside a company. These functions often encompass human resources, planning, inventory, marketing, and finance ([Hasan, 2023](#)). From a technical standpoint, the adoption of Enterprise Resource Planning (ERP) poses challenges due to the requirements of configuring, adapting, migrating, and converting data from existing legacy systems ([Barth & Koch, 2019](#)).

Moreover, it is important to note that while there are numerous advantages associated with the implementation of Enterprise Resource Planning (ERP) systems, it is crucial to consider the influence of organisational skills on the relationship between ERP adoption and business performance. Previous research studies have neglected to consider the mediating role of organisational capacities, thereby limiting the understanding of the enhanced value in the association between enterprise resource planning (ERP) adoption and business success ([Elgohary \(2019\)](#)).

## 2. Critical failure factors of ERP Systems

The process of adopting and installing an Enterprise Resource Planning (ERP) system can pose challenges and complexities for firms. There are multiple factors that can impede the utilisation of Enterprise Resource Planning (ERP) systems within a business. It is vital to possess a comprehensive comprehension of the precise meaning of failure prior to delving into the examination of challenges encountered in the deployment of Enterprise Resource Planning (ERP) systems ([Coşkun et al., 2022](#)).

The majority of organisations do not opt to engage the services of a vendor or utilise the same software on many occasions. One of the most common reasons for the failure of ERP deployment is the occurrence of budget overruns. Budget overruns often occur due to a variety of factors, including an expanded scope of work, the introduction of new technology requirements, and unforeseen organisational challenges. Several Enterprise Resource Planning (ERP) installations experienced delays beyond the initially estimated completion time due to issues such as expanded project scope and data-related challenges. Furthermore, another type of failure occurs when organisations fail to fully utilise enterprise resource planning (ERP) technology.

A multitude of theoretical frameworks are commonly employed in a substantial portion of the study pertaining to the implementation of Enterprise Resource Planning (ERP) systems ([Saadé, Nijher, & Sharma, 2017](#)). Previous research has examined the assessment criteria utilised to identify instances of failure in the installation of Enterprise Resource Planning (ERP) systems ([Zhang et al., 2003](#)). Several key issues that contributed to the failure and require resolution include inadequate managerial support, a negative organisational culture, communication challenges, financial management problems, ambiguous project scope, subpar project management, an insufficient project team, incompatible ERP software, underperformance by solution implementers, outdated IT infrastructure, inadequate training, and excessively specialised ERP solutions. The combination of these factors cumulatively contributed to the project's limitations.

The websites and journals of ERP suppliers often feature the dissemination of success stories. Nevertheless, in order to achieve success, it is imperative to thoroughly analyse case studies of failures and extract valuable insights from them. There exists a multitude of case studies that effectively elucidate the negative consequences resulting from failures in Enterprise Resource Planning (ERP) applications, as well as the failures themselves. As an example, Nike incurred a loss of \$100 million in sales due to the selection of an inappropriate Enterprise Resource Planning (ERP) system and the subsequent development of an inefficient supply chain. Hewlett-Packard serves as an additional exemplification. The failure of Hewlett Packard's ERP installation can be attributed to inadequate scope planning and implementation, as well as the utilisation of a big bang strategy instead of a staged strategy. In contrast, Ingram Micro incurred substantial financial losses due to operational challenges arising from the implementation of an Enterprise Resource Planning (ERP) system ([Sivaprasad, 2012](#)).

### **3. Critical Success factors of ERP Systems**

The concept of "critical success factor" pertains to a requisite that must be fulfilled by a project or organisation in order to achieve success ([Pham et al., 2016](#)). In order to maintain company continuity, it is necessary to consistently manage Critical Success Factors (CSF). This management approach encompasses various activity areas, as outlined by [Yeoh and Popovič \(2016\)](#). The utilisation of enterprise resource planning (ERP) solutions is becoming increasingly prevalent among firms as a means to effectively allocate resources and obtain accurate data for sustainable corporate expansion. Enhanced integration of sustainable activities can be achieved through the utilisation of Enterprise Resource Planning (ERP) system technology.

Extensive research has been published on critical success factors (CSFs) pertaining to the adoption of enterprise resource planning (ERP) systems and the various stages

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of ERP deployment. However, there is a noticeable dearth of studies focusing on the examination, allocation of resources, and management of CSFs during the development phase of ERP systems. Our objective is to present empirical and scientific evidence on the direct impacts of the chosen Critical Success Factors (CSFs) on the performance of Enterprise Resource Planning (ERP) implementation. This will be achieved through the integration of an empirical survey and mathematical modelling. [Shanks \(2000\)](#) assert that the adoption of ERP entails the crucial inclusion of resource allocation as a fundamental element.

## 4. Literature Review and Hypotheses

### 4.1 ERP Implementation

Despite the fact that off-the-shelf software is readily available, a considerable percentage of organisations who decide to install an Enterprise Resource Planning (ERP) system chose to customise the software to align with their current business practises instead of modifying their operating techniques. Enterprise Resource Planning (ERP) solutions are software packages that have been standardised based on industry "best practises". Nevertheless, the concept of customization exhibits a dichotomous character. On one hand, it possesses the capacity to augment functionality, elevate user experience, and fulfil the desires of users. On the other hand, it introduces significant risks for businesses, owing to the increased intricacy, escalated costs of implementation, and additional charges for updates. This is underscored by [Hustad & Stensholt's \(2023\)](#) research.

The process of customising an ERP system involves implementing significant modifications at a macro-level in order to meet specific organisational or business requirements. Presently, there exists a prevailing perspective among scholars and professionals that regards the modification of Enterprise Resource Planning (ERP) systems as a double-edged phenomenon. The literature on ERP systems often presents a negative view of customization, perceiving it as a challenging issue that may impede the system's future updates and upgrades over its life cycle ([Hansen, Haddara, & Langseth, 2023](#)).

The objective of this study is to implement Enterprise Resource Planning (ERP) after the careful selection of ERP software and project planning. In doing so, we consider various internal and external factors, such as user support, top management involvement, IT consultants and experts, computer self-efficacy, effective communication, ERP utilisation, and business performance.

### 4.2 User Support

Current endeavours undertaken by academics and developers in the field of information systems are focused on formulating innovative approaches to improve user acceptance, [Akrong, Shao, and Owusu \(2022\)](#) promote the utilisation of Enterprise Resource Planning (ERP) systems, and provide methodology for evaluating the effectiveness of these systems. Therefore, it may be argued that the organisational environment has an impact on the deployment, utilisation, user satisfaction, and overall measurement of success of an Enterprise Resource Planning (ERP) system.

