

THE APPLICATION OF ERP SYSTEMS IN SOME UNIVERSITIES AROUND THE WORLD AND IN VIETNAM**Dr. Nguyen Thi Kim Anh, Nguyen Thi Thao**Thai Nguyen University of Economics and Business Administration, Vietnam

ABSTRACT

Applying Enterprise Resource Planning (ERP) systems in higher education is not only a global trend but also an important part of the digital transformation process of universities. ERP in higher education helps automate and integrate management processes, from finance, human resources, student management, to asset management and enterprise collaboration, creating a unified and efficient information system. Worldwide, many universities have successfully implemented ERP solutions, bringing significant benefits in resource management and planning. In Vietnam, the application of ERP in higher education is relatively new but has begun to receive attention.

Keywords:Application, ERP, university, Vietnam.

INTRODUCTION**1. The concept of ERP systems**

ERP is an enterprise resource planning system supported by computer software that automatically performs processing procedures, helping enterprises manage key activities, such as accounting, financial analysis, purchasing management, inventory management, production planning and management, human resource management, ... and other enterprise operations. The overall goal of this system is to ensure that the enterprise has appropriate resources such as manpower, materials, machinery and finance available in sufficient quantities when needed, using planning tools to improve operational efficiency and overall enterprise management.

Typically, in an enterprise using software such as accounting software, human resource management, materials, equipment, ... This separate management software usually serves the activities of a specific department (such as the sales department, accounting department, human resources department...) and are like an "island" for the software of other departments. The transfer of information from one department to another is done manually (transferring documents, copying files...) with low productivity and no control. Unlike traditional separate management software, an ERP system is a single software that integrates many closely related modules, performing similar or higher functions than separate management software. Integration is the most fundamental distinguishing feature of ERP application compared to the application of multiple separate management software.

The functions of an ERP system are usually understood as common business processes. Some main functions of the ERP system are payroll, procurement, accounts receivable and payable, general ledger, inventory control, human resource management, product design, order management, material planning, production planning, production planning, quality management, maintenance and warehousing.

ERP calculates and forecasts the possibilities that will arise in the enterprise's production and business operations. For example, ERP helps the factory accurately plan material supply (materials) for each order based on total material requirements, progress, productivity, supply capacity... This approach allows enterprises to have enough materials for production but not too much inventory causing capital stagnation.

ERP supports pre-planning of work content and operations required in production and business. For example, pricing policy planning, discounts, purchase types to calculate raw material procurement solutions, in order to minimize errors in transaction processing.

ERP creates links between the company's office - subsidiaries, department - department and within departments, forming a continuous sequence and process for handling operations.

2. Research situation of ERP application in the world

Previously, organizations often used Management Information Systems (MIS) to support the management and operation of their activities. However, since the emergence of the ERP system, organizations have tended to switch to applying the ERP system to suit the new situation.

ERP spans across business functions horizontally and along the supply chain vertically within an enterprise. In the early 1990s, ERP systems emerged with the unique ability to reengineer business processes. However, the application of ERP peaked in the late 1990s, and then declined severely, mainly due to the Y2K issue. The early 21st century witnessed a rapid resurgence of ERP systems across the manufacturing and service industries due to its strong adaptability and alignment with business processes in the new era.

There have been many studies evaluating the success of ERP application in enterprise management operations. Key success factors for ERP implementation include: top management support, clear business vision, comprehensive integration of an enterprise's business processes and functions. However, more important factors are related to business process reengineering and integration of different core processes into the ERP system. Many companies use powerful information systems like ERP to handle complex business applications, such as managing customer services on a large scale. The reason ERP became so popular is that it can enhance operational efficiency and business performance of the enterprise.

Regarding the influence of organizational size on the application of ERP systems, Sedera et al. argued that "the size of an organization (small or large) may contribute to the difference in realizing the benefits that ERP brings to the organization". The difference in organizational operational practices was measured using a time-lagged validation model, using five main factors: system quality, information quality, user satisfaction, individual impact, organizational impact and 42 minor measures (data collected from 310 respondents, representing 27 public sector organizations). The results showed: (1) Larger organizations received more benefits than smaller ones; (2) Smaller organizations demonstrated higher confidence in their ERP systems; (3) There were significant differences in perceived benefits between employees in small and large organizations.

