

Factors Determining Successful Implementation of ERP in Higher Education – A Review



DOI: 10.26573/2020.14.3.3

Volume 14, Number 3

September 2020, pp. 159-170

N. Ramachandran

G. Thangamani

Indian Institute of Management Kozhikode

Kozhikode, India

(raman@iimk.ac.in)

(gtmani@iimk.ac.in)

Implementing Enterprise Resource Planning (ERP) system is complicated and very costly too. Many Higher Education Institutions (HEIs) are not able to implement ERP successfully. It has claimed that many HEI meets their expected outcomes, only 60% to 80%. As per the available literature about ERP implementation in HEI, many countries struggling due to various factors. This paper is going explore the literature reviews of various important factors for the successful implementation of ERP in HEI, particularly in the Indian context.

Keywords: Enterprise Resource Planning, Higher Education Institutions, ERP Implementation, Important Factors

1. Introduction

In the present scenario, a large number of companies have successfully implemented ERP, and they are playing a vital role in business [15]. Because it integrates the entire business processes from top to bottom, and it improves productivity in many folds. Apart from business sectors, ERP is invading into many areas such as health care, insurance, higher education, etc. Despite many advantages [32], many Higher Education Institutions (HEIs) fail to implement ERP successfully due to various factors. It is claimed that many HEIs meet their expected outcomes, 60% to 80% [1]. Out of these, about 90% fail due to beyond schedule or over budget [13] [33]. As the adoption of ERP Software in HEI has increased substantially and its demand continues to grow, HEI has become the primary target market for ERP vendors [14] [30] [43]. Even though many kinds of literature are available about ERP, research about ERP implementation in HEI is countable [14] [29] [45]. Moreover, in India, many HEIs are there when compared with other countries, but the number of literature is very minimal, focusing on India about ERP implementation. The novelty of this paper is to discuss the critical factors which have to consider for the successful implementation of ERP in HEIs based on the literature review.

2. Higher Education Institutions (HEI)

HEI plays a vital role in the educational sector for boosting the economy. It produces leading managers with innovative ideas to improve the business/organization, new policymakers, and entrepreneurs. These institutions share their vast knowledge and play a significant role in today's social, cultural, and economic change [45].

The functional requirements of HEI are entirely different from the business processes of any manufacturing/service industries. For example, most of the HEI are non-profit organizations, and it has to follow government policies strictly. Higher Education Institutions (HEI) mainly have two cluster activities one is administrative activities, and the other one is academic activities. The administrative activities include human resources, finance, purchase, stores, general administration, etc. In the case of academic activities from student's admission to publishing results, attendance, class schedule, course bidding, etc. Even though these two are different activities, both are interconnected.

For many years HEI used to manage its massive amount of information by software, which might have developed in-house or third-party software. These information systems mostly maintained by dedicated HEI computer staff. That software is not an integrated package; it handles academic and administrative activities in bits and pieces. As we know that if the systems do not integrate, then manual intervention is required to incorporate the process. It will take more time, lack of transparency in the system, and also the possibility of human error. If the systems integrate without human intervention, it would improve the overall working efficiency, more transparent, proper academic planning, and also it may improve the quality of education too.

3. Evolution of ERP

In the 1960s, the manufacturing companies developed software for managing inventory control, designed to handle inventory based on traditional inventory concepts. In the 1970s, these packaged further developed to handle components, raw materials planning, and procurement to master schedule built for the end items, and it was called Material Requirement Planning (MRP). In the 1980s, MRP extended for shop floor and distribution management activities that concept called MRP-II. In the early 1990s, the software further developed to cover the entire business process like finance, human resource, project management, etc., which is called ERP. ERP is a very complex system because ERP interconnects business as the whole process in a single database [2]. Generally, ERP core modules and modules to manage student life cycle do not cover the funding agency and alumni module; however, using any 3rd party applications can integrate with ERP. Figure 1 shows the conceptual diagram of the ERP supply chain management system.

In a nutshell, ERP is a set of modules which interconnects all functional areas of a business such as finance, human resource, production, customer relation, etc. into a single integrated system with a common platform for information flow [3].

ERP should have the following characteristics [3]

- **Open System Architecture** - ERP should run on any platform and any hardware.
- **Data Sharing** – All ERP modules should share the same data definition across the ERP processes.
- **Centralized Database** – Within an organization, ERP should maintain a single set of data across the entire ERP process.
- **Flexibility** - ERP should have a facility to add or remove the modules without affecting the other modules. And also support different database back ends.