In order to evaluate the efficacy of an Enterprise Resource Planning (ERP) system, several variables must be taken into consideration. These elements encompass information quality, service quality, system quality, system utilisation, and user satisfaction. The study

undertaken by [Nkasu \(2020\)](#) involved a comprehensive examination of the key success factors (CSFs) that influence the adoption of Enterprise Resource Planning (ERP) systems. The results highlight that among the various critical success factors identified, only a specific group of 10 factors have a substantial impact on the effective implementation of an Enterprise Resource Planning (ERP) system. Several key factors contribute to the effectiveness of these initiatives, including well stated objectives, the readiness of learners, and complete training for users. Surprisingly, the aspects of teamwork and composition were ranked fifteenth on the list. [Vargas and Comuzzi \(2020\)](#) assert that the significance of user education and training persists as crucial elements in the adoption of ERP systems.

**H1:** *User Support has positive impact on ERP usage.*

### **4.3 Top Management Support:**

Senior management plays a crucial function in organisations by serving as a fundamental pillar. This is because they are responsible for driving the growth of the organisation through the integration and support of state-of-the-art technology. [Alshamaila, Papagiannidis, and Stamati \(2013\)](#) claim that the presence of senior management support plays a crucial role in establishing a connection between workplace productivity and technological innovation. A multitude of studies have provided evidence for the existence of a beneficial association between the support of senior management and the implementation of sophisticated technologies. Based on the research conducted by [Low, Chen, and Wu \(2011\)](#), the rate and intricacy of technological development play a crucial role in determining its ability to foster an atmosphere conducive to progress. The definition put forth by [Bryde \(2008\)](#) characterizes senior management as "a cohort of individuals occupying the highest authority positions within the organization." These professionals have significant experience in their positions and are characterised by their broad expertise in management and leadership, particularly when making important choices and providing assistance to all employees. The significance of this job is heightened in its facilitation of institutional decision-making and promotion of complete staff assistance. The research conducted by [Mvelase et al. \(2013\)](#) highlights the significance of using cloud computing in enterprises as it enables senior management to reduce labour costs while also improving service scalability, quality, efficiency, and turnaround times. In their study [Bai and Sarkis \(2013\)](#), provide a procedural definition that the researchers embrace, which characterises senior management as the primary coordinator and advocate for internal organisational activities across all functional units inside the institution. This entails their obligation to enhance collaborative work teams, facilitate the delivery of services, and address conflicts and issues faced by personnel inside the organisation. The study conducted by [Al Najjar, Al Shobaki, and El Talla \(2022\)](#) examines the preparedness of senior management and organisational frameworks in Palestinian charitable institutions to adopt and execute cloud computing. This research was published in the International Journal of Academic Information Systems Research (IJAIRS).

**H2:** *Top Management support has positive impact on ERP usage.*

### **4.4 IT Expert/Consultant Support**

In consideration of this issue, [Siek and Urian \(2021\)](#) in his role as a technology consultant, directed his attention towards implementing a knowledge-based expert

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system. The purpose of this system is to offer suitable technical remedies to facilitate ongoing educational activities within academic institutions. Throughout the duration of the study, a series of activities were undertaken with the objective of developing a dependable expert system. The duties encompass the effective utilisation of design knowledge ontologies, the formulation of if-then rules and logical reasoning, the development of the architecture and user interface of an expert system, and several analogous jobs. The development of a knowledge-based expert system has yielded impressive performance and facilitated the automated acquisition of knowledge through machine learning techniques. This expert system, which is grounded in knowledge, has the capability to collaborate with human consultants in order to offer support to those who are actively involved in delivering technology consulting services.

**H3:** *IT expert/consultant has positive impact on ERP usage.*

#### **4.5 Computer Self-Efficacy**

Implementation and effective utilisation of enterprise resource planning (ERP) systems are widely acknowledged as significant and dependable elements that influence computer self-efficacy (CSE). Previous research on computer self-efficacy (CSE) in the context of enterprise resource planning (ERP) has frequently neglected this differentiation, prioritising a comprehensive understanding of CSE as a general computer-related construct rather than examining its specific implications for ERP systems. It is noteworthy to acknowledge that the field of Computer Science and Engineering (CSE) encompasses a broad spectrum of knowledge and skills, encompassing both fundamental computer literacy as well as specialised applications such as Enterprise Resource Planning (ERP). Nevertheless, there exists a dearth of scholarly inquiry about the determinants that exert an influence on CSE specifically within the context of ERP situations. Prior investigations have predominantly focused on exploring the impact of CSE on behaviours associated with ERP, as evidenced by the work of [Arasanmi & Ojo, \(2019\)](#) and [Hasan \(2023\)](#).

Furthermore, a study conducted in 2019 investigated the sequential mediation of computer self-efficacy and transfer motivation in the relationship between social support and training transfer in an ERP post-training scenario. The influence of social support, computer self-efficacy, and transfer motivation on the transfer of ERP training has been discovered. According to [Albashrawi, Turner, and Balasubramanian \(2020\)](#), it was postulated that the determinants of individuals' inclination to adopt mobile ERP encompass service quality, system security, and computer self-efficacy.

**H4:** *Computer self-efficacy is positively associated with ERP usage.*

#### **4.6 Communication Effectiveness for the Organization:**

Effective communication is of utmost importance in organisational settings as it cultivates a sense of unity and collaboration among individuals. It serves as a vital component that contributes to the achievement of objectives in every commercial endeavour. Through the act of communication, individuals are able to develop a shared vision and collaborate in order to synchronise their actions with common goals ([Brinia et al., 2022](#)).

The selection of an appropriate ERP suite is of paramount importance for firms who are either planning to implement an ERP system for their organisational activities

or have already chosen an ERP solution from the software industry. Furthermore, factors such as a high level of dedication from senior executives, efficient project management practises, comprehensive staff training, resilient information technology infrastructure, the involvement of skilled consultants, and the promotion of open and clear communication among all parties involved also play a substantial role in facilitating this process ([Huang, 2010](#)).

