ERP Software Selection Strategy Using Analytic Hierarchy Process (AHP) Case Study: PT Gramedia Printing

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Abstract

Enterprise Resource Planning (ERP) is an integrated information system technology used by world-class manufacturers to improve company performance. According to the policy determined by Kompas Gramedia, in all business sectors, the strategy must implement ERP. Printing PT Gramedia plans to implement ERP. The ERP that will be implemented in the printing company has not yet decided which ERP to use. Persian Malan. The choice of ERP in PT Gramedia printing is the object of research. The research was conducted by applying quantitative research methods, using raw data and auxiliary data as samples. The test results and analysis are expected to provide guidelines for PT Gramedia's print management to choose the correct implementation of ERP, so as to realize the vision to be realized.

I. INTRODUCTION

The enterprise system seems to be a dream come true. These ones Commercial software packages are expected to achieve seamless integration All the information flowing through the company-financial and accounting information, human resources information, supply chain Information, customer information. For struggling managers, The incompatibility of information systems and inconsistent operating specifications have paid a huge price and created a great sense of frustration. Therefore, the hope for a ready-made solution to the business integration problem is encouraging. Therefore, it is not surprising that the company has been hopping the door of enterprise system developers. [1]

An enterprise resource planning (ERP) system is a vital investment, which may seriously affect the competitiveness of enterprises in the future. The AHP method guides how to determine the priority of a set of alternatives and the relative importance of attributes in a multi-criteria decision problem. The framework can systematically build the ERP selection goals to support the business goals and strategies of the enterprise. [2]

The PT Gramedia printing management information system, which has only provided services at one production site in Palmerah so far, serves as a support for the printing business process, so it must be modified to assist the management in managing P.T.'s printing business process. Gramedia is scattered in multiple locations. The existing management information system is still operationally capable of processing data from the production order entry process, finished product delivery and payment process. [3]

Considering the vision and technological development to be realized, P.T Gramedia's printing company intends to implement ERP in 2010. Gramedia has become more and more effective. This plan is certainly not so easy. To implement it, many things must be prepared. One of the things that must be prepared is the question of choosing the right ERP vendor/software to be implemented in PT. Gramedia. [4]

II. RELATED WORKS/LITERATURE REVIEW

ERP

ERP system refers to the term used to support daily transactions or operations in the management of company resources. These resources include funds, personnel, machinery, spare parts, materials, time and capabilities. From several documents, several definitions of ERP can be revealed. The American Association for Production and Inventory Control defines ERP as: "A method of effectively planning and controlling all resources needed in manufacturing, distribution or service companies to acquire, build ships and process customer orders". [5]

Davenport published another ERP overview, he said: "ERP (Enterprise Resource Planning includes a business software package that guarantees seamless integration through the company's finance, accounting, human resources, supply chain and customer information flow through all information. [6]

The concept of ERP delivered by Davenport can be illustrated in Figure 1 below:

Fig. 1 The ERP concept [6]

The ERP system is divided into several subsystems, namely the financial system, the sales and distribution system, the manufacturing system, and the human resource system.

The ERP system has the following characteristics: [7]

1. The ERP system is a software package designed in a traditional (desktop-based) and Web-based client-server environment.
2. The ERP system integrates most existing business processes.
3. The ERP system handles all transactions organized by the company.
4. ERP system uses EntERPrise scale database for data storage.
5. The ERP system allows users to access data in real time.

In some cases, ERP is used to integrate transaction processing and planning activities. Therefore, ERP must:

a. Support multiple languages and financial systems in different countries/regions.
b. Support certain industries (for example: SAP can support various industries, such as oil and gas, health, chemical, and banking).
c. It can be easily customized without changing the program source code.

The fundamental reason for the printing industry to implement ERP is to solve the problems commonly faced by the manufacturing industry. However, in the printing industry, manufacturing usually has different problems. 3 It is expected that the main problems in the printing industry can be solved by implementing ERP: [8]

1. Order estimates the order estimation (pricing) process in the printing industry is a very complicated process. This is due to the wide variety of products and factors that determine the price of the print order. The factors that determine the order estimation process include:
   -The price factor of materials (paper, ink).
   -Color configuration factor (imposition), shape.
   -Engine coefficient used. -Finishing process factor (volume), insert.
   -Processing factors before printing (retouching, imaging)
2. Manufacturing order/order routing Order routing or commonly referred to as work orders, production orders are a mechanism for planning and controlling production. The order process in the printing industry is usually completed by personnel familiar with the printing production process and the machine's ability to process orders. This leads people to be highly dependent. With the implementation of ERP, anyone can complete this process and it becomes easier.
3. Orchestration/production scheduling in general, the scheduling process in the printing industry is different from that in the manufacturing industry. Planning in manufacturing is usually based on BOM (Bill of Materials). In the printing industry, this method cannot be applied correctly. In the printing industry, the clamping process is determined by the configuration and the machine to be used. Of course, in the large-scale printing industry, many machines and their variants will complicate this process. ERP implementation is expected to solve this problem.