- **Across-the-Board** - ERP should be suitable for any organization; i.e., it should support a wide range of functional modules.
- **Simulation of Reality** - Capable of simulating real business processes [3].

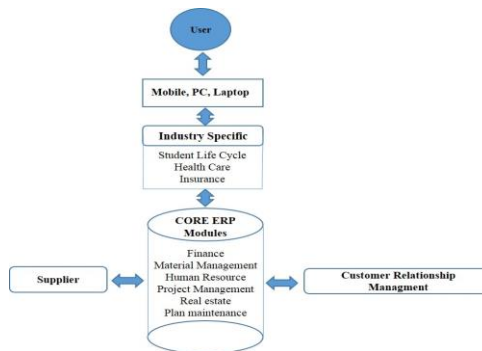


Figure 1 Conceptual ERP Supply Chain Diagram

4. ERP in Higher Education – Literature Review

Nowadays, HEIs are drastically changing, and everyone can see the swift development of this field. Technology plays a significant role in progress, and it contributes to providing a high quality of education. It also observed that traditional HEIs could not succeed without adopting new technology. Therefore HEIs are forced to take ERP to cope up with sustainable development and continually changing for market-oriented learning [45]. Moreover, the programs, including an undergraduate, postgraduate, doctorate, management development programs, faculty development programs, short term courses handled by the HEI, specifically focus on various market segments. Hence, there is a greater need for integration of their strategic, tactical, and operational goals. Also, there are numerous functional activities such as student management, faculty management, academic administration, general administration requires integration.

ERP implemented successfully in many industries and organizations such as manufacturing, health care, insurance, finance sector, communication, etc., around the globe [3]. In recent years, ERP invaded HEI, and ERP implementation in HEI increased in many folds around the world. The main reason for this adoption is to ease operational, managerial, organizational, strategic, and Information Technology related infrastructural benefits promised by ERP systems [35]. Therefore the ERP market started focusing on HEI, and it has shown rapid growth [4].

Since ERP assumed as a significant technology enabler and an efficient management tool [51] also ERP enables HEI to connect and interact with all activities to access data and organize internal processes, ERP considered being one of the essential software. Many HEI uses ERP software, but still, many implementations fail due to over schedule or exceeding budget limits. When compared with other sectors, the rate of failure is higher in HEIs [13] [38]. Although for HEIs

In the present scenario, ERP is crucial for improving operational efficiency and enhance competitiveness in HEI to compete with other HEIs in the competitive

world. Even though many kinds of literature indicate the importance of ERP for increasing HEI efficiency, ERP implementation in HEIs is very less. Therefore the ERP implementation in HEIs is still in embryonic level [29].

In the present world, traditional HEIs are non-competitive; however, by implementing new technology, HEI becomes competitive to survive [34]. ERP plays a vital role in connecting administrative and academic functionalities into a single database to improve the efficiency of the education system [39] [40]. The main focus of the ERP system is to automate the entire process, transparency, manageability, and huge cost saving if implemented successfully [32]. ERP provides accurate data which will be useful to make correct decision making, and it leads significant benefit to users and organization [43].

Nowadays, many HEI started using business models for increasing business activities at HEI. ERP vendors observed this and started recommending business solutions to grab the new market opportunity [28].

From the perspective of HEI, ERP started providing a different set of modules apart from the ERP core module. For example, student lifecycle management software from ORACLE and SAP [5], handle the student admission process, student data management, course enrollments, attendance, course management, library systems, alumni management, feedback, research, etc. [4]. The HEI started adopting ERP in the hope to cope with the changing environment. As a result, existing information systems in HEI were replaced by ERP to achieve more efficiency and accessibility for all members and improve end-user performance by providing an ERP system [6].

As per the web survey, some of the leading higher education institutes in India, such as IIM Ahmedabad, ISB, IIT Bombay, IISc Bangalore, are in the process of implementing ERP.

Also observed that many literature discussed about include ERP as a course curriculum and train students in HEIs, as ERP plays an important role in business sector [17] [18] [19] [20] [21] [22] [23] [24] [25] [26]. And literature [1] [8] and [45] none of the paper listed what are factors should be considered while implementing ERP in Higher Education. Moreover, literature [1] focused on higher education in Australia, [8] focused on security and customization of ERP in higher education, and [45] focused on compare and identify the distinct modules of business ERP and education ERP.

