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Benefits and Challenges of ERP Implementation in Higher Education Institutions: A Systematic Literature Review

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Abstract

This study aims to identify the benefits and challenges of Enterprise Resource Planning (ERP) implementation in higher education institutions through a Systematic Literature Review (SLR). Based on the analysis of 37 relevant articles, the findings show that ERP implementation provides significant benefits, such as reducing operational costs, increasing efficiency, and enhancing decision-making. However, challenges such as system complexity, resistance to change, and technological infrastructure limitations remain major obstacles. To address these challenges, increased training, coordination, and management support are required, along with adequate budget allocation. The findings of this study are expected to provide higher education management with insights into the importance of thorough planning in ERP implementation to achieve successful outcomes.

Keywords: Systematic Literature Review; Enterprise Resource Planning; Education Institution; Benefit; Challenges.

1. Introduction

In the modern business and organizational world, Enterprise Resource Planning (ERP) is not just a tool for automating business processes but also a strategic approach that integrates all functions and departments into a unified information system. ERP enables companies to efficiently manage their resources, enhance productivity, and respond more adaptively to market changes (Soliman and Karia, 2015a; Erwanto and Zusi, 2020; Shatat and Al Burtamani, 2019).

Specifically, ERP consists of various integrated application modules designed to consolidate diverse business processes and functions into a centralized database. This includes integrating multiple information systems operating at various management levels, allowing organizations to conduct better data analysis and improve their operational efficiency (Soliman *et al.*, 2019; Dewi and Asriani, 2019). The primary goal of ERP implementation is to increase productivity, service quality, and competitiveness in the global market (Bamufleh *et al.*, 2021; Abdel-Haq, 2020; Elhasnaoui, 2021).

In the context of higher education, where institutions face increasing pressure to enhance administrative efficiency and service delivery to students and staff, the adoption of ERP has become a solution to meet these challenges (Almigheerbi *et al.*, 2020a; Soliman and Noorliza, 2021). ERP systems in higher education typically involve integrating data on students, academic and non-academic staff, financial transactions, as well as document management and other registration processes (Shatat and Al Burtamani, 2019).

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Despite numerous studies highlighting the benefits of ERP, such as improved information accuracy, better data analysis, and enhanced organizational efficiency (Soliman and Noorliza, 2021; Soliman and Noorliza, 2022), many universities have yet to adopt this technology (Anggraeni and Andini, 2017; Buanawati *et al.*, 2019).

As of this writing, the researcher has not found specific articles summarizing the benefits and challenges of ERP implementation in higher education. This study aims to compile a summary of the benefits and challenges of ERP implementation in universities and provide guidance on strategies to address these challenges through a Systematic Literature Review (SLR) based on case studies from various higher education institutions. The article is structured into several sections: introduction, theoretical basis covering the general understanding of ERP and its relevance in higher education, and a discussion section that will comprehensively summarize the benefits and challenges revealed in the literature. The goal is to provide comprehensive insights to top management in universities before deciding on ERP implementation.

2. Theory

2.1. Enterprise Resource Planning (ERP)

Enterprise Resource Planning, known as ERP, is not just an information technology innovation designed to automate the business processes of companies or organizations (Soliman and Karia, 2015a; Erwanto and Zusi, 2020). Beyond that, ERP is a software package widely implemented by various

companies to integrate all functional units and departments into a unified information system that can meet all the operational needs of the company or organization (Shatat and Al Burtamani, 2019). There are various reasons or motives why many companies adopt and implement ERP. At least four main motives are driving the adoption and implementation of ERP: integration, processes, decision-making, and complexity resolution (Huang *et al.*, 2023; Wibowo *et al.*, 2021).

Specifically, ERP consists of various integrated software application modules aimed at integrating all business processes and functions into a centralized database (Soliman *et al.*, 2019). This includes integrating various information systems that perform different functions and are at different management levels (Dewi and Asriani, 2019). The primary goal of ERP implementation is to enhance the productivity, quality, and competitiveness of the organization (Bamufleh *et al.*, 2021; Abdel-Haq, 2020). By providing better and comprehensive data analysis, as well as improving organizational performance and efficiency through enhanced processes, ERP provides advantages that enable an organization to become more competitive in the market (Soliman and Karia, 2015a; Elhasnaoui, 2021).

2.2. Enterprise Resource Planning (ERP) in the Higher Education Sector

Education institutions are one of the critical sectors that require significant information technology development (Almigheerbi *et al.*, 2020a). Higher education also faces an urgent need for the adoption of modern technology to remain competitive (Soliman and Noorliza, 2021). Higher education serves not only as an educational institution but also handles various aspects related to academics and student affairs, resources, collaboration, business, research, and innovation.

ERP systems in higher education essentially assist the entire academic community in handling various business processes, with a primary focus on student administration, human resources management, and finance. They enhance information accessibility and enable real-time data transfer between processes (Madi *et al.*, 2022). ERP systems can be considered one of the most crucial support tools in providing quality services to the entire academic community in higher education (Soliman and Noorliza, 2022).