Next is the study on the customizability of ERP systems for each organization by Luo W. and Strong D. M. This study identified 9 customization options based on the degree of change made to both the ERP system and management processes. It is designed to help organizations know what customizations are available to choose from, and which customizations are feasible given the organization's capabilities. Applications of this framework are illustrated through a case study of an organization implementing several ERP system modules. The phased implementation also illustrates an organization's evolution, as ERP application implementation involves organizational and technical changes, and how additional customization options become feasible with the organization's capabilities.

3. Practical application of ERP in some universities around the world

Along with the development of ERP systems applied in industrial production and services, recent years have also marked a strong trend of applying ERP in the university environment. The prevailing assumption is that since ERP systems have worked well in many different organizations, they should also work well in universities.

Lockwood argued that universities, like other organizations, have to deal with many common issues facing most modern organizations, including: resource coordination issues, cost control, encouraging and facilitating employees in the enterprise, etc... Therefore, it can be interpreted that when universities have common issues like a range of organizations, then the standard tools of organizational analysis and modern organizational management - including computer systems used by large corporations around the world - can be similarly applied in universities.

In addition, changes in universities around the world are under immense pressure from the external environment, including: declining government funding and support per student, globalization and global competition, continuously increasing student numbers, changes in the nature of learning work, increasing competition between educational organizations, government pressure to improve operational efficiency, and diverse and changing stakeholder expectations. In the field of higher education, these changes are significant and continuously demand more effective management processes, requiring improved administrative activities.

It is in this context that universities have sought to exploit new information technology, in which new generations of integrated management information systems have become very attractive. In many cases, universities do not build these systems themselves, nor do they purchase them from software vendors specializing in providing separate solutions, but rather they are moving towards modifying and customizing commonly used software systems by large corporations, typically ERP systems. ERP systems fully cover the operational scope and processes of the organization, providing flexible, efficient and regularly updated organizational management information. These systems are promised to bring universities the capabilities to meet management needs in the face of a range of pressures and stresses characteristic of their current circumstances. For this reason, universities are increasingly interested in applying ERP systems.

Leading global ERP providers such as SAP, SunGard SCT, Datatel also began to shift towards this potentially lucrative market. In the early 21st century, the main market share was concentrated in the hands of these three companies. In recent years, after many acquisitions and mergers, Oracle, SAP and Microsoft have dominated the market for providing ERP solutions to universities. They have been and are successful with the ERP model for hundreds of large universities in the US, UK, Germany, etc.

Universities in the US were the first places to apply ERP systems in management. Notably, the ERP system services provided by SAP for the alliance of SAP-using universities [30]. From the success at universities in the US, many universities in Europe have also gradually approached and deployed ERP systems. There have been empirical evaluations of the effectiveness and success of ERP implementation projects at universities. In Europe, the German government took the lead in implementing ERP systems at universities, restructuring the organizational structure based on the information system. This study also discussed factors leading to increased operational capability of higher education organizations by applying SAP R/3. The effectiveness of this application was also empirically mentioned at German universities.

Eastern European countries such as Slovenia, Romania have also gradually implemented ERP in higher education organizations. They carried out step-by-step integration, with solutions for each field or application of a large ERP system. In their study, the group of authors researched the integration of software systems into research management in the university.

4. Advantages and Challenges of the ERP Application Trend in Universities

First is the study by Pollock N. and Cornford J. discussing the analogous relationship between universities and business organizations. It can be said that universities are organizations established a very long time ago, with a much longer history than companies and enterprises. Although there have been certain changes in form, function and outward appearance nowadays, universities still retain the inherent similar characteristics from long ago. That is a certain combination of purpose, limited "production" output, autonomy and dependence on social needs. Any organization has one or more of the above characteristics. In addition, the two authors also drew conclusions about the similarities in activities and management functions between universities and business organizations.

