

[DOI: 10.20472/IAC.2015.015.060](https://doi.org/10.20472/IAC.2015.015.060)

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DESIGNING ERP SOFTWARE EVALUATION PROCEDURE FOR A GOVERNMENTAL ORGANIZATION

Abstract:

An enterprise resource planning (ERP) system is regarded a solution approach for any organization. It is an information system to plan and manage whole firms' or organizations' function. Once it is adopted, it provides many useful tools in management. This study expose an evaluation procedure of ERP software selection for any governmental organization. The proposed evaluation framework use step by step process in order to reach final decision. It also advise some decision making techniques for ERP alternatives applying selected criteria. It is a fact that an ERP software cannot meet all needed company functionalities of a governmental organization. Thus, organization must choose a flexible ERP system for its requirements.

Keywords:

Enterprise Resource Planning (ERP), Organization, ERP evaluation procedure, Decision making.

JEL Classification: M20

1. Introduction

Every organization/corporation is aware of the strategic role of the operations functions' today. Governmental organizations have considerable effects in stability of a state (Moore, 2000). These organizations are realizing that a focus on speed and needs of citizens is effective when the organizational function is well planned and operated. ERP software may play an important role in order meeting governmental demands.

ERP is a generic term for Enterprise Resource Planning Software. ERP is a wide information system that combines different functions like human resource, production planning, purchase, sales inventory control etc (Umble et al, 2003). Governmental organizations demand ERP implementation for the purposes of citizen information integration, defence planning, standardization of inhabitants' data, and standardization between other states (Zhang et al, 2003). Most organizations (governmental or non-governmental) operate in a connected environment where user demands are continuously changing and increasing. They usually have ERP systems and a great number of competitors are in ERP market (Lim et al, 2005). Cost or quality is not sufficient in competition. Therefore new competition parameters are needed like sophisticated data management and customizable products etc.

ERP software automates and integrates information sharing of governmental organization, while allowing data management. Therefore ERP selection process is an important decision making problem for organizations (Haddara, (2014). Computer engineers design ERP software to run on different hardware platforms, databases, languages and operation systems. However, few of them are compatible with organisations' information environment. Therefore governmental organizations should first conduct a requirements analysis to determine what issues need to be solved and then select the best suitable ERP package. In order to achieve this goal, careful planning and selection for the right ERP system should be implemented.

This study consists of four sections. The next section consists of the literature review. The third chapter introduces the proposed ERP system evaluation procedure designed for governmental organization. Conclusion arise in the last chapter.

2. Literature Review

Adaptation of information technology (IT) is described as a goal for any organization. Federal, state, or local governmental organizations are carrying their service environments to IT in order to reduce costs and increase efficient program management (Carter & Belangar, 2005). Some researchers observed a growing interest by public administration offices that are providing government services using internet technologies (Ke and Wei, 2004; Linders, 2012; Ganapati and Reddick, 2012). Policy-makers need detailed information and analytical resources to make decisions. ERP class software provide detailed information for policy-makers (Shao et al, 2012). There are abundance of studies in ERP software selection topic. Latest studies and short information related to these are given in Table 1.

Table 1. Recent studies in ERP software selection process

Researcher(s)	Article Title	Research Topic
Haddara, (2014)	ERP Selection: The SMART Way	This research, presents an explanatory case study, which employed a simple multi-attribute rating technique (SMART)-based ERP selection method.
Kilic, H. S., Zaim, S., & Delen, D. (2014)	Development of a hybrid methodology for ERP system selection: The case of Turkish Airlines.	A three-stage hybrid methodology has been proposed in this study. Weighted criteria are used as input to the Technique for Order Preference by Similarity to Ideal Solution method to rank the decision alternatives. The proposed methodology is applied to the ERP selection problem at Turkish Airlines.
Pitic, L., Popescu, S., & Pitic, D. (2014).	Roadmap for ERP Evaluation and Selection.	In this paper a structured approach to ERP evaluation and selection is proposed. The developed roadmap for ERP selection combines quality management specific approaches to the mains authors' practical experience in the selection and implementation of business related software.
Parthasarathy, S., & Sharma, S. (2014).	Determining ERP customization choices using nominal group technique and analytical hierarchy process.	This research applies nominal group technique (NGT) and analytical hierarchy process (AHP) techniques to Luo and Strong's framework to help organizations determine feasible customization choices for their ERP implementation initiatives.
Ram, J., Corkindale, D., & Wu, M. L. (2014).	ERP adoption and the value creation: Examining the contributions of antecedents. <i>Journal of Engineering and Technology Management</i> , 33, 113-133.	This study examines the role of antecedent factors in the organisational adoption of ERP projects for the achievement of competitive advantage. Authors draw on information system success and information system implementation theories to build a conceptual model to examine the role of antecedent factors in influencing the achievement of competitive advantage.

Some researchers considered ERP software selection as multi-criteria decision making problem. Wei et al. (2005) studied on AHP based ERP software selection. Kılıç (et al, 2015) used two prevalent multi-criteria decision making techniques, Analytic Network Process (ANP) and Preference Ranking Organization Method for Enrichment Evaluations (PROMETHEE), in combination to better address the ERP selection problem.