Many reasons are driving higher education to adopt ERP systems, such as global trends post-COVID-19 pandemic, which necessitate higher education institutions to adapt to digital transformation in all operational aspects (Lamey *et al.*, 2023). Government directives also play a role in guiding higher education to meet education quality requirements and academic accreditation standards (Abdel-Haq, 2020).

However, despite the perceived benefits of ERP systems in enhancing the quality of services in higher education, many institutions find them difficult and costly to implement (Madi *et al.*, 2022; Soliman and Noorliza, 2021). The failure rate of ERP system implementations in higher education worldwide is much higher than in other sectors, such as banking or manufacturing, with approximately 60% - 80% of ERP projects failing to deliver the expected results (Bamufleh *et al.*, 2021). The rapid development of information technology places higher education in intense competition, but at the same time, faces constraints in obtaining financing that often lead to rejections (Soliman and Karia, 2015a).

The proper implementation of ERP systems will result in better coordination between units and enable better decision-making (Hermanto, 2020). In one study, it was concluded that ERP systems take more than 2 years to be felt beneficial by top management (Cataldo *et al.*, 2022). Therefore, before deciding to implement ERP systems, a well-thought-out plan and strong commitment from top management are required to achieve the success and effectiveness of ERP system implementation (Madi *et al.*, 2022).

3. Method

This research adopts the systematic literature review (SLR) method, which consists of three main stages: planning, execution, and reporting (Butarbutar *et al.*, 2023). In the planning stage, emphasis is placed on determining the research questions or research questions (RQ) for the SLR. In this stage, two questions related to the implementation of ERP in universities are formulated by the author, including:

RQ1: What are the benefits of implementing ERP in universities?
RQ2: What are the challenges faced by universities when implementing ERP?
RQ3: How to overcome the challenges faced by universities when implementing ERP?

Next, during the implementation phase, the researcher conducted a search for articles in various digital libraries such as Scopus, ScienceDirect, Springer Link, and Google Scholar using the keywords "Enterprise Resource Planning", “Implementation”, and "Higher Education Institution" within the time frame of 2015 - 2024. Based on the main keywords, the article search was then performed using the advanced search method with the query (“ERP” OR “Enterprise Resource Planning”) AND (“Implementation”) AND (“Education” OR “Education Institution”). The next step involved extracting articles based on predefined criteria and research questions, focusing on the title and abstract, and had to meet the following criteria:

1) Articles must be written in English or Indonesian;
2) Articles must be “open access”;
3) Limited to articles only;

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4) The abstract must explicitly explain the benefits or challenges faced in the implementation of ERP systems.

Following that, in the reporting stage, all findings related to the benefits and challenges of implementing ERP in universities were recorded, and conclusions were presented in the next section. In summary, the stages of this SLR can be seen briefly in Figure 1.

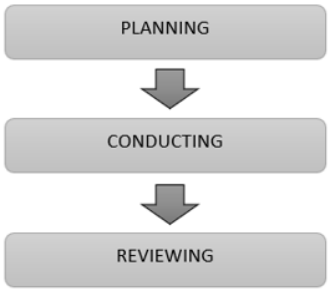


Figure 1. Stages of Systematic Literature Review
Source: create by author

4. Result and Discussion

4.1. Result

After completing the planning and implementation stages, a total of 37 articles were found to answer the research questions. Subsequently, key statements deemed significant in the articles were noted, including points related to benefits and challenges. The recorded information was then compiled into notes, which were summarized and explained in the following section.

The process of searching and extracting articles can be briefly seen in Figure 2. below:

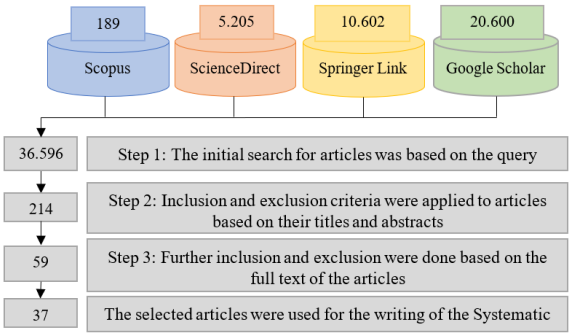


Figure 2. Stages of Article Search
Source: create by author

Table 1. below summarizes the 37 articles used as the primary sources in writing this paper. The table includes the ERP models used, the implementation locations, and the outcomes of their application in various higher education institutions. The analysis covers both the successes and failures of ERP implementation, providing a comprehensive overview of the benefits gained as well as the challenges faced by different institutions.