The successful implementation of an ERP project requires careful deliberation by management with regards to many supplementary factors. The aforementioned factors involve the formation of a comprehensive team, proficiently managing changes in organisational culture, adapting the managerial approach, cultivating project advocates, delegating decision-making authority, implementing effective communication strategies, enhancing employee motivation, efficiently overseeing the budget, and actively engaging clients in consultations ([Mahar et al., 2020](#)).

**H5:** *Communication effectiveness is positively associated with ERP usage.*

#### **4.7 Impact of ERP usage**

Organisational capabilities are manifested when a company effectively aligns its internal resources in accordance with their inherent value. Within the domain of information technology, the utilisation of enterprise resource planning (ERP) arises as a mechanism to augment these functionalities. According to [Yusuff, Shahzad, and Hassan \(2019\)](#), enterprise resource planning (ERP) is a computer-based integrated system designed to provide comprehensive planning, real-time production operations, and prompt customer replies. The fundamental objective of this system is to optimise corporate transactions and facilitate the integration of planning processes. Enterprise Resource Planning (ERP) systems function as a classification of information systems that possess the capability to consolidate and mechanise several departments inside an organisation, encompassing finance, human resources, logistics, and other areas. Furthermore, these systems play a significant role in the overall management of an organization's resources and, when necessary, can also encompass material resource planning.

Within the context of expansive enterprises, it is customary for information to be dispersed across a multitude of computer systems, as well as numerous departments and units. It is conceivable that many departments, beyond those now possessing the data, may perceive this information as indispensable due to its potential to facilitate different and specific tasks or procedures. The emergence of enterprise resource planning (ERP) systems can be attributed to this particular advancement, as they were designed to facilitate the efficient exchange of information among various departments and functions. Enterprise Resource Planning (ERP) solutions facilitate the integration of information, improve communication, accelerate operational procedures, and ultimately promote productivity. These advantages cumulatively contribute to a net improvement in productivity. These systems facilitate the exchange of information among different departments within an organisation by efficiently offering a thorough, reliable, and trustworthy summary of company operations and undertakings. Accordingly, the decision-making process is improved ([Laudon & Laudon, 2021](#)). Moreover, enterprise resource planning (ERP) functions as the central hub for all organisational processes, information, and activities, enabling individuals and organisations to effectively collect, manage, distribute, and organise

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extensive amounts of data ([Molina-Castillo et al., 2022](#)).

**H6:** ERP usage has positive impact on firm performance.

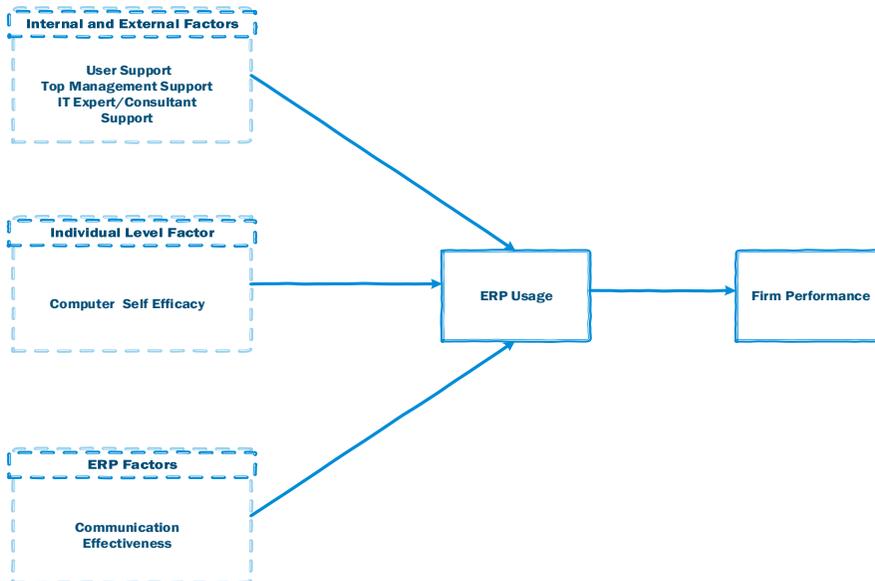


Figure 1: Framework for this Study

## 5. Methodology

### 5.1 Research Instrument

The measurement of the several constructs in the study will be conducted using pre-validated instruments that have been documented in existing literature. The measurement of the components of internal and external support, namely user support, top management support, IT expert/consultant support, computer self-efficacy, communication effectiveness, ERP usage, and firm performance similarity, will be conducted using a 5-point Likert scale. These measures have been adopted from the works of [Ruivo et al. \(2014a\)](#), [Beheshti and Beheshti \(2010\)](#), [Rodrigues, Ruivo, and Oliveira \(2014\)](#), [Kaplan and Norton \(1992\)](#), [Rosario \(2000\)](#), [Teo and Koh \(2010\)](#), [Garg and Garg \(2014\)](#), [Wang and Chen \(2006\)](#), [Lee and Kim \(1992\)](#), [Jiang, Klein, and Means \(2000\)](#), and [Ruivo, Oliveira, and Neto \(2014b\)](#). The measurement of all constructs will be conducted using a 5-point Likert scale. Table 1 below presents the measurement items and statements for each construct, along with their respective sources.

Table.1 Measurement Scales and References

Factors	References
<b>User Support</b>	
“Users are enthusiastic about the project.	<a href="#">Jiang et al. (2000)</a> .
Users are an integral part of the development team.	
Users are available to answer the question.	
Users have a positive opinion about the system.	
Users ready to accept the changes”	
<b>Top Management Support</b>	<a href="#">Lee and</a>

"Top management actively engages in selecting the H/W needed to implement.  
MIS.

[Kim  
\(1992\).](#)

Top management actively engages in recruiting MIS department personnel.  
Top management tries to encourage the user departments to use MIS.  
Top management is much concerned with the performance of MIS operation.  
Top management makes an effort to provide stable funding for systems development and operation activities.  
Top management tries to take part in deciding in what order the information systems should be implemented.  
Top management often emphasizes managing and controlling the tasks for MIS development and operation effectively."

