

Comparison on the Implementations of ERPs with Different Versions

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Abstract. As a typical type of Management Information System (MIS), Enterprise Resource Planning (ERP) systems are mature on assisting in managerial operation with businesses. With the development of digital technologies and wide acceptance on MIS, Cloud ERP has received extensive attractions than Traditional ERP. This paper aims to analyze and evaluate the comparison between Cloud ERP with Traditional ERP. Both Traditional ERP and Cloud ERP have their competitive advantages since Cloud ERP is not mature in all dimensions. Traditional ERP is more stable, safer and cheaper, whereas Cloud ERP is more efficient and more flexible. Therefore, small or middle-size companies are suitable to use Traditional ERP, and large enterprises with rapid growth and changes are more suitable for Cloud ERP. Suitability and adaptability are the main factors that should be considered when the enterprise chooses its ERP system. The results of this paper provide general suggestions on the directions of selecting ERP systems for enterprises of different sizes.

Keywords: Management Information System (MIS); Enterprise Resource Planning (ERP); Enterprise Management.

1. Introduction

Management Information System (MIS) has become a promising trend for the past twenty years. It has become more and more mature in recent years, especially with the expansion based on the development of Internet [1]. As a managerial tool, an MIS provides the functions to manage and modify the information with digital technologies. However, some computer MISs are stand-alone operating systems, which means they do not need network but cannot share information [2]. The key strength of MIS is to strengthen the ability and efficiency of human beings to process information [3]. With an MIS, an enterprise could simplify operations of its information management. MIS now is developing for integration on both various technologies and different modules, and more enterprises have been focusing on the adaptability of the system [4]. The application depth has deficiencies, especially heavily relying on manual operation on it, so intelligent development is also a direction of its prospect [5]. To be more specific, an MIS with computers used in a business or an enterprise is called an Enterprise Resource Planning (ERP) or an Enterprise System. Realizing information management could maximize the level of enterprise asset management and build up a standardized and efficient management process [6]. As an integrated management system, ERP has been mature software products as technical supports, so it always plays a role of the management information platform for the internal business process of the enterprises [6]. The scientific and rational use of the proper ERP will eventually improve the core competitiveness of enterprises.

Sun et al. briefly introduced the development history of ERP and the application direction of ERP with a typical case of National Grid [7]. Liu discussed Traditional ERP that has been established by enterprises cannot match up with the growth of volume of information and size of enterprises, so Cloud Computing helps solve such problems [8]. Lyu and Ye analyzed the main features of Traditional ERP systems and cloud ERP systems, the structure of cloud ERP systems, and the risks and challenges faced by cloud ERP systems are discussed [9]. Wen and Zhang surveyed 34 cloud ERP vendor staff and 42 SME users on the main performance of cloud ERP and evaluation of services provided by the vendor and the current status of cloud ERP adoption, and then provided some suggestions for the existing problems [10]. Xu and Zeng compared Cloud ERP with Traditional ERP and pointed out their differences, and in the article, they also mentioned main disadvantages of Cloud ERP [11]. Huang and Wang analyzed the characteristics of the Traditional ERP system and made

suggestions on how the EPR system can cope with the new situation of supply-side reform, ecological accounting, the era of big data, the new economic normal and other new situations [12]. Ivănuș et al. designed to introduce the transition from Traditional ERP to Cloud-based ERP and the advantages and disadvantages in the context of digital technology and transformation [13].

The motivation of this paper is to analyze the advantages and shortcomings, and compare two typical versions of ERP - Traditional ERP and Cloud ERP to indicate what kind of enterprises they are suitable to. Based on the previous research, this paper would generate the general development status of ERP in Section 2. Afterwards, the detail strengths and weaknesses analysis of Traditional ERP and Cloud ERP would be discussed in Section 3 and Section 4. The results of comparison between these two version and suggestions will be presented in Section 5. Section 6 would be the limitation and future work of this paper. Eventually, Section 7 is a brief summary of the entire text.