Table 1. Article Details

No	Authors	ERP model used	ERP implementation location	ERP implementation results
1	(Almigheerbi *et al.*, 2020a)	The model used is Collaboratively-Developed Enterprise Resource Planning (CD-ERP), which combines ERP principles with community resources. CD-ERP is a software model that sits between open-source and closed systems, where administrative and development costs are shared among the universities in Libya under the Ministry of Higher Education.	Public universities in Libya under the Ministry of Higher Education	The ERP implementation is considered successful in terms of improving efficiency, reducing costs, and providing a more reliable system compared to building one from scratch. However, several challenges remain, particularly in the areas of administration and coordination between universities.
2	(Soliman and Noorliza, 2022)	The specific ERP model used is not clearly stated. The ERP system is implemented to integrate various processes across higher education institutions (HEIs) to enhance efficiency and effectiveness, including data management and campus operations.	A survey was conducted involving 112 higher education institutions in Egypt.	The results of ERP implementation in Egyptian higher education show that institutions generally have a positive perception of ERP and its benefits. However, the success rate is only around 42%, indicating significant challenges, particularly related to technological complexity and security issues.
3	(Lamey *et al.*, 2023)	The ERP model used is Enterprise Resource Planning (ERP) based on Enterprise Architecture (EA) as a key guide in selecting the right solution. The article also mentions the use of a specific reference model for higher education, called Smart University Reference Architecture (SURA).	ERP was implemented at ABC University in Egypt.	The ERP implementation at ABC University was considered successful. The selection of ERP was based on careful analysis using critical criteria and evaluation based on EA. The chosen ERP was able to support the university's digital transformation and improve operational efficiency and information flow.
4	(Abdel-Haq, 2020)	The ERP model used in this article is a module specifically designed to meet the quality assurance and academic accreditation needs of higher education	Dar Al Uloom University in Riyadh, Saudi Arabia.	The ERP implementation in this study was considered successful. The system facilitated data collection, generated the necessary reports for

No	Authors	ERP model used	ERP implementation location	ERP implementation results
		institutions. The system proposes a Quality Assurance and Accreditation Module (QAAM) as part of the existing ERP to support data collection and performance indicators related to accreditation.		accreditation, and provided tools for decision-makers to plan improvements.
5	(Huang *et al.*, 2023)	The ERP model used is Cloud-based ERP, provided through a Software-as-a-Service (SaaS) model. The system was adopted to enhance flexibility and efficiency in resource management at the university through cloud infrastructure, allowing access to data and processes from anywhere.	University X (U1), Australia	The ERP implementation was deemed successful, though some challenges were encountered during implementation. The system improved accessibility, reduced IT costs, and allowed operational flexibility, as expected from adopting cloud-based ERP.
6	(Soliman and Noorliza, 2021)	The specific ERP model used is not clearly stated. The ERP serves as an integration tool to improve operational efficiency and competitiveness in higher education institutions (HEIs). The model is adopted to unify various business processes and provide the information needed for better decision-making.	ERP was implemented in higher education institutions in Egypt. The study involved 112 higher education institutions in Egypt, most of which have not fully adopted ERP systems.	The ERP implementation in Egypt is still in its early stages. Many institutions recognize the value of ERP but have yet to fully adopt the system. Some institutions have shown a positive attitude toward ERP adoption, but most are still hesitant to implement it.
7	(Madi *et al.*, 2022)	The specific ERP model used is not clearly stated. ERP was implemented to automate processes such as human resource management, finance, and administrative services in higher education institutions (HEIs). The article identifies critical success factors (CSFs) for ERP implementation in higher education.	ERP was implemented in three public higher education institutions in Jordan. The study used semi-structured interviews with technicians and managers from the three institutions.	The ERP implementation in Jordan was generally successful, though some challenges were encountered during the process. One major challenge was the initial rejection of the ERP system, which was deemed unsuitable for the institution's needs.
8	(Shatat and Al Burtamani, 2019)	The specific ERP model used is not clearly stated. The ERP includes three core modules: Students Information System (SIS), Financial Management System (FIS), and Human Resource System (HRS).	Sohar University, Oman.	The ERP implementation at Sohar University was partially successful. The SIS and FIS modules significantly contributed to the university's academic performance, while the HRS module did not have a meaningful impact.
9	(Omar, 2020)	The specific ERP model used is not clearly stated. The ERP discussion focuses on the social impact of its implementation in higher education institutions. The ERP implementation involves systems such as Customer Relationship Management (CRM) and modules for university administration management.	King Saud University and Prince Sattam Bin Abdulaziz University, Saudi Arabia.	The ERP implementation at these universities was technically successful but faced significant challenges regarding its social impact on employees and the work environment.
10	(Bamufleh *et al.*, 2021)	The ERP model used in this study is PeopleSoft, a major ERP provider designed to integrate business processes and information in higher education institutions (HEIs). The study focuses on the adoption of PeopleSoft by academic and administrative staff.	Yanbu University College (YUC), located in Yanbu, Saudi Arabia.	The PeopleSoft ERP implementation at Yanbu University College was not entirely successful. Significant challenges were encountered with user acceptance, which affected the system's effectiveness in improving productivity and efficiency.
11	(Cataldo *et al.*, 2022)	The ERP model used is SAP-ERP, which was implemented to integrate administrative and financial processes at the university. The system was designed to improve efficiency in managing purchasing, sales, payroll, and budgeting.	Universidad de Talca, Chile.	The SAP-ERP implementation was successful, although there was initial resistance from employees. After two years of use, the university began to realize the expected benefits from the ERP system.
12	(Budiman *et al.*, 2021)	The ERP model used is API-based ERP (Application Programming Interface). This system enables automatic data collection from various university subsystems, such as academic management, human resources, finance, and community services.	State University of Semarang, Indonesia	The ERP implementation was successful in increasing the speed of data collection for accreditation purposes. The system allowed for faster data collection and reduced data redundancy typically associated with manual collection.
13	(Khand and Kalhoro, 2020)	The ERP model used is Campus Management Solution (CMS), implemented as part of ERP in several universities in Pakistan. The system supports various campus management	Sukkur IBA University and Institute of Business Administration (IBA) Karachi, Pakistan.	The ERP implementation was successful, with results showing improvements in information quality, service quality, and system quality. The system supports the integration of