5. Important Factors for Successful Implementation

Successful implementation of ERP with regular follow-up only will be effective, and it will yield a better result. But Implementing an ERP system is complicated, time-consuming, and very costly, too [3]. Based on the available literature about ERP implementation in HEI, many countries struggling due to various factors [2] [3] [4] [7] [8] [10] [11] [12] [13] [15] [16] [20] [28] [29] [30] [32] [33] [35] [38] [39] [40] [42] [47] [48] [49] some of the important factors which have to be seriously considered are listed below, table 1 shows the important factors & number of instances listed in the literatures and figure 2 shows the analysis report of important factors.

- **Top Management Support:** This is one of the most important factors; without senior management support, ERP cannot implement successfully.

- **Cost:** - Before implementing top management must be aware of project cost; otherwise, the project may fail while half-way through.
- **Change Management / Employee Resistance:** Employees may resist due to various reasons such as over workload due to double data entry, may not like change management, perception, retention of institution process, don't want to change their work culture since they are familiar with the existing system, etc.
- **Consultant:** Consultant plays a crucial role in ERP implementation, therefore the consultant must be well experienced and the hand of full knowledge about ERP.
- **ERP Software Selection / Vendor Selection:** While evaluating, proper ERP software selection has not done based on the requirement; it may misfit for the institution. As well as vendor selection also plays an important role; if the vendor is not capable of customizing or integrate the legacy application in ERP according to their customer need may lead to the unsuccessful implementation of ERP.
- **Cultural:** Cultural fit also may affect the proper implementation, mostly ERP developed by the developed countries, some criteria such as terminology, language, etc., it may not be suitable for all institutions. Therefore while selecting ERP, select which will adequately fit for the institution.
- **Clearly Defined Goals:** The aim and scope of the project should be communicated clearly to the vendors before implementation.
- **Project Management:** Poor project management, less knowledge, and poor planning may lead to challenges of ERP implementation.
- **Project Planning:** - Proper planning should be done, and it should be communicated appropriately to all.
- **Implementation Strategy:** Proper implementation strategy should be followed.

Table 1 Important Factors and Number of Instances

Important Factors	No of the instances cited in the literature
Top management	20
Cost	10
Employee resistance	22
Consultant	12
Software/vendor selection	11
Cultural	10
Clearly defined goals	11
Project management	12
Project planning	9
Implementation strategy	7
Communication	15
Customization / Integration	12
Business Process Reengineering (BPR)	15
Infrastructure	8
Training	24
Testing	6
Too tight project schedule	2

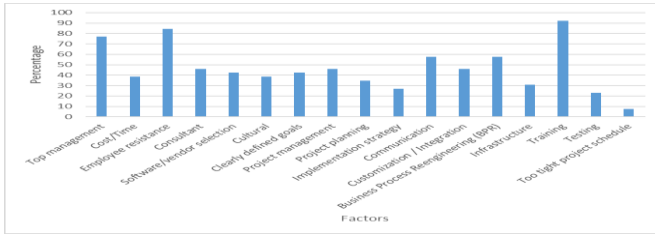


Figure 2 Analysis Report of Important Factors based on the Literature Review

- **Communication:** - Proper communication is essential while implementing ERP; each stage of implementation is to be communicated from top management to end-user as well as a consultant by the ERP vendor.
- **Customization:** - Customization should be avoided or at least less customization because it may cost you more as well as time-consuming.
- **Business Process Reengineering (BPR):** - Poor quality of BPR will lead to incorrect system configuration, and if the consultant did not map the functionalities depending on the institute requirement, it might lead to incompatibility with ERP and institution requirements.
- **Infrastructure:** - Poor IT infrastructure may lead to a slow process.
- **Training:** - Proper training needs to be given to the user based on their level of IT knowledge. Users may not be able to attend a single session due to busy with their existing workload; therefore, multiple time training may require.
- **Testing:** - Without proper trial, put it live may affect the entire institute process. Therefore a thorough live examination should be done before putting it on live.
- **Too Tight Project Schedule:** - Due to budget constraints, top management insisted on reducing the project schedule or without proper training may lead to project failure.

6. Benefits of ERP

Since very few successful implementations of ERP in HEI, it does not realize the effect of the ERP system fully. Based on the literature review [5] [6] [7] [11], some of the conceptual/practical benefits of using ERP are consolidated and listed below:

6.1 Core Benefits of using an ERP

An ERP creates a single version of the truth and no data redundancy because everyone uses the same system. It also establishes a self-service for the faculty, students, and employees. It provides accurate real-time data, and it can be accessible by user-friendly web-based interfaces using various gadgets such as laptops, mobile, desktop, etc. from anywhere, anytime. It will help for proper planning and better management, and it improves workflow, internal communication, increases efficiency and productivity. ERP emphasizes transparency, accountability, tightens controls, and automates communication through e-mail alerts.