2. Description of ERP

ERP is the abbreviation of Enterprise Resource Planning (ERP), which refers to the management platform built on the basis of information technology to provide decision making means for enterprise decision makers and employees with systematic management ideas [7]. Due to the management focuses of each enterprise almost on manufacturing management, it is necessary to manage the material inventory efficiently. The development history is shown as in Fig. 1. There is the earliest application of enterprise resource planning called Material Requirements Planning (MRP), which was only used to automate production and inventory management. Then, Manufacturing Resources Planning (MRP II) was born to optimize manufacturing operations and processes by combining materials with production requirements. It includes more modules of financial accounting, financial management, distribution management, demand management, human resources. MRP II integrates multiple types of modules into a single system for optimal management on the manufacturing process.



Fig. 1 Development History of ERP.

To solve the problem of narrow range of application, ERP was developed. The application of ERP improved efficiency of each business process sections, especially in production, resulting the more competitive enterprises. To a certain extent, it has changed the traditional operation and management mode of enterprises, promoted the integration and utilization of internal resources, and optimized business processes. The main function modules of an ERP system are presented in Fig. 2. ERP system integrates all resource planning for company management and production organization into a single system, including product design, warehouse management, material planning, human resources, finance, project management, production planning, sales and distribution, control, operations and logistics management, etc. [7]. That is Traditional ERP, which is a stand-alone system with several modules of different functions. With the mature development of the application of Cloud Computing, it allows users to access and modify the resources of information on the cloud server. In this case, it does not require the users to install any client or software on the computer. With only the browsers and networks, Cloud ERP can be accessed easily. In the meantime, the cloud server brings some challenges like the issue of data security. To sum up, ERP system integrates information technology and advanced management ideas, becoming the operation mode of modern enterprises, reflecting the requirements of the times for enterprises to rationally deploy resources and maximize social wealth creation, becoming the cornerstone of enterprise survival and development in the information age. It has a significant role in improving enterprise business processes and enhancing the core competitiveness of enterprises. Although ERP could be helpful for an enterprise, it is better to choose

the most suitable version of ERP for enterprises in different sizes. Main ERP products in the market include SAP, Oracle, and so forth.

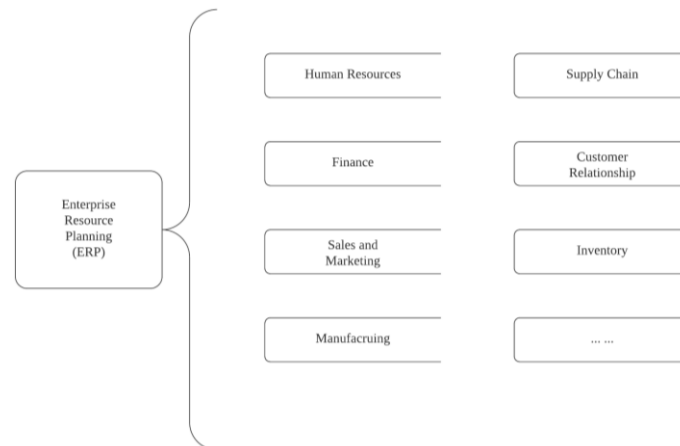


Fig. 2 Main Function Modules of ERP.

