

Factors Influencing the Effectiveness of Leasing Cloud-based Enterprise Resource Planning

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Abstract

In the general environment of global economic downturn, enterprises are constantly proposing new policies to reduce cost in all aspects. The leasing cloud-based Enterprise Resource Planning (ERP) system shows its advantages in reducing costs for enterprises. The propose of the study is to understand leasing cloud-based system implementation benefits through unintrusive participant observation, to record the import process, and use the literature over the years as a comparison and analysis. The research results show that the payment method of system procurement influences the effectiveness of leasing cloud-based ERP system, system vendor's influence on leasing cloud-based ERP system effectiveness, implementation strategic objectives affect the performance of leasing cloud-based ERP system, top management support has an impact on the effectiveness of leasing cloud-based ERP system, and business process reengineering influences the effectiveness of leasing cloud-based ERP system. The research results will provide reference for academic and practice.

Keywords: Enterprise resource planning, cloud-based system, leasing system, system implementation

1. Introduction

The electronics industry has driven the economic development in Taiwan, leading to the improvement of national competitiveness and considerable foreign exchange income in the past. The promotion of the industry means that the enterprises in the industry must constantly strive for innovation and growth. When businesses stop creating innovation and growing, businesses will soon face the question of survival. How to enhance the competitiveness and profitability of the organization so as to maintain the sustainable operation and development of the enterprise is an important issue at present.

American Production and Inventory Control Society (APICS) defined the enterprise resource planning (ERP) system in 1995 as "ERP is an accounting-oriented information system used to confirm and plan the order receiving, manufacturing, shipping and the entire enterprise resources required to settle customer orders." The biggest feature of ERP system is "Comprehensiveness". The operations handled include business planning, marketing, sales, material planning, production scheduling, on-site operation management, logistics, etc., which have covered the needs of the daily operation of the enterprise, and are the main basis for the enterprise to enter the electronic enterprise (Cox, Blackstone & Spencer, 1995). In the general environment of global economic downturn, enterprises are constantly proposing new policies to reduce cost in all aspects. The

leasing cloud-based ERP system shows its advantages in reducing costs for enterprises.

This research is to explore the first step of enterprise information systematization: A case study of electronic business (EB) based on leasing cloud-based ERP. The propose of the study is to understand leasing cloud-based ERP system implementation benefits through unintrusive participant observation, to record the import process, and use the literature over the years as a comparison and analysis. This study will conduct in-depth interviews with the implemented seed members after the company is officially launched. The research questions are as follows:

1. Does the payment method of ERP system procurement affect the effectiveness of the system?
2. Does the system supplier have an impact on the effectiveness of leasing cloud-based ERP system?
3. Does the implementation strategic objectives affect the effectiveness of leasing cloud-based ERP system?
4. Does the support of top executives influence the effectiveness of leasing cloud-based ERP system?
5. Does the business process reengineering affect the effectiveness of leasing cloud-based ERP system?

2. Literature Review

2.1 Development of Enterprise Resource Planning (ERP)

With the changes in market competition, enterprises' demand for informatization is becoming more and more changeable and stricter. The development of enterprise resource planning system (ERP) can be divided into five stages to discuss (King, 1999).

Stage 1: MRP (Material Requirement Planning) system

The MRP system (Material Requirement Planning) came out in the 1960s, and it belongs to the consideration of cost production-oriented system. The main function is to solve the problems of material item, material quantity and material delivery date when producing products.

Stage 2: MRP II (Manufacturing Resource Planning) system

In the 1980s, the MRP system developed into a product-oriented system based on product quality. MRP II becomes a kind of enterprise for the management system of material management focuses on improving production efficiency.

Stage 3: ERP (Enterprise Resource Planning) system

At the end of the 1980s, with the pace of internationalization of enterprises, the automation technology of enterprises became more and more mature, and the traditional MRP II system could no longer meet the needs of comprehensive operation and management of enterprises. In the 1990s, the integration of enterprise resources began to be emphasized, so an enterprise resource planning system (Enterprise Resource Planning, ERP) with a focus on speed and efficiency emerged.

Stage 4: ERP II (Enterprise Resource Planning II)

In December 2000, Gartner Group redefined the ERP system and called it ERP II. It is a system with collaborative planning-based system, combined with CRM (Customer Relationship Management), SCM (Supply Chain Management), KM (Knowledge Management), BI (Business Intelligence), so that enterprises and e-commerce can establish a better mode of operation (value chain) to effectively enhance the competitiveness of enterprises.

Stage 5: RTE (Real Time Enterprise)

At the end of 2002, due to years of environmental changes and long-term research and investigation, Gartner Group proposed a new

concept of enterprise management, RTE (Real Time Enterprise). Gartner Group defines it as the ability of enterprises to use the latest information in real time to relieve delays in the management and execution of their critical business processes (Gartner, 2004). RTE is not a technology, but a business capability (MBA-lib, 2022).