In his study, Yakovlev I. V. discussed the process of restructuring the management processes of a university when applying the ERP model to support management. The author pointed out the great challenge in restructuring management processes is having to forget traditional ways of working, being more open to accepting the functions provided by the new management system. Among the new functions, many help improve the operational activities of the university, while some others are not suitable for the small scale of the university. Therefore, the system needs to be reconfigured for suitability, although not everyone can do this.

Furthermore, Swartz D. and Orgill K. also conducted studies to provide a systematic ERP approach to help implementers save costs in implementing an ERP project. The group of authors pointed out the main issues and challenges when implementing an ERP system in a university. These are challenges in technology, techniques, functionality, retaining old personnel and recruiting new personnel.

Besides the advantages of this trend, there are also many difficulties. In his study, Pollock mentioned the shortage of professional ERP providers specifically serving the higher education market. As a result, universities have no choice but to apply a general solution. These solutions are very difficult to customize for the specific needs of organizations. Therefore, an important issue for software vendors and universities relates to the benefits of ERP systems that can be combined with strategies to improve the fit between these solutions, the needs of specific universities and organizations in general. In this regard, the provider needs a deeper understanding of the specific organizational context and requirements of universities.

In addition, the procurement strategy of universities has a significant impact on the application of ERP because universities find it difficult to evaluate software packages [39]. Also in this study, the author analyzed the incomparable issues between the university environment and the business environment where ERP was previously widely applied. It is very difficult to transition from a generic software package like ERP to implementation at a specific university. It is not only simply related to the technical factor, but also the understanding of trained users. Due to this difficulty, the author further analyzed the optional strategies that software vendors offer to different organizations. Software vendors offer a standard model, on the basis of which they customize for each specific organization based on repairing and upgrading standard software packages. Along with reconfiguring the software is an extremely difficult organizational change. Finally, the author analyzed the impacts of ERP on the organization: standardization, unit organization, re-establishment of policy planning processes and changes in relationships.

In addition to theoretical research, in practice there have been studies related to the successful application of the ERP model in the university environment with the support of lecturers. MacKinnon also conducted research on the services provided by SAP in the ERP system for the alliance of SAP-using universities (Table 1.1). The study mentioned the different ERP models provided by SAP for universities in the US.

Table 1.1. List of universities using SAP's ERP models

University	Prefix	No.	Title
California State U, Chico	MINS	220	ERP: Systems Configuration and Use
California State U, Chico	MINS	222	ERP: Systems Administration
California State U, Chico	MINS	224	Business Programming with ABAP
Central Michigan U	BIS	247	SAP Enterprise Software in Business
Central Michigan U	BIS	357	ABAP/4 Programming Fundamentals
Central Michigan U	BIS	458	SAP Configuration & Implementation
Clarkson U	IS	211	Intro to ERP Tools and Applications
Fairleigh Dickinson U	MIS	6611	Enterprise Resource Planning
Fairleigh Dickinson U	MIS	6612	Enterprise Information Systems
Florida International	ISM	3153	Enterprise Information Systems
Georgia Southern	CISM	4334	Enterprise Planning Using SAP
Indiana U	CIS	415	Enterprise Resource Planning
Indiana U of Penn	IFMG	465	ERP Technical Fundamentals
La Salle U	MIS	405	Emerging Information Technology
Louisiana State U	ISDS	4111	Enterprise Systems
Northern Arizona U	CIS	460	Advanced Topics in Information Technology
Rider U	MIS	485	Management Information Systems
Rider U	MBAD	616	Enterprise Integration
Santa Clara U	OMIS	135	Enterprise Resource Planning Systems
S Illinois U Carbondale	MGMT	456	Enterprise Resource Planning and Decision Support
Texas A & M U	INFO	468	Enterprise Resource Planning
U of Arizona	MIS	451	Enterprises and Business Intelligence Systems
Villanova U	DIT	2175	Enterprise Systems & Applications
Villanova U	DIT	2176	Enterprise Computing & E-Commerce

(Source: MacKinnon, 2004)

From the success of ERP implementation at universities in the US, Australia, UK, etc., a series of universities in Asian countries have studied applying this model to management such as China, India, Korea, Japan, etc. In 2010, Mishra at Gaur University, India proposed a future ERP model for the management of public universities based on Oracle's PeopleSoft model.