#### **IT Expert/Consultant Support**

"The IT Expert/Consultant treat us with respect.  
The IT Expert/Consultant get adequate support from their firm to do their jobs well.  
The IT Expert/Consultant treat information about us with complete confidentiality.  
The IT Expert/Consultant try to maintain a lasting and trusting relationship with us.  
The IT Expert/Consultant are helpful with advice on ways to reduce our ERP implementation efforts.  
Through training, the IT Expert/Consultant effectively transfer to us their knowledge of ERP implementation and operation.  
The consulting firm closely supervises any consultants when they are doing work for us.  
The IT Expert/Consultant give us personal attention.  
The IT Expert/Consultant really understand my needs.  
The IT Expert/Consultant always have our best interests at heart. When we have a problem, the IT Expert/Consultant are sympathetic and reassuring.  
The IT Expert/Consultant would hesitate to take on one of my competitors as a client.  
The IT Expert/Consultant would make themselves available outside regular office hours if we truly needed them.  
The IT Expert/Consultant work is error-free.  
When IT Expert/Consultant promise to do something by a certain time, they do so.  
The IT Expert/Consultant return phone calls and inquiries promptly.  
The IT Expert/Consultant reply and inform us, within one day, when services will be performed.  
We can trust the IT Expert/Consultant."

[Wang and  
Chen  
\(2006\).](#)

#### **Computer Self Efficacy**

"I am able to use the internet to search for information and resources  
I am able to use word processor to create, edit and format documents for specific purposes. (e.g, Microsoft Word)  
I am able to use Presentation Software (e.g, Microsoft PowerPoint) for classroom delivery  
I am able to use spreadsheet to record data, compute simple calculations and represent data in the form of tables and graphs (e.g, Microsoft Excel)  
I am able to use email (e.g, Hotmail, Outlook, Yahoo, Gmail, and MyEdumail) for communication  
I am able to use website Editors (e.g, Microsoft FrontPage, and Macromedia Dreamweaver) to create and/or modify web pages  
I am able to use video editing software (e.g, Microsoft MovieMaker, Adobe Premier, and Ulead VideoStudio)"  
"I am able to use graphic Editors (e.g, Microsoft Paint, Adobe Photoshop) to create and/or modify resources for teaching  
I am able to use animation software (e.g, Macromedia Flash, Authorware, and Director) to create animations  
I am able to use blogging for personal use. .13 .32 .74 .66 WBS2 I am able to use conferencing Software (e.g, Yahoo, IM, MSN Messenger, ICQ, and Skype) for collaboration  
I am able to use a learning management system (e.g, Blackboard, IVLE, WebCT, and Moodle) to support teaching"

[Teo and  
Koh  
\(2010\).](#)

#### **Communication Effectiveness**

"In the company, it is easy to communicate their acceptance / dissatisfaction with ERP  
In the company, the employees were informed about the structural changes followed by ERP implementation  
The company answers employees' questions regarding the ERP system "

[Garg and  
Garg  
\(2014\);  
Rosario  
\(2000\)](#)

#### **ERP Usage**

"I use the ERP system on daily bases.  
Every day I spend most of the time working with the ERP system.  
I prepare sales order reports using the ERP system.  
I use the ERP system to manage customers data such as new customers, complaint, current customers history etc. "

[Ruivo et  
al.  
\(2014a\)](#)

#### **Firm Performance**

[Beheshti](#)

"The ERP system improves user satisfaction.  
The ERP system improves customer satisfaction.  
The ERP system improves the firm's management control  
The ERP system improves individual productivity.  
The ERP system improves overall productivity.  
The ERP system reduces operational and administrative costs."

[and Beheshti \(2010\); Kaplan and Norton \(1992\); Rodrigues et al. \(2014\).](#)

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## 5.2 Population, Sample and Data Collection Method

The study centred around the personnel of various organisations and enterprises comprising the targeted population. A total of 300 questionnaires were disseminated, and 203 of them were successfully completed and returned for inclusion in the subsequent study. The participants in the study were primarily those who extensively utilised contemporary systems and technology.

Data collection for this study was conducted using the survey approach. A self-administered questionnaire was designed and distributed to a randomly selected group of online social media users through the use of Google Forms. The utilisation of online data collecting facilitates a broader scope of access and enhances the inclusivity of the data collected. The participants were requested to complete the survey instrument. The participants were provided with the guarantee that their answers would remain anonymous and confidential, and would solely be utilised for the purpose of an academic research investigation. The respondents' participation in the study was completely voluntary, indicating that no coercion or pressure was exerted to compel their involvement.

## 5.3 Data Analysis Method

The data that was collected was subjected to analysis utilising statistical software packages such as SPSS and Amos-16. The data underwent an initial cleaning and filtering process using SPSS. This involved examining the data for any missing values and removing any outliers that were identified. Moreover, a descriptive study was conducted, which involved the generation of frequency distribution tables for demographic analysis. In addition to this, the measurement model and structural model of the study were assessed by the utilisation of Amos-16. The evaluation of the measurement model encompasses the utilisation of confirmatory factor analysis, a statistical technique employed to assess the reliability and validity of the measurement instruments. The assessment of reliability is conducted by the utilisation of statistical measures such as Cronbach's alpha, composite reliability, and factor loadings. The assessment of discriminant validity is conducted according to the criteria established by [Fornell and Larcker \(1981\)](#). This involves comparing the square root of the average variance extracted (AVE) for each construct with the correlations between that construct and the other constructs under investigation. The evaluation of the structural model encompasses the utilisation of path analysis through a regression model, wherein the examination of both direct and indirect impacts is conducted.

## 6. Analysis

To evaluate the proposed model and hypothesis, the statistical software SPSS with

Amos-16 was employed. According to [Hair et al., \(2007\)](#), the utilisation of structural equation modelling (SEM) proves advantageous in instances where the objective of the study involves both testing relationships and evaluating the adequacy of the model fit. Hence, as a preliminary step, the measurement model was evaluated in order to examine the validity of each item inside the construct. In a subsequent phase, the structural model was evaluated using known indicators of model fit. It can be seen from Table 2 that all scales show acceptable convergent validity where alpha > 0.5 ([Yusuff et al., 2019](#)) with square covariance > 0.6 ([Hair et al., 2007](#)) which shows appropriate discriminant validity.

*Table 2: Reliability of the Scale*

<b>Name of the Variable</b>	<b>Internal Consistency</b>
User Support	0.790
Top Management Support	0.804
IT Expert/Consultant Support	0.766
Computer Self Efficacy	0.809
Communication Effectiveness	0.799
ERP Usage	0.864
Firm Performance	0.737

The following table displays the model fit indices for the measurement model utilised in the investigation. The observation can be made that all fit indices fall within acceptable ranges, indicating that the measurement model is a suitable fit. Consequently, the study can progress into the examination of the structural model.