2.2 ERP-related Research

Barth and Koch (2019) propose 14 critical success factors in ERP upgrade projects based on the prioritization of the factors done by the interviewees and the amount of occurrences within the interviews, including project management, external support, ERP team, multiple system landscape, system testing, communication, key user integration, lessons learned, stick to the standard, top management support, resources and focus, change management, data and code cleansing, use of new potentials.

Drawing from the literature, security, usability, and vendors were the top three most widely cited critical issues for the adoption of cloud-based ERP (Salih et al., 2021). Byungchan and Hyunchul (2020) conduct the empirical analysis to show that the factors of organizational culture, regulatory environment, relative advantage, trialability, and vendor lock-in all have significant effects on the intention to adopt cloud-based ERP.

The research presents the 16 critical factors in the adoption of cloud ERP systems and their priorities, including security of the systems, senior management support, add-ons and customisation, ease of integration, user education and training, effectiveness of employees' ICT skills, service providers' dependability, data backup and recovery, retention of data, cost of software maintenance and upgrades, maintainability, usability as perceived, effectiveness of inventory and inventory carrying cost, reliability of the Internet, government regulations and policies and use of latest IT technology (Salih et al., 2021).

After introducing ERP system in Food Company in West Java, ERP implementation positively affects work quantity, work quality, knowledge, collaboration, creativity, dependence, initiative, and personal quality (Fauzi, Adnani & Jamaludin, 2022). Several benefits in cloud ERP adoption, including cost aspect (low maintenance cost, and low upfront investment cost), technology aspect (increase scalability, continuously system enhancement, and reliability) (Zhao & Kirche, 2018; Razzaq et al., 2020).

Companies can use Cloud ERP to manage finance, business and report to conduct in the cloud (Saha, Kundu & Ghosh, 2018). Companies leasing cloud-based ERP services can save

money by reducing the ownerships and licensing costs associated with their purchased software and other installation and maintenance costs of on-premise ERP systems (Acumatica, 2018; Valashani & Abukari, 2020).

3. Research Method

This study adopts the unintrusive participant observation in the case study method. "Unintrusive Participant Observation", that is, go deep into the real life mirror of the case, and participate in case activities while observing. The seed members who participated in the leasing cloud-based ERP implementation were used as the objects of in-depth interviews, combined with the collection of secondary data. The key factors for the success of the leasing cloud-based ERP implementation were analyzed. The research results were used as a suggestion and plan for the implementation of the leasing information system in the future.

3.1 Research Object

The object of this study is a local complete yellow light process equipment company in Taiwan. The company positions itself as a system integrator, mainly engaged in the design and manufacture of front-end yellow light lithography process equipment for the LED industry, CMOS industry, and advanced packag-

ing industry, automation integration, and design, assembly and manufacture of automatic optical inspection (AOI) systems. Products include track coater system, mask aligner, track developer system, mask cleaner and optical automatic inspection system (AOI).

The company has an excellent management team, focuses on the business philosophy of "innovation + humanities", and pursues the sustainable operation and growth of the enterprise. In addition to hardware design capabilities, the focus of core competitiveness will be on automation integration, including electronic control software and hardware design capabilities/CIM/MES/UI... and other C++ software language applications. The case company has also successfully integrated a well-known domestic equipment factory as a subcontracting cooperative supplier to engage in capacity coordination for mass production.

The case company has approximately 110 employees. There are fourteen departments and four divisions. The interview objects selected in this study are mainly the seed members of the leasing cloud-based ERP implementation team or the director of the department in the case enterprise. The background information of the 7 interviewees are as follows:

Table 1: Respondent Profile Analysis

Interviewees	Department	Job Title	Major	Education Level
1 Ru	Human Resources	Head	International Trade	Bachelor
2 Re	Material	Specialist	Business Administration	Bachelor
3 Iv	Purchasing	Senior Specialist	International Trade	Associate Degree
4 Ju	Finance	Head	Finance	Bachelor
5 Ma	Project	Senior Specialist	Information Management	Associate Degree
6 Wi	Business	Specialist	Food Science	Bachelor
7 He	Mechanical	Specialist	Business Administration	Bachelor

The leasing cloud-based ERP implemented by the case company is divided into seven modules, including resource management, purchase-sales-inventory management, financial management, production management, quality management, manpower management, and purchasing modules.

4. Case Analysis

The contents of the interviews with seven members of the enterprise in this study are summarized as follows:

1. Information quality of leasing cloud-based ERP

The seven interviewees generally shared the opinions that the system can provide correct information quality. The 7 interviewees generally agree that the quality of information comes from the completeness and correctness of the data, and the output information can meet the needs of users. The only disadvantage is that

the creation of data must be entered one by one, and the method of batch import cannot be used, which increases the working time of many people and feels very inconvenient.

2. System quality of leasing cloud-based ERP

On the whole, the system can collect and provide the information required by users correctly and at a reasonable processing speed. In the performance of reports and tables, the information can be directly output into a common document format, which makes all interviewees feel very convenient. Although not all the built-in formats are applicable to the case enterprises in this study, they can basically be formatted and output by themselves. In the operation interface section, the screen is novel and the colors are bright, and the typesetting of the operation interface can also be set according to the user's personal preferences. Generally, the interviewees can accept it, and only a few think it is too fancy.