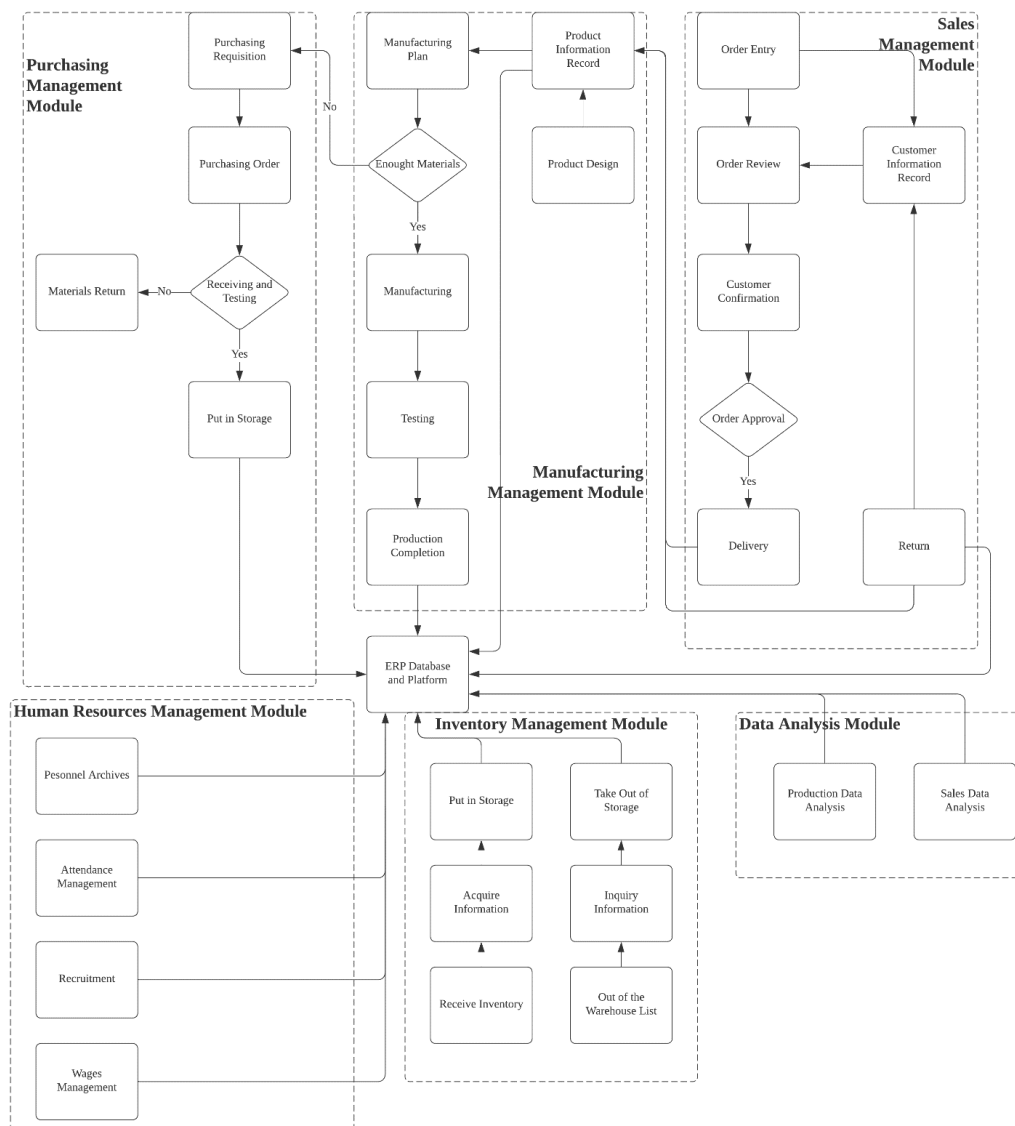


Fig. 3 Example Data Flow Diagram of ERP.

3. Traditional ERP

Traditional ERP can provide most functions that enterprises may be involved in. Traditional ERP systems have made outstanding contributions to building competitive advantage, enhancing product quality, improving service levels, and reducing operating costs [12]. The best advantage of it is to save the human resources on management, especially the loss caused by manual mistakes. It allows the users to analyze their finance situations, and with the dynamic analysis, the enterprise could figure out whether the capital structure is reasonable and the operations are proper. The data stored also provide information for prediction and decision making. The most critical function it offers is the resources allocation in production, finance, inventory, and so forth. This helps the manager to propose corresponding solutions to specific problems. Traditional ERP can play the role of resources planning supporter well. The basic process with a few modules flows as depicted in Fig. 3.