No	Authors	ERP model used	ERP implementation location	ERP implementation results
		functions such as academic information, administration, and finance.		various departments and helps enhance operational efficiency and user satisfaction among students and academic staff.
14	(Kanwar and Sanjeeva, 2022)	The specific ERP model used is not clearly stated. The ERP is designed to improve the efficiency of administrative services in higher education institutions, particularly in supporting academic services such as registration, financial aid, and general facilities.	The ERP implementation is discussed in the context of higher education institutions in India.	The ERP implementation was successful, with increased student satisfaction regarding administrative services. The system reduced campus service processing times and improved the quality of facilities such as libraries and career counseling services.
15	(M *et al.*, 2022)	The ERP model used in this study is Cloud Computing Based Enterprise Resource Planning (ERP). The system is designed for higher education, particularly providing cloud-based educational solutions for women in remote areas. This model allows flexible access to educational resources such as servers, software applications, and other services that can be accessed anytime through the cloud.	The cloud-based ERP was implemented in various higher education institutions in India, Indonesia, and Saudi Arabia.	The ERP implementation was considered successful. The cloud computing model provided easier and more affordable access to educational resources in remote areas. By using cloud solutions, institutions were able to reduce hardware costs, update materials in real-time, and ensure accessibility for students and staff from any location.
16	(Alimboyong and Bucjan, 2021)	The ERP model used in this study is Cloud Computing Based Enterprise Resource Planning (ERP). The system is designed to provide flexibility, collaboration, and cost efficiency in resource management in higher education, particularly in state universities in the Philippines.	The ERP was adopted in state universities in the Philippines, specifically in the Caraga region, involving three universities (names not disclosed).	The ERP implementation was partially successful, but major challenges remain. Some universities have started using cloud services for administrative processes such as registration, finance, and e-learning. However, the main issues hindering full implementation are slow internet access and a lack of understanding of cloud technology among staff.
17	(Epizitone and Olugbara, 2020)	The ERP model used is Financial ERP, aimed at supporting financial functions in higher education institutions. This ERP integrates financial functions such as planning, acquisition, control, and fund management for effective operations.	ERP was implemented in a higher education institution in South Africa.	The ERP implementation was successful. The study showed that important factors contributing to the success of ERP implementation included support for financial functions and process integration.
18	(Cruz-Torres *et al.*, 2021)	The ERP model used is modular ERP, specifically designed for education. The system includes various modules such as academic management, finance, and human resources to support operational processes in educational institutions.	The study analyzed the impact of ERP implementation in a leading university in India.	The ERP implementation was successful, with results showing significant improvements in performance, particularly in resource management, operational efficiency, and academic service quality. ERP helped improve information management and decision-making processes in the educational institution.
19	(Grandón *et al.*, 2021)	The ERP model used in this study is SAP ERP. The system was implemented in an educational context to introduce the concept of ERP and how business process integration occurs in the corporate environment through the SAP/R3 system.	ERP was implemented in two public universities: Universidad del Bío-Bío in Chile and Universidad Nacional de Colombia, Colombia.	The ERP implementation was successful, with research results showing that students' perceptions of the system's usefulness and ease of use improved as they gained hands-on experience in the classroom. The study used the Technology Acceptance Model (TAM) to assess students' intentions to use ERP systems.
20	(Ullah *et al.*, 2020)	The ERP model used is Campus Management Solution (CMS), a higher education resource management system used to manage academic, administrative, financial, and other services at universities.	ERP was implemented in eight universities in Pakistan, including University of Swabi and Bacha Khan University.	The ERP implementation was successful. Research showed that system quality, information quality, and service quality had positive impacts on user performance, meaning the system was considered beneficial and easy to use by university staff. User performance improved along with the quality of services provided.
21	(Althunibat *et al.*, 2019)	The specific ERP model used is not clearly stated. The ERP was adopted with the goal of improving resource	ERP was implemented in ten private universities in Jordan, including Al-	The ERP implementation was successful, with results showing that factors such as "perceived usefulness"