### 6.1 Notes for the Model

*Table 3: Computation of Degree of Freedom (Default Model)*

No. of distinct sample moments	1097
No. of distinct parameters to be estimated	233
Df	864

*Table 4: Results (Default Model)*

<b>Minimum was achieved</b>	<b>Score obtained</b>
$\chi^2$	891
Df	203
Probability level	0.05

*Table 5: Measurement Model Fit*

<b>Overall Model Measure</b>	<b>Overall Model Score</b>	<b>Acceptable Model Fit</b>	<b>Acceptable Baseline</b>
CFI	0.92	Achieved	≥0.90
AGFI	0.86	Achieved	≥0.80
RMSEA	0.029	Achieved	<0.10
CMIN/df	2.30	Achieved	<3
TLI	0.94	Achieved	≥0.89
IFI	0.93	Achieved	≥0.90

The structural model's model fit indices are presented in Table 1. The observed fit indices for the structural model are all within the recommended ranges, indicating that the structural model demonstrates a favourable fit.

*Table 6: Structural Model Fit*

Overall Model Measure	Overall Model Score	Acceptable Model Fit	Acceptable Baseline
CFI	0.91	Achieved	≥0.90
AGFI	0.84	Achieved	≥0.80
RMSEA	0.014	Achieved	<0.10
CMIN/df	1.27	Achieved	<3
TLI	0.93	Achieved	≥0.89
IFI	0.92	Achieved	≥0.90

*Table 7: Summary of Effects*

Variables	Direct Effects	Indirect Effects	Total Effects
User Support → ERP Usage	0.378		0.378
Top Management Support → ERP Usage	0.497		0.497
IT Expert/Consultant Support → ERP Usage	0.470		0.470
Computer Self Efficacy → ERP Usage	0.369		0.369
Communication Effectiveness → ERP Usage	0.647		0.647
ERP Usage → Firm Performance	1.240		1.240
User Support → Firm Performance		0.697	0.697
Top Management Support → Firm Performance		0.599	0.599
IT Expert/Consultant Support → Firm Performance		0.697	0.697
Computer Self Efficacy → Firm Performance		0.794	0.794
Communication Effectiveness → Firm Performance		0.881	0.881

Following the assessment of the fit indices of the structural model, the investigation progressed to the step of hypothesis testing. Table 7 presents a comprehensive overview of the hypothesised direct and indirect interactions in the current investigation. It is evident that all components The constituents of internal and external support i.e. (User Support, Top Management Support, IT Expert/Consultant Support), Computer Self Efficacy, Communication Effectiveness and Firm Performance is positively associated with ERP Usage which provides support for H1, H2, H3, H4, H5 and H6 of the study. Table 8 shown below offers a concise overview of the acceptance or rejection outcomes pertaining to all the hypotheses of the study, as per the findings presented in Table 7 above.

*Table 8: Result of Analyses and Hypotheses*

Hypotheses	P-value	t-value	Accept or reject
H1 User Support has positive impact on ERP usage.	0.012	3.57	Accept
H2 Top Management support has positive impact on ERP usage.	0.025	3.99	Accept
H3 IT expert/consultant has positive impact on ERP usage.	0.019	4.67	Accept
H4 Computer self-efficacy is positively associated with ERP usage.	0.013	2.67	Accept
H5 Communication effectiveness is positively associated with ERP usage.	0.027	2.66	Accept
H6 ERP usage has positive impact on firm performance.	0.021	4.97	Accept

p-value <0.05, t-value > 1.96 ([Hair et al., 2007](#)),

## 7. Discussion

The primary objective of this study is to assess the effects and significance of

Enterprise Resource Planning (ERP) implementation within an organisational context. This study aims to analyse the process of adopting and converging existing Enterprise Resource (ER) systems into an Enterprise Resource Planning (ERP) system. In order to achieve this objective, a total of 300 questionnaires were disseminated, and afterwards, 203 fully completed questionnaires were collected and utilised for the purposes of analysis. The study utilised a 5-point Likert scale to measure the various components of internal and external support, namely user support, top management support, IT expert/consultant support, computer self-efficacy, communication effectiveness, ERP usage, and firm performance similarity.

### **7.1 User Support has positive impact on ERP usage.**

The provision of user support is of utmost importance in ensuring the effective adoption and utilisation of enterprise resource planning (ERP) systems. Based on the results obtained from our research, it is evident that user support can exert a beneficial influence on the utilisation of Enterprise Resource Planning (ERP) systems. Enterprise Resource Planning (ERP) systems possess a considerable level of intricacy, characterised by the presence of many modules and functionalities. User support plays a crucial role in facilitating user proficiency by offering extensive training sessions and onboarding programmes aimed at acquainting users with the system. This practise mitigates ambiguity and fosters optimal utilisation of the Enterprise Resource Planning (ERP) system by users. The user support teams have the capability to collaborate with users in order to customise the Enterprise Resource Planning (ERP) system according to their individual requirements, hence improving its usability and applicability. User assistance plays a crucial role in facilitating the acquisition of information and resources necessary for employees to proficiently utilise the Enterprise Resource Planning (ERP) system. Consequently, this phenomenon has a beneficial effect on an organization's operational effectiveness, strategic decision-making processes, and overall competitive advantage.

### **7.2 Top Management support has positive impact on ERP usage.**

When senior executives actively endorse and advocate for the enterprise resource planning (ERP) programme, it effectively communicates to the entire organisation that the system holds significance and is in line with the company's strategic objectives. This leadership establishes the overall atmosphere for employees, encouraging them to approach the execution with a high level of seriousness and commitment. Based on the results obtained from our research, it is evident that the involvement of top management assistance was highly advantageous. This support encompassed the organisation and provision of essential resources such as training, an IT team, conducive work environment, and accessibility measures. The successful execution of ERP implementations typically necessitates substantial financial and human resources. The provision of support from top management guarantees the allocation of essential resources such as budget, staffing, and other necessary resources to the project. This support mitigates the risk of project delays or partial execution caused by limitations in available resources. The utilisation of their authority, top management have the ability to effectively tackle problems, disseminate the advantages of the Enterprise Resource Planning (ERP) system, and foster an environment that encourages receptiveness towards change. The active participation of top-level management in the Enterprise Resource Planning (ERP) project signifies

a dedication to ongoing enhancement. The engagement of stakeholders promotes the continuous assessment of the system's performance and the discovery of potential areas for optimisation.