The authors also introduced the necessary sub-systems for an ERP system, the ERP life cycle, the challenges encountered when implementing an ERP project, and finally, suggestions for effective implementation.

5. Situation of ERP application in Vietnam

Theoretically, research on ERP in Vietnam is still limited, mainly empirical reports, lessons learned from implementing ERP systems in business organizations or the success or failure factors of ERP in Vietnam.

Along with global trends, Vietnamese enterprises are gradually understanding the role of ERP systems and are strongly investing in deploying ERP systems. ERP helps enterprises increase labor productivity, promote effective communication and increase competitiveness.

However, although the benefits that the ERP system brings to enterprises are very large, the ERP market in Vietnam is still not bustling. A study by the software company EFFECT [52] raised the issue that many enterprises and managers still do not fully understand what ERP is, whether to implement an ERP system or not, and how to choose an implementation solution. These are major concerns that have prevented the widespread application of ERP systems. Another reason pointed out by a report from PC World magazine is the lack of transparency of information in the ERP system implementation process, which also affects the application of ERP systems in enterprises. Currently in Vietnam, there are only two major foreign ERP providers, Oracle and SAP, along with Vietnamese implementation partners FPT-ERP, Pythis, Tinh Van, CMC, Fast, EFFECT... The information they provide at ERP seminars is not of high quality, lacking multi-dimensional and diverse information about all ERP solutions as desired by enterprises. Success or failure in implementation is also not clearly presented.

Potential for researching the application of the ERP model in university management in Vietnam The scientific and technological revolution, especially information and communication technology, will create favorable conditions for fundamentally innovating the content, methods and organizational forms of education, renovating education management, towards an e-education that meets the needs of each individual learner. The process of in-depth international integration of education is taking place on a global scale, creating favorable opportunities to access new trends, new knowledge, modern educational models, and mobilize external resources, creating opportunities for educational development.

Vietnamese universities have also gradually applied information technology to their management processes. However, the effectiveness remains low due to the lack of a common unified management framework and model for universities. Additionally, due to certain budget constraints, universities only apply small, separate management sub-systems from small or inexperienced vendors in the management information system field. This creates difficulties in communicating with applications from other vendors.

The combination of old systems, although meeting most requirements and having equivalent systems for student management, human resource management and finance modules, is not the same as ERP systems, where the modules are seamlessly integrated. Integration in the old systems was managed across multiple servers and different interfaces. Maintaining these interfaces became more difficult and required increasing resources. The individually designed ready-made systems lacked the essential features and functionality for investing in holistic systems.

Hence, the need arose to replace the old systems with an ERP system stemming from the following reasons:

- Difficulty in maintaining integration between different old systems.
- Many ready-made systems but lacking full support for requirements.
- Difficulty in scaling old systems to meet growth in operations.
- Difficulty in providing web-based services.
- Difficulty in integrating new technologies such as interfaces and web services with mainframes

based on old systems.

Thus, the application of ERP in universities is a global trend. Many universities have succeeded with different ERP models. Many lessons have also been learned, and the determining factors for the success of an ERP project have been studied. This is a favorable premise for universities in Vietnam to apply ERP systems to university management.

CONCLUSION

In general, the application of ERP in higher education in Vietnam and around the world is opening up new opportunities for effective resource management and planning. With the development of technology and the increasing need for digital transformation, the future of ERP in higher education promises to bring many benefits not only for universities but also for the entire education system. Importantly, universities need to continue investing in technology, training personnel and developing strategies to maximize the benefits of ERP.

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