No	Authors	ERP model used	ERP implementation location	ERP implementation results
		management quality and business process automation at universities. The ERP implementation adopted the Technology Acceptance Model (TAM) to evaluate user acceptance of the system.	Zaytoonah University of Jordan and Yarmouk University.	(PU) and "perceived ease of use" (PEOU) played important roles in user acceptance of the ERP system, particularly among professors and managers at the universities.
22	(Alhanatleh and Akkaya, 2020)	The ERP model used is Cloud ERP, designed to support electronic learning resources at the Ministry of Education in Jordan. This system is known as the Cloud E-Learec System, a cloud-based platform used to manage learning resources.	ERP was implemented at the Ministry of Education in Jordan, specifically at the Queen Rania Center.	The ERP implementation was successful. The study showed that technological factors and employee factors had significant impacts on user perceptions of the system's usefulness and ease of use. This improved user attitudes toward the Cloud ERP system and supported managerial decision-making.
23	(Weli, 2019)	The ERP model used is SAP ERP, implemented in training for accounting students at Atma Jaya Catholic University of Indonesia. The system helps students understand best business practices in companies.	ERP was implemented at Atma Jaya Catholic University of Indonesia in Jakarta, Indonesia, through training in collaboration with ERP vendor SAP.	The ERP implementation was considered successful, based on the student satisfaction model that showed students were satisfied with SAP training. This satisfaction also influenced students' intentions to continue using ERP in the future.
24	(Subhani *et al.*, 2023)	The ERP model used is PeopleSoft Campus Solutions, an ERP system developed by Oracle. This system was designed to manage campus information, including academic, financial, and human resource management, and was adopted by several public universities in Pakistan.	ERP was implemented in several public universities in Pakistan, including University of the Punjab, Islamia University Bahawalpur (IUB), Quaid-e-Azam University (QAU), and University of Engineering and Technology (UET) Peshawar.	The ERP implementation was generally successful, although there were challenges during the early implementation stages, such as a lack of training and budget constraints. However, the results showed increased operational efficiency at these universities.
25	(Harun and Mansor, 2019)	The ERP model used in this study is Campus Enterprise Resource Planning (Campus ERP), designed to integrate various university functions such as academic management, finance, human resources, and campus administrative services.	ERP was implemented in public universities in Malaysia, focusing on the pre-implementation phase at Universiti Malaya and Universiti Kebangsaan Malaysia.	The ERP implementation is still in the pre-implementation phase, and the study focused on individual readiness for change among university staff. The research indicated successful change readiness, showing good management support, improved change efficacy, and positive personal valence.
26	(Andrianto, 2019)	The ERP model used at Universitas Jember is SISTER (Integrated System), which is part of the ERP used to manage academic administration, such as workload planning, student registration, faculty workload planning, and learning evaluation. In addition, there is SIMKEU (Financial Information System) for financial management, SIMPEG (Personnel Information System) for human resource management, and SIMANGGA (Budget Planning Information System) for budget management.	ERP was implemented at Universitas Jember, Indonesia.	The ERP implementation at Universitas Jember was successful, with positive impacts on user performance (faculty and staff), particularly in the number of tasks completed, quality of work, and improved collaboration across units. Users also reported increased creativity in problem-solving.
27	(Alhazmi *et al.*, 2023)	The specific ERP model used is not clearly stated. ERP includes systems designed to integrate organizational data across administrative, financial, human resources, and other operational functions. ERP is used in higher education institutions to improve operational efficiency and reduce paper usage.	ERP was implemented at the University of Science and Technology in Aden, Yemen, and discussed ERP implementation at higher education institutions in several other countries.	ERP implementation at higher education institutions often faced varying success rates. Some studies showed that ERP successfully improved management efficiency and supported better decision-making, but the failure rate of ERP implementation in higher education institutions was also quite high, reaching up to 70%. Factors such as uncertainty, resistance to change, and high costs were common causes of failure.
28	(Rizkiana *et al.*, 2021)	The ERP model used is Oracle and SAP. The ERP implementation involved various functions to support academic, financial, human resources, and other	ERP was implemented at several universities in Indonesia, including Institut Teknologi Bandung	The ERP implementation was generally successful, but there were varying degrees of success at each university. For instance, at Unpad, the