### **7.3 IT expert/consultant has positive impact on ERP usage.**

Information technology professionals possess the expertise necessary to aid in the identification and selection of an enterprise resource planning (ERP) system that is in accordance with the specific requirements and objectives of a company. Based on the results of our study, it is evident that training plays a crucial role in the successful adoption of new technology. Additionally, it is advisable to have competent technical employees responsible for conducting and organising these training sessions. The evaluators assess a range of solutions, taking into account variables such as scalability, features, and compatibility with pre-existing systems. The proficiency of the individuals involved guarantees a smooth incorporation of the selected Enterprise Resource Planning (ERP) solution into the information technology (IT) framework of the firm. The provision of training by IT consultants to end-users on the optimal utilisation of the Enterprise Resource Planning (ERP) system is a common practise. The organisation provides assistance in the areas of navigation, data entry, and troubleshooting, so enabling staff to effectively operate the system. Information technology professionals possess the requisite expertise to properly oversee the entirety of an enterprise resource planning (ERP) implementation endeavour. Their responsibilities encompass assuring adherence to established schedules, efficient allocation of resources, and effective mitigation of potential hazards. The engagement of information technology (IT) professionals or consultants is necessary for the effective deployment and utilisation of enterprise resource planning (ERP) systems. The individual's proficiency in technical matters, astute understanding of strategic concepts, and adeptness in problem-solving play a crucial role in facilitating the system's optimal performance, enhancing operational efficacy, and ultimately ensuring the organization's overall success.

### **7.4 Computer self-efficacy is positively associated with ERP usage.**

Computer self-efficacy pertains to an individual's confidence in their capacity to proficiently utilise computers and associated technology. Individuals who possess a higher level of computer self-efficacy are more likely to experience a greater sense of confidence when engaging with intricate systems such as Enterprise Resource Planning (ERP). Based on the results obtained from our study, it was observed that the employees exhibited a significant level of motivation and enthusiasm towards the exploration and acquisition of knowledge pertaining to novel aspects of Enterprise Resource Planning (ERP) systems. This sense of confidence motivates individuals to engage in the exploration of the various aspects of the system, conduct experiments with new features, and utilise the enterprise resource planning (ERP) system to a greater extent. Individuals with high computer self-efficacy tend to have reduced levels of anxiety during technology usage. Individuals who possess a high level of computer self-efficacy exhibit a tendency to hold a favourable perspective towards technology. The positive opinion of the ERP system contributes to a more favourable attitude towards its adoption, hence promoting its utilisation and mitigating opposition towards the implementation of new technology. The impact of computer self-efficacy on individuals' attitudes and behaviours towards enterprise resource planning (ERP) systems is substantial. Increased levels of computer self-efficacy are

associated with enhanced confidence, engagement, and effectiveness in utilising the Enterprise Resource Planning (ERP) system. Consequently, this leads to improved outcomes for both people and the organisation as a collective entity.

### **7.5 Communication effectiveness is positively associated with ERP usage.**

The successful execution of effective communication strategies guarantees that users are provided with unambiguous instructions and comprehensive information pertaining to the use of the Enterprise Resource Planning (ERP) system. The enhanced clarity of the system minimises ambiguity and enables users to effectively traverse the system with a sense of assurance. Based on the results obtained from our research, it was observed that the management's endorsement and effective communication of assistance from both IT consultants and employees contributed to the seamless handling of the chain. The establishment of a culture that promotes effective communication entails fostering an environment where users are encouraged to offer input regarding the Enterprise Resource Planning (ERP) system. The aforementioned feedback loop serves the purpose of identifying areas that require improvement, addressing user complaints, and implementing appropriate adjustments to optimise usage. The promotion of transparency in the utilisation of the ERP system is facilitated by effective communication. When individuals possess a comprehensive understanding of how their contributions influence the organisation and its processes, they tend to exhibit a higher level of accountability for their activities within the system. The efficacy of communication plays a pivotal role in facilitating the successful use of Enterprise Resource Planning (ERP) systems. Effective and timely communication has a crucial role in enhancing user confidence, fostering participation, promoting collaboration, and ultimately increasing overall satisfaction with the system. These positive effects, in turn, lead to better organisational efficiency and the attainment of desired goals.

### **7.6 ERP usage has positive impact on firm performance.**

The utilisation of Enterprise Resource Planning (ERP) systems has been found to have a favourable influence on the overall performance of organisations. Based on the results of our study, the adoption and utilisation of ERP systems were widely embraced and received positive recognition. The implementation and efficient utilisation of an Enterprise Resource Planning (ERP) system can yield a range of advantages that enhance the overall performance of a corporation. The utilisation of RP has been found to have a favourable influence on the performance of firms through the augmentation of operational efficiency, improvement in data accuracy, facilitation of decision-making processes, and enhancement of overall company effectiveness. When properly installed and efficiently managed, Enterprise Resource Planning (ERP) systems have been found to enhance the competitiveness, profitability, and growth of firms.

## **Implications**

Many studies have been conducted on the adoption of Enterprise Resource Planning (ERP) systems, although a comprehensive examination of all perspectives has not been consistently undertaken in the majority of these research. This study encompassed the perspective of employees as end-users and examined the participation of higher authorities. The recruitment of the IT team is intended to

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facilitate employee training and assess their computer abilities and expertise inside the organisation. Furthermore, an evaluation and analysis of the firm's performance was conducted to demonstrate the direct correlation between all the aforementioned aspects. The methodology that has been proposed comprehensively addresses all the dimensions pertaining to business performance subsequent to the implementation of Enterprise Resource Planning (ERP) systems. Furthermore, the incorporation of similarity as a factor in assessing source trustworthiness has not been explored in prior research. As a result, this current study makes a valuable contribution to the existing body of literature by examining the impact of similarity on the utilisation of ERP (Enterprise Resource Planning) systems.

This study provides various relevant learning points that may be applied by marketers and practitioners. This research presents empirical findings on the implementation and acceptance of enterprise resource planning (ERP) systems. ERP systems encompass the integration of a comprehensive software solution that consolidates and automates many business tasks and procedures inside an organisation. Enterprise Resource Planning (ERP) solutions are specifically engineered to streamline the exchange of information among various organisational departments, enhance the precision of data, and optimise overall operational effectiveness.