AHP

AHP is a quantitative method that can make complex evaluation decisions. [9]. AHP is an analysis tool that can be used. Decisions are made under conditions with complex factors, especially when the decision is highly subjective [10]. AHP can simplify complex, unstructured, structured problems and structural dynamic changes in the form of hierarchical structures. preparation. This level is the most important level. Use AHP as a model for solving desired problems. Required to compile this hierarchy [11]. Creative thinking, collecting information, grafting, thinking process in practice, without setting standard process goals, standards, and other element hierarchy. Layered suspension is the most common multi-layer and top-down stacking factor, and it is also the most difficult to control. The most common and controllable factor. Specific and controllable factors [12]. I think the advantages of the AHP method are as follows: 1) Hierarchical structure, because the selection standard to the deepest sub-standard. 2) Pay attention to the inconsistency criteria and tolerances of alternative methods selected by the validity decision maker. 3) Guess the results of resistance or sensitivity analysis to make a decision. [13]

III. METHODS

This research is conducted by first studying the theories and materials of previous research (library research) and then conducting surveys (survey research), that is, allocating questionnaires at a certain time to collect sample data (cross-sectional survey). Potential ERP applications Program user group. (Enterprise business plan) [14]. This type of research is exploratory, that is, extracting facts about the choice of ERP software, taking printing P. T. Gramedia as an example.

The method used is purposeful sampling, which is based on certain considerations [15]. This questionnaire is used to select the ERP software to be used in P.T Gramedia printing. The types of respondents will be divided into three categories. There are 6 low-level managers, 4 middle-level managers, and 2 high-level managers.

The data collection strategy is based on the opinions of individuals or respondents and is implemented using survey techniques obtained from questionnaire surveys. In the process of filling out the questionnaire, the interviewee is always accompanied by the researcher. This is to help the interviewee have difficulty filling out the questionnaire or there are things that the interviewee cannot understand.

IV. RESULTS

Selection criteria for ER software

When choosing ERP software according to Oyku Alanbay's criteria, there are 3 criteria, namely technology, user and supplier. In the case of choosing PT Gramedia's ERP printing software, the following results were found:
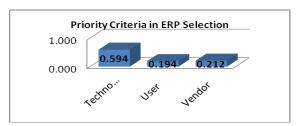

Fig. 2 Priority Criteria in ERP Selection

It can be seen from the comprehensive opinion analysis results of the interviewees that the technology-related standards (weighted value of 0.594 or 59.4% of the total standard) are the most important standards considered by the interviewees. ERP software from PT Gramedia Printing Company. When choosing ERP software, the supplier standard is the second consideration (weight value of 0.212 or equal to 21.2% of the total standard). At the same time, the user standard is the last standard considered when choosing ERP software (weighted value 0.194 or equal to 19.4% of the total standard).

Factors to be considered in technology-related standards

In the technology-related standards, there are six factors that affect the choice of software. Each factor has a different priority value. The results of processing interviewee data when determining the priority of factors in technical standards are as follows:
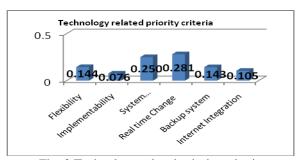
Fig. 3 Technology related priority criteria

It can be seen from the analysis results of the respondents' comprehensive opinions that the real-time change factor (weight value of 0.282 or equivalent to 28.2% of the total factor in the technology-related standards) is the most important factor considered by the respondents. It is very important in technology-related standards. The system requirement factor becomes the second priority (weight value of 0.250 or equal to 25.1% of the total factor in the technology-related standards). The flexibility factor becomes the third priority (weight value of 0.144 or equivalent to 14.4% of the total factor in the technology-related standards). The last factor to be considered is the implementability factor (the weight value is 0.076 or equal to 7.6% of the total factors in the technology-related standards).
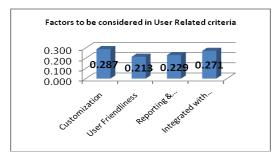

Fig. 4 Factors to be considered in User Related criteria

From the results of the respondents' comprehensive opinion analysis, the custom factor (weighted value 0.287 or equivalent to 28.7% of the total factor in the user-related standards) is the most important factor considered by the respondents. Standards related to users. Integration with other application factors becomes the second priority (weight value of 0.271 or 27.1% of the total factor in the user-related standard). Reporting and analysis function factors are the third priority (weight value of 0.229 or equal to 22.9% of the total factors in the user-related standards). The user-friendliness factor is the fourth or final priority (weight value of 0.213 or equal to 21.3% of the total factors in the user-related criteria).