No	Authors	ERP model used	ERP implementation location	ERP implementation results
		campus operations, with the goal of improving operational and management efficiency at universities.	(ITB), Universitas Padjadjaran (Unpad), Universitas Kristen Maranatha, and Prasetiya Mulya University (UPM).	Oracle ERP system succeeded in linking the payment system with the bank, although there were failures in the budgeting system. At Maranatha, the SAP system succeeded in the taxation system, though the initial implementation was challenging.
29	(Almigheerbi *et al.*, 2020b)	The model used is Collaboratively-Developed ERP (CD-ERP). CD-ERP combines a community-source model with cloud-based ERP. The model is designed to meet the needs of higher education institutions in Libya and has also been used in other countries as a more flexible and cost-effective solution.	ERP was implemented at higher education institutions in Libya, particularly at Tripoli University.	The CD-ERP implementation was considered successful in various international projects such as Kuali in the U.S. and Sigma Suite in Spain. The success was marked by increased operational efficiency, reduced development costs, and the sustainability of open-source applications in the higher education sector.
30	(Soliman and Karia, 2016)	The ERP system used in higher education institutions in Egypt is an integrated commercial ERP system that supports various functions such as human resource management (HRM), finance, supply chain management (SCM), and customer relationship management (CRM). Some universities also use ERP modules for academic and student resource management.	ERP was implemented at several universities in Egypt, including public and private universities. Examples include Al-Azhar University and other higher education institutions in Egypt.	The ERP implementation in Egypt had varying degrees of success. Although many universities improved operational efficiency, others faced significant challenges, with ERP failure rates reaching 50%. One of the main reasons for failure was organizational culture misalignment and resistance to change.
31	(Soliman and Karia, 2015b)	The ERP model used at higher education institutions in Egypt is an integrated commercial ERP, including modules such as finance, human resources, academic management, and logistics. The system is designed to improve operational efficiency and strengthen decision-making through more integrated data access.	ERP was implemented at various universities in Egypt, both public and private, focusing on improving campus administrative efficiency and academic services.	The ERP implementation at some higher education institutions in Egypt was successful in improving administrative efficiency and campus services. However, some challenges remain, particularly related to organizational readiness and technical limitations, which affected the adoption of ERP systems at certain universities.
32	(Al-Hadi and Al-Shaibany, 2017)	The specific ERP model used is not clearly stated. ERP is designed specifically to meet the needs of higher education institutions. It includes modules such as human resources, finance, academic management, and logistics integrated into one system to improve institutional efficiency and productivity.	ERP was implemented at Sana'a University, Yemen.	The ERP implementation at Sana'a University was considered successful in several aspects, such as improved information access and better management. However, challenges remained, particularly related to inadequate technological infrastructure and resistance to change.
33	(AlQashami and Mohammad, 2015)	The specific ERP model used is not clearly stated. ERP focuses on improving management efficiency in higher education institutions. The ERP used includes various modules such as human resources, finance, supply chain management, and academic information management.	ERP was implemented at King Saud University (KSU), Saudi Arabia.	The ERP implementation at universities in Saudi Arabia had mixed results. At King Saud University, the MADAR ERP system improved administrative efficiency, but challenges such as insufficient training and limited budget were significant obstacles.
34	(Schwade and Schubert, 2016)	The ERP model used is Microsoft Dynamics NAV, implemented in an e-learning environment to provide practical ERP skills to students. The model integrates with e-learning platforms and business simulations.	ERP was implemented at the University of Koblenz-Landau, Germany.	The implementation was successful, with evaluation results showing that most students responded positively to the "ERP Challenge" concept and felt that it helped them develop practical ERP skills relevant to their future careers.
35	(Al-Sabaawi, 2015)	The ERP used is a commercial ERP system designed to support various organizational functions, including human resources, finance, sales, distribution, and manufacturing. The ERP also includes both back-office and front-office functions, which universities adopted to manage administrative processes more efficiently.	ERP was implemented at Cihan University, Iraq.	The ERP implementation at Cihan University was considered successful in improving operational efficiency and information management. However, some challenges remained in user training and change management, requiring further attention.
36	(Soliman and Karia, 2017)	The specific ERP model used is not clearly stated. ERP adopted at several	ERP was implemented at several universities in	The ERP implementation had varying levels of success. While some

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No	Authors	ERP model used	ERP implementation location	ERP implementation results
		higher education institutions in Egypt aims to improve performance and operational efficiency. The system includes modules such as human resources, finance, and academic management.	Egypt, both public and private. The study focuses on the adoption and implementation phases of ERP systems at these institutions.	universities improved operational efficiency through ERP, many others in Egypt faced failure. It is estimated that nearly 50% of ERP projects in Egypt failed due to planning errors, lack of skilled human resources, and issues with cross-functional coordination.
37	(Leandro *et al.*, 2017)	The specific ERP model used is not clearly stated. ERP includes various modules for human resources management, finance, academic management, and logistics operations in education.	ERP was implemented at various public educational institutions in Brazil.	The ERP implementation at several higher education institutions in Brazil was generally successful, although there were some challenges during the implementation process. Success was marked by improved management efficiency and the ability to integrate various functions within the institutions.