6.2 Benefits for Administration

In ERP, all workflows are digital; therefore, paperwork will be less, and it reduces piles of files. Automation will save time for managing information, and minimize

paper will save money. Quick access to real-time data will become useful for accurate decision making. Reports can be generated from anywhere in the world, and cohesive information can be easy to manage academic and administrative processes.

6.3 Benefits for Faculty

Due to less paperwork, time-consuming administrative functions by the faculties will be less. Student's attendance is wholly automated in ERP. Therefore faculties can fully concentrate on students and teaching. ERP improves teaching efficiency through content and information about the student, manages class information and analytical reports. Also, it enhances the quality of interaction between students, administration, and parents.

6.4 Benefits for Students

Better flow of information about class schedule, assignments & announcements, better communication with alumni to gain their immense experiences, better access to library material, and other references will improve the quality of students.

6.5 Benefits for Parents

Since the information is transparent, parents can directly access their student's grades, attendance, fee status, exam schedule, announcements, etc. Also, they can easily communicate with faculty and administration through the mail, and this will save time and money in communication aspects.

6.6 Technical Benefits

Campus-wide integrated information runs on a standard system; it reduces the time to take a backup from various systems. The manual process either removed or reduced, develop and maintain consistent data definitions, robust data integrity, and reliability, system-wide security and protection of confidential data, high availability of academic and administrative systems, are the benefits of using an ERP system.

7. Conclusion

The majority of the literature about the implementation of ERP in HEI is from developed countries such as the USA, UK, Australia, Canada, etc. when compared with developing countries such as India, Pakistan, etc. [12]. Since India is still in an early stage of ERP implementation in HEI [4] if HEI considers the factors mentioned above while implementing ERP will improve the success rate of ERP implementation in India.

Though not all implementations are successful in HEI, ERP successfully implemented in many industries, and it reaps the benefit by reducing inventory, improving customer services, enhancing communication, etc. ERP implementation in developing countries is a challenging process, some of the significant failures are due to high cost of implementation and maintenance, lack of top management support, employee resistance, the shortage of ERP exposure, inadequate IT infrastructure, etc. [3]. Since the ERP core module is in line with administrative activities, it can be easily implemented without much customization. But for the academic activities, it is challenging because it is an entirely different process, each country follows its own culture and government policies. ERP is a generic type of software, but the HEI

functions are unique processes; therefore, more customization is required. In other words, ERP systems in HEIs are very different in terms of functionality and modules when compared to corporate ERP [45], [49].

Considering the important factors and benefits of ERP, as mentioned earlier, HEI requirements are unique. Therefore vendor has to understand HEI needs, and HEI has to understand the ERP limitations [16]. However, success means satisfying the customer's needs. ERP vendors could satisfy business customers, but they could not meet the HEI customers' expectations. It is because the vendors have good exposure to business processes, but they do not have good exposure in academic operations. If ERP vendors understand the academic processes, they can easily convince top management, properly communicate, and train employees according to their needs; this will lead to reducing employee resistance. And also customization can be minimized, due to less customization, implementation time and cost also will come down drastically.

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About Our Authors

N. Ramachandran is working as a Senior Systems Manager in Indian Institute of Management Kozhikode, India. He obtained his Ph.D. from Bharathiar University, Coimbatore and his thesis had been entitled "Performance Analysis of Content Delivery Network and Deployment of Cloud in Academic Institutions". He started his career as a Senior Information Scientist and worked about 4 years. Later, he joined in Indian Institute of Management Kozhikode and he has more than 20 years

of experience in ICT. His research interests are in Cloud, CDN and ERP. He has two publications in international journals and three international conferences and one national conference

G. Thangamani is working as an Associate Professor in Indian Institute of Management Kozhikode, India. He obtained his Ph.D. from IIT Madras and his thesis had been entitled "Models for assessment of Reliability Measures for Complex Systems". He earned his bachelor's degree in mechanical engineering with honours for scholastics achievements and did his M.E in Industrial Engineering from Anna University, Chennai. He started his career as a faculty in Pondicherry Engineering College, Pondicherry and worked for 4 years. Later, he was associated with some of the best companies in the world such as Whirlpool and GE for more than 13 years. His research interests are in Complex System Reliability Prediction, Business Process Modeling, Analysis & Reengineering, ERP, Six Sigma, Lean approaches in manufacturing/service systems, Product innovation and technology management and Risk assessment. He has several publications in international journals and conferences.