Factors to Consider in Vendor Related Criteria

In this supplier-related conditions, there are 5 factors. According to the survey respondents, the priority factors are as follows:
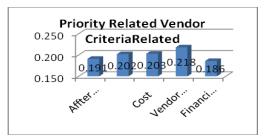

Fig. 5 Priority Related Vendor Criteria

According to the comprehensive opinion analysis results of the interviewees, it is found that the supplier certificate factor (weight value of 0.218 or equal to 21.8% of the total factor in the supplier's relevant standards) is the most important factor. Select the cost factor as the second priority (weight value of 0.203 or equal to 20.3% of the total factor in the supplier-related criteria). Select maintenance factor as the third priority (weight value is 0.202 or equal to 20.2% of the total factor in the supplier's relevant standards). The after-sales service and support factors are selected as the fourth priority (weight value of 0.191 or equal to 19.1% of the total factors in the standards related to the supplier).

Alternative ERP Software Which is a Priority.

After several interviewees fill in the questionnaire, and through the calculation of merging the interviewee data, the replacement weight value of the following figure is obtained:
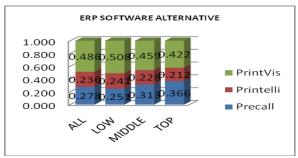

Fig. 6 ERP Software Alternative

All interviewees have the same view on alternatives to ERP software. Low-level, middle-level, and high-level management all agree to choose Print Vis software as the main choice.

Inconsistency Rate

The inconsistency rate or inconsistency rate of expert responder data is a parameter used to check whether pairwise comparisons are performed consistently. If CR value <= 0.1, the data inconsistency rate is good According to the results of data processing performed by respondents when choosing ERP software, the following consistency ratio data can be obtained:

Fig. 7 Inconsistency Rate

Research Implications

The research results pointed out that ERP PrintVis software is the most suitable software for PT Gramedia printing company. The management (supervisor) must decide letter and then socialize the decision. As we all know, the ERP implementation project is a crucial project, not just buying software and then installing and completing it. PT Gramedia's print managers must prepare the ERP software implementation program and how to manage the ERP resource project. Management must.

Form a change management team to support the successful implementation of the ERP. Management also needs to prepare control strategy or risk management (risk management) The ERP software selection team, especially those from the IT field, can begin to review the existing infrastructure to support the implementation of ERP software. The review can be aimed at server equipment, LAN network, WAN network, application software, and whether all these areas can support the selected PrintVis ERP software. Of course, if something is not supported, a solution must be found, whether it is an upgrade or the purchase of a new solution.

Technical documents related to the existing system must be prepared to simplify the ERP implementation process. For old or existing systems, the method of the conversion process must also be adjusted.

This research can also be extended by adding other criteria and determining future factors. In addition, the research can be repeated to determine whether the method and verification of the criteria and factors, as well as the research alternatives, are still valid as time and technological progress increase. Combined with the implementation of the ERP software, the impact of ERP implementation on company performance can also be studied.

V. DISCUSSION

According to the results of the research and data processing of the survey subjects using the Expert Choice2000 software, the following conclusions can be drawn:

1. There are 3 criteria to consider when choosing ERP software. These guidelines are technology-related guidelines, user-related guidelines, and supplier-related guidelines. Among these three standards, technology-related standards are the most important for choosing ERP software.
2. The second question is about which ERP software to choose from among the three softwares: Precall, Printelli and PrintVis. Therefore, based on the data processing of the interviewees, it is found that PrintVis is the preferred ERP software. Assuming that ERP PrintVis software is proposed to be suitable for ERP software implemented in PT Gramedia printing company, it is obvious from the data processing results that ERP PrintVis software is the first choice of respondents (weight 0.486 or equal to 48.6%).

VI. CONCLUSIONS

It is hoped that the work initiated in this study will be useful and can be used as a basis for strategic decisions in determining when a company or organization will implement ERP. Some suggestions for the development of this research:

1. The results of this research can also be applied or used and developed in other printing companies.
2. In addition to applying this research to the selection of ERP software, the AHP Oyku Alanbay model used can also be applied to the selection of other software or equipment related to the technology used by PT Gramedia Printing Company.
3. With the application of such research, the selection of future technical equipment is no longer based only on estimates but based on reasonable scientific considerations.
4. To make the ERP software implementation project of PT Gramedia Printing Company a success, it must pay attention to the following factors:
    a. Senior management support.
    b. Clear objectives.
    c. Effective project management.
    d. communication.
    e. Applicability of software and hardware.
    f. User participation.
    g. Business process reengineering.
    h. Education and training.
    i. Data accuracy and completeness.

As a decision-making tool, the system is still imperfect, so constructive opinions, suggestions and criticisms are needed to improve and develop this research.

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