4.2. Discussion

4.2.1. Benefits of Implementing ERP in Higher Education Institutions

Based on the findings in the literature, the implementation of ERP systems in higher education institutions offers several benefits. Below is a summary of the benefits categorized by the recipients and types of benefits:

1) Institutional Benefits
   a. Reduction of Operational Costs: The implementation of ERP significantly reduces operational costs, particularly through process integration and automation in various areas such as IT, finance, and human resource management. For example, universities in Libya, Egypt, and Chile (Almigheerbi *et al.*, 2020a; Soliman and Noorliza, 2022; Cataldo *et al.*, 2022; Almigheerbi *et al.*, 2020b) successfully used systems like CD-ERP and SAP ERP to lower administrative and development costs while avoiding the substantial expenses typically required to build systems from scratch. Additionally, the use of cloud-based ERP in Australia (Huang *et al.*, 2023), the Philippines (Alimboyong and Bucjan, 2021), and Jordan (Alhanatleh and Akkaya, 2020) also enabled a reduction in IT infrastructure costs through the flexibility and efficiency of cloud services.
   b. Increased Operational Efficiency: Many institutions reported increased operational efficiency following the implementation of ERP. At ABC University in Egypt (Lamey *et al.*, 2023) and Sohar University in Oman (Shatat and Al Burtamani, 2019), ERP reduced data redundancy, accelerated information flow, and supported digital transformation. At Semarang State University (Budiman *et al.*, 2021) and Yanbu University College, Saudi Arabia (Bamufleh *et al.*, 2021), the implementation of API-based ERP and PeopleSoft enhanced inter-departmental integration. Similarly, in several universities in Pakistan (Khand and Kalhoro, 2020; Ullah *et al.*, 2020), Jordan (Althunibat *et al.*, 2019), and Brazil (Leandro *et al.*, 2017), ERP supported departmental function integration and improved productivity and user satisfaction.
   c. Improved Decision-Making: ERP helps university management make faster and more accurate decisions by providing more structured and real-time data. Its implementation in Jordan (Madi *et al.*, 2022), Saudi Arabia (Omar, 2020), India (Cruz-Torres *et al.*, 2021), Yemen (Alhazmi *et al.*, 2023), and South Africa (Epizitone and Olugbara, 2020) supported strategic decision-making, particularly in financial management and academic quality assurance.
   d. Meeting Accreditation and Quality Improvement Needs: ERP also facilitates the fulfillment of accreditation requirements and quality improvement in universities. At Dar Al Uloom University, Saudi Arabia (Abdel-Haq, 2020) and Semarang State University, Indonesia (Budiman *et al.*, 2021), ERP helped expedite data collection, generate more accurate accreditation reports, and provided tools to support institutional improvement planning.
2) Benefits for Staff and Management
   a. User Satisfaction: ERP implementation increases satisfaction among administrative staff and faculty by simplifying operational and academic tasks. In Pakistan and Chile (Subhani *et al.*, 2023; Grandón *et al.*, 2021), the use of PeopleSoft and SAP ERP created more efficient administrative processes, making staff feel more productive and supported by integrated systems.
   b. Better Resource Management: ERP provides effective tools for administrative staff to manage human resources, finance, and logistics. At Jember University, Indonesia (Andrianto, 2019), integrated systems and financial management information systems

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improved the amount of work completed and enhanced inter-unit collaboration. In Indonesia (Rizkiana *et al.*, 2021), the Oracle ERP system successfully connected payment systems with banks, though challenges remained in the budgeting system. Meanwhile, at Maranatha Christian University, the SAP system succeeded in the taxation domain, despite initial challenges during implementation.

3) Benefits for Students
   a. Improved Academic Services: ERP contributes significantly to improving the academic experience for students by speeding up access to information and campus services. At Sohar University, Oman (Shatat and Al Burtamani, 2019) and Atma Jaya University, Indonesia (Weli, 2019), the Students Information System (SIS) module facilitated the management of academic information, from registration to student achievement records. At higher education institutions in India (Kanwar and Sanjeeva, 2022), student satisfaction with administrative services increased due to faster processing and improved campus facilities, such as libraries and career counseling services.
   b. Better Collaboration and Learning: ERP integration with e-learning platforms also enhances learning for students. At Koblenz-Landau University, Germany (Schwade and Schubert, 2016), the use of Microsoft Dynamics NAV allowed students to develop practical ERP skills through business simulations, which in turn improved collaboration and their readiness for the workforce.
4) Benefits for Specialized Implementations
   a. Flexibility and Accessibility: Cloud-based ERP implementations, such as those in Australia (Huang *et al.*, 2023) and various institutions in India, Indonesia, and Saudi Arabia (M *et al.*, 2022; Alimboyong and Bucjan, 2021), allowed for more flexible access for both staff and students. This flexibility was especially crucial during the pandemic when remote access to data and campus services became essential. With cloud-based ERP, universities could update materials in real-time and ensure accessibility for all users, including those in remote areas.