#### **Limitations and Future Research Directions**

In conclusion, the domain of enterprise resource planning (ERP) installation and adoption is continuously progressing, presenting a multitude of study prospects to tackle constraints and augment the efficiency of these systems. Future research should aim to produce novel solutions that effectively tackle practical difficulties, take into account the ever-changing technical environment, and make significant contributions to the overall success of organisations' Enterprise Resource Planning (ERP) activities. The process of data migration might provide challenges, primarily stemming from the variable quality of the data and the difficulty of mapping data from legacy systems to the new enterprise resource planning (ERP) framework.

Future research might potentially prioritise the investigation of data migration best practises, data cleansing procedures, and the development of automated technologies aimed at ensuring the accuracy and efficiency of data movement processes. The potential utilisation of blockchain and data integration technologies warrants investigation as a means to augment the trustworthiness of data. The proliferation of cloud-based enterprise resource planning (ERP) systems has given rise to apprehensions over the security, privacy, and compliance of data.

Future research could focus on the development of effective security measures for cloud-based enterprise resource planning (ERP) applications. This may involve exploring many aspects such as encryption techniques, access control mechanisms, and compliance frameworks. The investigation of hybrid cloud and on-premises solutions for industries with sensitive data holds potential value.

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## References

- Akrong, G. B., Shao, Y., & Owusu, E. (2022). Evaluation of organizational climate factors on tax administration enterprise resource planning (ERP) system. *Heliyon*, 8(6), E09642. <https://doi.org/10.1016/j.heliyon.2022.e09642>
- Al Najjar, M. T., Al Shobaki, M. J., & El Talla, S. A. (2022). Supporting Senior Management and the Readiness of the Organizational Structure in Palestinian Charitable Institutions to Adopt and Implement Cloud Computing. *International Journal of Academic Information Systems Research (IJAISR)*, 6(3), 1-17. <https://dx.doi.org/10.2139/ssrn.4073207>
- Albashrawi, M. A., Turner, L., & Balasubramanian, S. (2020). Adoption of mobile ERP in educational environment: computer self-efficacy and system security. *International Journal of Enterprise Information Systems (IJEIS)*, 16(4), 184-200. <https://doi.org/10.4018/IJEIS.2020100109>
- Alshamaila, Y., Papagiannidis, S., & Stamati, T. (2013). Cloud computing adoption in Greece. *UK Academy for Information Systems Conference Proceedings 2013*, 5. <https://aisel.aisnet.org/ukais2013/5>
- Arasanmi, C. N., & Ojo, A. O. (2019). Social support, computer self-efficacy, transfer motivation and ERP training transfer. *International Journal of Enterprise Information Systems (IJEIS)*, 15(2), 1-14. <https://doi.org/10.4018/IJEIS.2019040101>
- Bai, C., & Sarkis, J. (2013). A grey-based DEMATEL model for evaluating business process management critical success factors. *International Journal of Production Economics*, 146(1), 281-292. <https://doi.org/10.1016/j.ijpe.2013.07.011>
- Barth, C., & Koch, S. (2019). Critical success factors in ERP upgrade projects. *Industrial Management & Data Systems*, 119(3), 656-675. <https://doi.org/10.1108/IMDS-01-2018-0016>
- Beheshti, H. M., & Beheshti, C. M. (2010). Improving productivity and firm performance with enterprise resource planning. *Enterprise Information Systems*, 4(4), 445-472. <https://doi.org/10.1080/17517575.2010.511276>
- Brinia, V., Selimi, P., Dimos, A., & Kondea, A. (2022). The impact of communication on the effectiveness of educational organizations. *Education Sciences*, 12(3), 170. <https://doi.org/10.3390/educsci12030170>
- Bryde, D. (2008). Perceptions of the impact of project sponsorship practices on project success. *International journal of project management*, 26(8), 800-809. <https://doi.org/10.1016/j.ijproman.2007.12.001>
- Coşkun, E., Gezici, B., Aydos, M., Tarhan, A. K., & Garousi, V. (2022). ERP failure: A systematic mapping of the literature. *Data & Knowledge Engineering*, 142, 102090. <https://doi.org/10.1016/j.datak.2022.102090>
- Elgohary, E. (2019). The role of ERP capabilities in achieving competitive advantage: An empirical study on Dakahlia Governorate companies, Egypt. *The Electronic Journal of Information Systems in Developing Countries*, 85(4), e12085. <https://doi.org/10.1002/isd2.12085>
- Fornell, C., & Larcker, D. F. (1981). Structural equation models with unobservable variables and measurement error: Algebra and statistics. *Journal of Marketing Research*, 18(3), 382-388. <https://doi.org/10.1177/002224378101800313>
- Garg, P., & Garg, A. (2014). Factors influencing ERP implementation in retail sector: an empirical study from India. *Journal of Enterprise Information Management*, 27(4), 424-448. <https://doi.org/10.1108/JEIM-06-2012-0028>
- Hair, J. F., Money, A. H., Samouel, P., & Page, M. (2007). Research methods for business. *Education+ Training*, 49(4), 336-337. <https://doi.org/10.1108/et.2007.49.4.336.2>

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Hansen, H. F., Haddara, M., & Langseth, M. (2023). Investigating ERP System Customization: A Focus on Cloud-ERP. *Procedia Computer Science*, 219, 915-923. <https://doi.org/10.1016/j.procs.2023.01.367>

Hasan, B. (2023). An Empirical Investigation of ERP System Self-Efficacy Beliefs: Examining the Effects of ERP System Characteristics. *Journal of Information & Knowledge Management*, 22(3), 2350001. <https://doi.org/10.1142/S0219649223500016>

Huang, Y., & Huang, Y. (2019). Informatization design of raw material purchase and payment for feed processing enterprises under ERP system environment. *Concurrency and computation: practice and experience*, 31(10), e4941. <https://doi.org/10.1002/cpe.4941>

Huang, Z. (2010). A compilation research of ERP implementation critical success factors. *Issues in Information systems*, 11(1), 507-512. [https://doi.org/10.48009/1\\_iis\\_2010\\_507-512](https://doi.org/10.48009/1_iis_2010_507-512)

Hustad, E., & Stensholt, J. (2023). Customizing ERP-systems: A framework to support the decision-making process. *Procedia Computer Science*, 219, 789-796. <https://doi.org/10.1016/j.procs.2023.01.352>

Jiang, J. J., Klein, G., & Means, T. L. (2000). Project risk impact on software development team performance. *Project Management Journal*, 31(4), 19-26. <https://doi.org/10.1177/875697280003100404>

Kaplan, R. S., & Norton, D. P. (1992). The balanced scorecard measures that drive performance. *Harvard Business Review*, 70(1), 71-79. <https://pubmed.ncbi.nlm.nih.gov/10119714>

Laudon, K. C., & Laudon, J. P. (2021). *Management information systems: Managing the digital firm*. Pearson Educación.