As mentioned before, Traditional ERP is a stand-alone system, which requires the enterprise to prepare the database, deploy the system, and install the system by itself, and there are restrictions on the enterprise operating system, which makes the system preparation phase complicated [11]. It is more complex to prepare and get into use at the initial stage. As an entire software, if the enterprise decides to buy a Traditional ERP, the expense should be paid once, resulting more pressure on the capital. Since the structure of Traditional ERP is fixed to some extent, it is hard for enterprises to update the system as they want and the cost will be higher than updating a Cloud ERP. In addition to it, the data stored in Traditional ERP is relatively separated, which means it is difficult for enterprises to integrate all the information or data from different modules in an operation process. The processing speed and volume will be limited since the processing volume and performance have maximum. Although the preparation stage is tough, the security of the information operated in Traditional ERP is worthy to trust. Since the data is always used in local system, the data flows without disruptions from other users. The database of the system is also located in the specific computer, which makes the data store safer. It is easier to build a more customized ERP system when using the traditional one. Through linking different tables in the database to each other, Traditional ERP can also realize that integrate different modules with respective tables. It rarely iterates after the product was sold, so the maintenance cost would not be expensive all the time. The management pattern is standard so that once the user gets accustomed to using the system, the user would tend not to make mistakes and save time to realize the management operations.

4. Cloud ERP

Cloud ERP can provide more functions that enterprises require. In addition, it has a cloud server to store and process the data. It allows the user to make a more comprehensive management over all the enterprise with permission. It solves the problem of manual mistakes to a larger extent. The advantages it brings to an enterprise is huge and apparent. The most important point is that the system can be updated according to the requirement from the dynamic change in the market or society.

It shields the software and hardware environment, effectively reduce the cost of enterprise software and hardware investment, shorten the ERP construction cycle, enhance the level of enterprise information technology [9]. The preparation stage for Cloud ERP is convenient. The payment method is more like a way to rent, so the price is not exceedingly expensive at once. As the size of the enterprise grows, it is unnecessary to uninstall the original version and reinstall it. It is flexible to update with new users by just upgrading the hardware facilities and network inside the enterprise. Meanwhile, Cloud ERP allows more users to operate and get involved in the managerial process together at the same time. Cloud ERP integrates information from different modules to analyze and process more convenient, and the acceptability to the volume of processing data is stronger. It realizes information interaction and multi-party information sharing. The processing speed and performance are also faster than the traditional one. However, the total costs to use Cloud ERP system is higher since the maintenance costs and updating costs are frequent as well as high. It is hard to be customized since the connection between modules are close and the price would be higher. Cloud ERP system is

mainly based on the Internet and overly dependent on the Internet, and the current Internet network has a certain degree of vulnerability, once the Internet network has a large area of failure, the system will not work properly, the normal operation of enterprises will be affected, which indirectly increases the cost of using the system [9]. Meanwhile, some providers just provide a cloud space for the enterprise to store data, which is not a real Cloud ERP [11]. The data security is also a problem of Cloud ERP system. Although several digital technologies have been put into use to prevent data leakage, Cloud ERP model determines that the cloud data will often be migrated between the data centers of different service providers, coupled with the imperfection of relevant laws and regulations, once the core data is damaged, leaked and tampered with, it is difficult to delineate the relevant responsibilities between users and cloud service providers [9], i.e., it may lead to severe impacts.

Table. 1 Differences between Traditional ERP and Cloud ERP

	Traditional ERP	Cloud ERP
Installation Preparation	Complicated installation preparation with process done by the enterprise and strict requirements on hardware	Short and easier construction with less restrictions on both hardware and software
Functionality	Most of functional modules enterprises need are provided	Almost every functional module enterprises need is provided
Cost	High cost to build up, but rare cost to maintain the system, and hard to be updated without huge investment	Easy to set up, but with regular and high maintenance or updating costs
Data Security	Safe in the stand-alone system without communication to other devices	Relatively unsafe in the regular data communication on the server through Internet
Integration	Separated operations in different modules by a database with tables	Integrated operations in all modules by a cross database
Efficiency	Small volume of data and a conventional speed	Large volume of data and high speed to process with cloud computing

5. Comparison

As shown in Table. 1, Traditional ERP and Cloud ERP have their own advantages now. Compared to Traditional ERP, Cloud ERP is more competitive in performance, efficiency and accuracy. In fact, Cloud ERP is the one more suitable to this digital time. However, it does not mean that Traditional ERP is nothing. At least so far, Traditional ERP is still used by many businesses since the cheaper operating and maintenance costs, more customized features, and safer data store. Although Cloud ERP is more attractive for modern digital enterprises and large companies, Traditional ERP will still be the potential choice of some businesses, especially those companies in small or middle size.