4.2.2. Challenges of Implementing ERP in Higher Education Institutions

The implementation of ERP systems in higher education institutions, while providing significant benefits, also faces various challenges. Below is a summary of the challenges encountered, categorized by types of failures, causes of failures, and potential solutions that higher education institutions can implement to overcome them:

1) Technical Failures
   a. System Complexity: One of the main challenges in ERP implementation is that users often find the system too complex. A clear example is the implementation of PeopleSoft at Yanbu University College, Saudi Arabia (Bamufleh *et al.*, 2021), where the system was deemed complicated and difficult to understand. This issue arose due to a lack of training and user resistance to change. To address this, universities must simplify the user interface, enhance training programs, and provide more intensive technical support.
   b. Technological and Infrastructure Limitations: Some universities face technical issues due to inadequate IT infrastructure. For instance, at King Saud University, Saudi Arabia (AlQashami and Mohammad, 2015) and Sana'a University, Yemen (Al-Hadi and Al-Shaibany, 2017), limited budgets and insufficient training were the main causes of partial failures. To overcome this, ongoing training and better budget allocation for technological infrastructure are necessary.
2) Organizational Failures
   a. Lack of Coordination and Change Management: Weak coordination and inadequate change management are often the causes of ERP implementation failures. At Tripoli University, Libya (Almigheerbi *et al.*, 2020b), while the implementation of Collaboratively-Developed ERP (CD-ERP) was successful in terms of efficiency and cost reduction, there were major difficulties in coordinating between universities. The solution is to strengthen collaborative structures, increase commitment from involved parties, and ensure effective communication.
   b. Resistance to Change: Many educational institutions fail in ERP implementation due to resistance to change, especially among management and staff. In Egypt (Soliman and Karia, 2016; Soliman and Karia, 2015b; Soliman and Karia, 2017), Iraq (Al-Sabaawi, 2015), and Yemen (Alhazmi *et al.*, 2023; Al-Hadi and Al-Shaibany, 2017), the inability of organizations to adapt to new systems became a significant barrier. The solution is to strengthen management commitment, improve training, and enhance internal communication. At King Saud University and Prince Sattam Bin Abdulaziz University (Omar, 2020), social impacts such as increased stress and workload also affected the acceptance of new systems. Management needs to provide greater support in terms of training and communication. Universiti Malaya and Universiti Kebangsaan

Malaysia (Harun and Mansor, 2019) faced similar challenges during the pre-implementation phase, which can be addressed by emphasizing management support and focusing on long-term benefits.

3) User and Training Failures
   a. Lack of User Training: Inadequate training often leads to the failure of certain ERP modules. At Sohar University, Oman (Shatat and Al Burtamani, 2019), while the Students Information System (SIS) and Financial Management System (FIS) were successful, the Human Resource System (HRS) failed due to a lack of training and user awareness of system functions. The solution is to increase the frequency and quality of training and raise user awareness campaigns for ERP users.
   b. User Awareness and Support: At some universities, user awareness and support for ERP are very low. At Yanbu University College, Saudi Arabia (Bamufleh *et al.*, 2021) and several universities in Pakistan (Subhani *et al.*, 2023), users found the system too difficult and unsuitable for their needs. To address this, universities need to provide better training, simplify the system, and offer responsive technical support.
4) Financial Failures
   a. Insufficient Investment: One of the main barriers in ERP implementation is the lack of investment in training and supporting infrastructure. For example, at King Saud University, Saudi Arabia (AlQashami and Mohammad, 2015), limited budgets were a major obstacle. The solution is to increase budget allocation for training and infrastructure, and ensure that management is involved in all stages of ERP implementation.
   b. Uncertainty About Long-Term Benefits: Some universities fail to adopt ERP due to uncertainty about its long-term benefits. In Egypt (Soliman and Noorliza, 2022; Soliman and Noorliza, 2021), many institutions were not fully convinced of ERP's added value, especially due to the high risk of failure and large investment costs. The solution is to introduce a more comprehensive approach, focusing on increasing user understanding of ERP's long-term benefits, as well as providing better technical and financial support.

In conclusion, challenges in ERP implementation in higher education institutions include technical, organizational, user, and financial failures. These failures are generally caused by inadequate training, resistance to change, limited budgets, and insufficient infrastructure. However, by improving training, simplifying systems, strengthening coordination, and ensuring management support and proper budget allocation, universities can overcome these challenges and increase the success of ERP implementation.

5. Conclusion

The implementation of Enterprise Resource Planning (ERP) in higher education institutions has demonstrated significant benefits, particularly in reducing operational costs, increasing efficiency, and enhancing decision-making at the management level. ERP also aids in meeting accreditation requirements and improving the quality of various universities. However, challenges remain in ERP implementation, such as system complexity, technological and infrastructure limitations, resistance to change, and a lack of user training. Failures in ERP implementation are generally attributed to insufficient training, weak coordination, and user resistance to the new system. Recommended solutions include improving training and communication, strengthening management commitment, and better allocation of funds to support adequate technological infrastructure. By addressing these issues, higher education institutions can enhance their operational efficiency and deliver better quality services to both students and staff.

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