Lee, J., & Kim, S.-h. (1992). The relationship between procedural formalization in MIS development and MIS success: A contingent analysis. *Information & Management*, 22(2), 89-111. [https://doi.org/10.1016/0378-7206\(92\)90064-M](https://doi.org/10.1016/0378-7206(92)90064-M)

Low, C., Chen, Y., & Wu, M. (2011). Understanding the determinants of cloud computing adoption. *Industrial Management & Data Systems*, 111(7), 1006-1023. <https://doi.org/10.1108/026355711111161262>

Mahar, F., Ali, S. I., Jumani, A. K., & Khan, M. O. (2020). ERP system implementation: planning, management, and administrative issues. *Indian Journal of Science and Technology*, 13(01), 1-22. <https://dx.doi.org/10.17485/ijst/2020/v13i01/148982>

Molina-Castillo, F.-J., Rodríguez, R., López-Nicolas, C., & Bouwman, H. (2022). The role of ERP in business model innovation: Impetus or impediment. *Digital Business*, 2(2), 100024. <https://doi.org/10.1016/j.digbus.2022.100024>

Morquin, D., Ologeanu-Taddei, R., Paré, G., & Wagner, G. (2023). A method for resolving organisation-enterprise system misfits: An action research study in a pluralistic organisation. *Information Systems Journal*, 33(5), 995-1028. <https://doi.org/10.1111/isj.12433>

Mvelase, P. S., Dlamini, I. Z., Sithole, H. M., & Dlodlo, N. (2013). Towards a government public cloud model: The case of South Africa. In *International Conferences on High Performance Computing* (pp. 149-156). <http://researchspace.csir.co.za/dspace/handle/10204/6849>

Nkasu, M. M. (2020). Investigation of the effects of critical success factors on enterprise resource planning (ERP) systems implementation in the United Arab Emirates. In *Smart Intelligent Computing and Applications: Proceedings of the Third International Conference on Smart Computing and Informatics, Volume 1* (pp. 611-623). Springer. [https://doi.org/10.1007/978-981-13-9282-5\\_58](https://doi.org/10.1007/978-981-13-9282-5_58)

Pham, Q. T., Mai, T. K., Misra, S., Crawford, B., & Soto, R. (2016). Critical success factors for implementing business intelligence system: Empirical study in vietnam. In *Computational Science and Its Applications—ICCSA 2016: 16th International Conference, Beijing, China, July 4-7, 2016, Proceedings, Part V* 16 (pp. 567-584). Springer. [https://doi.org/10.1007/978-3-319-42092-9\\_43](https://doi.org/10.1007/978-3-319-42092-9_43)

Rodrigues, J., Ruivo, P., & Oliveira, T. (2014). Software as a Service Value and Firm Performance—a literature review synthesis in Small and Medium Enterprises. *Procedia Technology*, 16, 206-211. <https://doi.org/10.1016/j.protcy.2014.10.085>

Rosario, J. G. (2000). On the leading edge: critical success factors in ERP implementation projects. *Business World*, 17, 15-29.

Ruivo, P., Oliveira, T., Johansson, B., & Neto, M. (2014a). Empirical study on differences and similarities in ERP usage amongst European SMEs. In *Information Systems for Small and Medium-sized Enterprises: State of Art of IS Research in SMEs* (pp. 199-212). Springer, Berlin, Heidelberg. [https://doi.org/10.1007/978-3-642-38244-4\\_10](https://doi.org/10.1007/978-3-642-38244-4_10)

Ruivo, P., Oliveira, T., & Neto, M. (2014b). Examine ERP post-implementation stages of use and value: Empirical evidence from Portuguese SMEs. *International journal of accounting information systems*, 15(2), 166-184. <https://doi.org/10.1016/j.accinf.2014.01.002>

Saadé, R. G., Nijher, H., & Sharma, M. (2017). Why ERP implementations fail—A grounded research study. In *Proceedings of the Informing Science and Information Technology Education Conference, Vietnam* (pp. 191-200). Santa Rosa, CA: Informing Science Institute. <https://doi.org/10.28945/3762>

Shanks, G. (2000). A model of ERP project implementation. *Journal of information Technology*, 15(4), 289-303. <https://doi.org/10.1080/02683960010009051>

Siek, M., & Urian, T. W. (2021). Converging on mutual harmony of knowledge-based expert system and technology consultant. *IOP Conference Series: Earth and Environmental Science*, 729(1), 012131. <https://doi.org/10.1088/1755-1315/729/1/012131>

Sivaprasad, R. (2012). Demystifying ERP implementation failures. *The Management Accountant Journal*, 47(12), 1413-1421. <https://nelumbo-bis.org/index.php/maj/article/view/78666>

Teo, T., & Koh, J. H. L. (2010). Assessing the dimensionality of computer self-efficacy among pre-service teachers in Singapore: A structural equation modeling approach. *International Journal of Education and Development using ICT*, 6(3), 7-18. <https://www.learnstechlib.org/p/42385>

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, E. T., & Chen, J. H. (2006). Effects of internal support and consultant quality on the consulting process and ERP system quality. *Decision support systems*, 42(2), 1029-1041. <https://doi.org/10.1016/j.dss.2005.08.005>

Yeoh, W., & Popovič, A. (2016). Extending the understanding of critical success factors for implementing business intelligence systems. *Journal of the Association for Information Science and Technology*, 67(1), 134-147. <https://doi.org/10.1002/asi.23366>

Yusuff, A. A., Shahzad, A., & Hassan, S. (2019). Factors affecting enterprise resource planning adoption on firms' performance among medium-sized enterprises. *International Journal of Supply Chain Management (IJSCM)*, 8(1), 142-149. <https://doi.org/10.1177/002224378101800313>

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