For small or middle-size businesses, building ERP system is something once for all. Lengthy preparation process and the higher start costs are inevitable. But compared to Cloud ERP, Traditional ERP has the suitable volume and model to process information in a computer, especially for small companies. The biggest challenge for the small or middle-size businesses is the security of the information. Information leakage problems may be deadly to these enterprises, since they do not have flexible capital chain. Then, after comparison, small or middle-size enterprises had better choose Traditional ERP for a stable and safe development.

Nevertheless, once the company size grows, especially for large businesses, Traditional ERP will be less effective and even cannot improve the management performance. Cloud ERP would show its superiority on the performance and efficiency. Large enterprises require more staffs to be involved into the business process management, which Traditional ERP cannot support. Meanwhile, Cloud ERP also help large companies integrate the distinct departments by the modules. Large companies

could endure the risks of information security to some extent. It is easier to update adapting to the constantly changing market environment. Then after comparison, large or growing-fast enterprises had better choose Cloud ERP for a flexible and efficient working environment.

6. Limitation & Prospects

ERP was and is always developing along the time. Traditional ERP is relative out of mode currently, but Cloud ERP has not developed to the level of one hundred percent trust. The issue of data security and the issue of adaptability or customization of Cloud ERP are the main problems to solve for ERP developers. Information leakage is the most serious one. Since the volume of data is large and most data are private for the enterprises. Once the information or data is stolen, the enterprise would lose its customers and become less competitive. A more secure environment for Cloud ERP is one of dimension to break the restrictions now for its further development. Another problem is the adaptability between ERP systems and enterprises. The most common ERP products in the market are general and could be used by most enterprises, however, specific modules are more effective when the function model is suitable to the detailed situation of the enterprise. Meanwhile, it is expensive for businesses to buy or develop a customized ERP, especially for small and middle size enterprises. The reasonable use of ERP is also a problem that is caused by users. There are not enough people who know both digital platform and management unless enterprises provide training on it. However, it will result in more costs, i.e., the development and the application of ERP are still on the road.

This paper points out what sort of enterprises Traditional ERP and Cloud ERP are suitable for at the present stage. As the further development of digital technologies, ERP tends to become more diversified. Only one of the modules could be used as an ERP system, and the connection among different modules would be closer. Traditional ERP would be transformed with those digital technologies at the same time. In this case, total costs of building an internal ERP system would be relatively less since there will be more choices for enterprises to select. Small and middle size enterprises is the main users and market potentially in the future. Under this condition, the providers of ERP products have more accurate direction to develop. Since changing ERP system within an enterprise impedes the stable and smooth progression, the cooperation relationship between the provider and enterprise users will be closer. There would be more cases of ERP products for enterprises to refer to. All of those will lead an enterprise to find its suitable ERP system easier.

7. Conclusion

In conclusion, both Traditional ERP and Cloud ERP play an optimal role in the management of enterprise resources, and it is more critical to choose the suitable ERP system for the enterprise to maximize the effect of ERP system. Based on the analysis, it is suggested that enterprises in small or middle size choose customized and safe Traditional ERP at first, and gradually replace it with Cloud ERP when the size and capital of the enterprise grow significantly. For large companies, performance, integration, and efficiency are more important. Therefore, Cloud ERP is more suitable and large companies should consider and plan more on how to make full use of the ERP system. This paper cannot predict the future of ERP systems since ERP is always developing. Due to the fast change of digital technologies, Cloud ERP will become close to perfect in the future, Traditional ERP may be eliminated, and the perspectives of this article may be overturned in the future. Overall, these results give general suggestions on how to choose ERP systems for a certain business at current time.

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