3. Service quality of leasing cloud-based ERP system providers

Through in-depth interviews with seven members of the case company in this study, it was found that the interviewees agreed that the supplier's attitudes are very different before and after the implementation. The planning, arrangement, and provision of manuals for education and training courses before the implementation were all appropriate and good. After the official launch, the single window was responsible for contacting the corporate information department. Therefore, the speed of responding and handling problems was significantly slower. Only the IT-related information and seminar information provided by the supplier from time to time make the employees feel good.

4. Service quality of the information department

The leasing cloud-based ERP system implementation plan conducted by the case company in this study is led by the senior executive (general manager) of the information department. All interviewees unanimously agree that colleagues in the IT department are highly motivated. Colleagues in the information department provide the most suitable training courses of the case company, and also specially produce and provide the operation manual for the SOP of each department within the company and the highest degree of cooperation with each department. In addition, colleagues in the information department have established a good basic concept of IT systems for all colleagues in the company.

5. Actual usage of leasing cloud-based ERP systems

All the interviewees agreed that the usage rate of this system is very high in the case enterprises in this study. The case company in this study has made very rigorous planning before introducing this system. The case company turns this leasing cloud-based ERP system into a part of the enterprise's internal working mode and operation process, and brings this IT system into the interlocking operation process. As long as any work does not be used with leasing cloud-based ERP system or creates wrong information, it will be discovered immediately in the next stage. It makes the internal employees to use this system necessarily. In addition, the top management will lead the colleagues, and use the group effect to force employees at all levels to try to learn and use this system.

6. Intra-corporate personal benefits

Most of the seven interviewees believe that the implementation of this leasing cloud-based ERP system has increased personal benefits within the company. The majority of

respondents who agreed were data beneficiaries. Those who were not creators of original data and mostly only needed occasional maintain or update it. However, a small number of interviewees think that after the introduction of this system, instead of reducing the expenditure on manpower, the staff will spend more time on the establishment and maintenance of data, which is a time-consuming and labor-intensive phenomenon, but also increased the workload of the department.

7. Organization benefits

In terms of overall enterprise organizational benefits, most of the interviewees believe that the implementation of this system has increased management performance, and reduced the burden and expenditure of manpower at the same time. Additionally, it also improves the accuracy of information and makes the operation more systematic. This is conducive to information integration and analysis. Therefore, it should be beneficial in terms of overall corporate organizational efficiency. There is still one interviewee who said that because the system must input data one by one, the operation process becomes complicated, the working time becomes worse, and the improvement of the overall organizational efficiency of the enterprise is limited.

5. Conclusion

1. The influence of the payment method of system procurement on the effectiveness of leasing cloud-based ERP system

When the case company in this study planned to purchase the ERP system at the beginning, it was limited by the eagerness to obtain the results of cost down performance. Therefore, the case company chooses to purchase the ERP system in the form of lease payment. As a result, the service quality of the supplier was affected due to the extension of the cost.

2. System vendor's influence on leasing cloud-based ERP system effectiveness

Vendors was one of the top three most widely cited critical issues for the adoption of cloud-based ERP (Salih et al., 2021). Since there are few leasing IT systems for small and medium-sized enterprises, and the director of the information department has no relevant leasing experience, they have not done a complete evaluation and arrangement of supplier data. According to the contract, the supplier cannot charge fees for system modification and maintenance services, and system services are almost always available. Under the circumstances, enterprise users have considerable advantages, and for suppliers, it is not easy to implement the charging method. This caused the supplier's service attitude to deteriorate af-

ter the implementation and launch, and even the corresponding window could not be contacted.

3. The influence of implementation strategic objectives on leasing cloud-based ERP system performance

The case company in this research belongs to the high-tech industry and has bases in mainland China and Taiwan. When introducing the leasing cloud-based ERP system, it has clearly set "information quality", "system quality", "inside individual benefits" and "enterprise organization efficiency" as ultimate strategic goals. Therefore, the implementation plan of the case enterprises in this study is carried out smoothly.

4. The impact of top management support on the effectiveness of leasing cloud-based ERP system

The leasing cloud-based ERP system implementation project of the case company in this study was led by senior executives, through various meetings and various ways of conveying information are used to declare their determination and belief to employees, and encourage colleagues in the enterprise to gather together and move towards the goal together. Top management support is one of critical success factors influencing the implementation of ERP system (Barth & Koch, 2019).

5. The impact of business process reengineering on the effectiveness of leasing cloud-based ERP system

The case company in this study clearly defined the introduction process, scope and implementation goals, so that each department in the company clearly understood its own needs and goals. Through the integration of internal organization and process reengineering, the work mode and operation process are redefined, so that internal business procedures and internal control can be integrated with the leasing cloud-based ERP system. Ease of integration is a critical factors in the adoption of cloud ERP system (Salih et al., 2021).

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