3. ERP System Evaluation Procedure

In this paper, we focused on ERP selection procedure. We know that a government or a state is a sophisticated organization. Each division is subdivided into smaller groups to facilitate better coordination and management in large organizations. For a better coordination and management, an organization needs ERP systems. In order to fulfill different tasks, ERP systems have a vital role in today's organizations. ERP systems have high costs and high implementation risks. Because of this, ERP evaluation procedure is a challenging task for decision makers. ERP evaluation process steps are given in Figure 1.

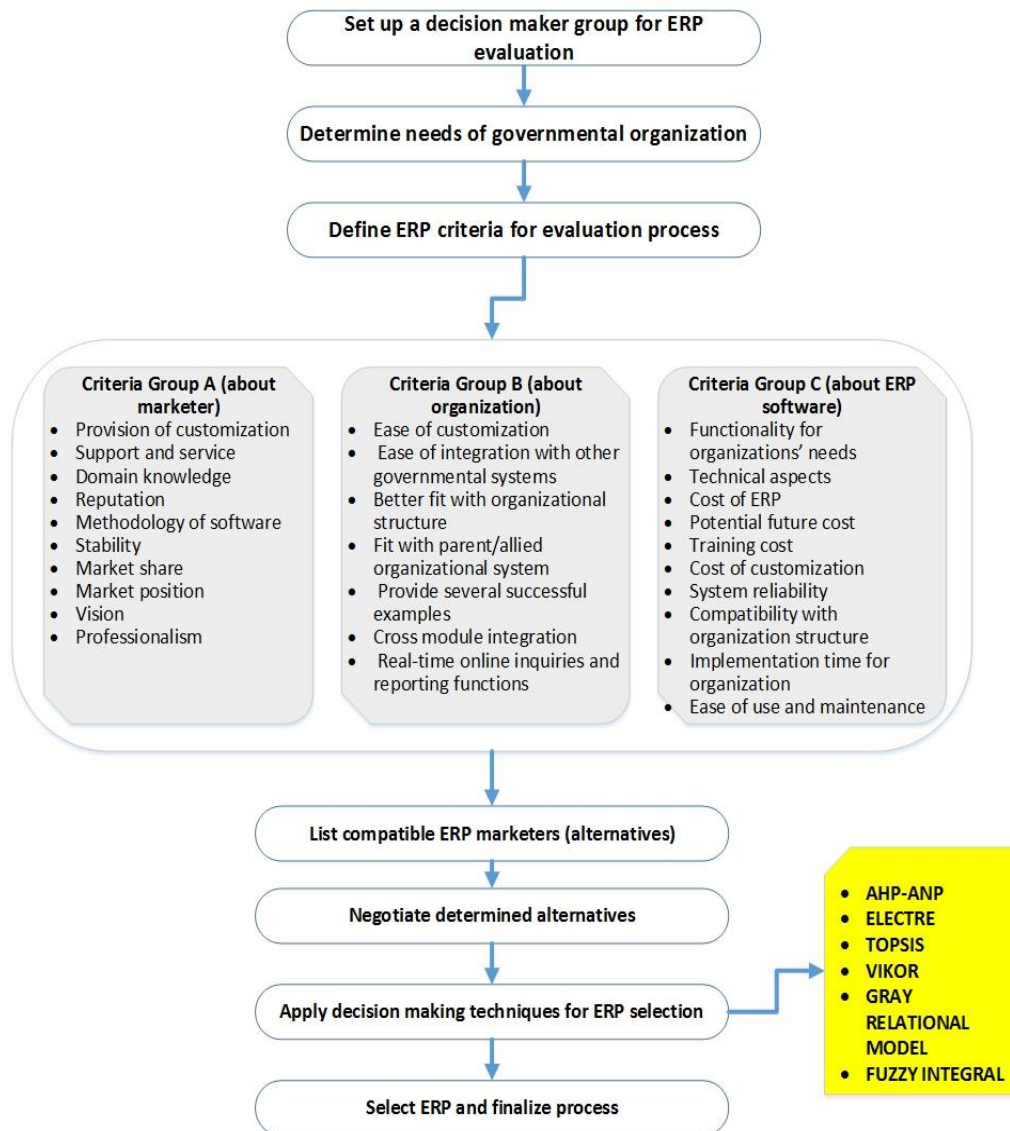


Figure 1. ERP evaluation process

Main steps of this procedure is explained in below.

Step 1. Set up a decision maker group for ERP evaluation

The first step of ERP evaluation process should be setting up a decision maker group. ERP has many special features and only ERP experts know how to use these systems efficiently. Financial and other software experts may be included in this group.

Step 2. Determine needs of governmental organization

A government organization (ministry of defence, central bank, etc) thinks about purchasing ERP system when dealing with a number of complex and interrelated activities, such as achieving financial goals, managing army's operational processes or better forecasting features. The organization requesting ERP has to define needs and requirements.

Step 3. Define ERP criteria for evaluation process

Decision makers should select appropriate criteria for the ERP evaluation process. Criteria must be related to the marketers, organizational needs and ERP software

features. We selected 27 criteria for ERP evaluation process in this study. There are three main criteria groups; criteria group *A*, criteria group *B* and criteria group *C*. Group *A* describes criteria about marketers and includes 10 criteria, group *B* describes criteria about organizational needs and includes 7 criteria, group *C* defines criteria about ERP software features and has 10 criteria. Some criteria used in this study have been selected from various studies (Adina et al, 2007; Yazgan et al; 2009; Tsai et al, 2009; Gürbüz et al, 2012)

Step 4. List compatible ERP marketers (alternatives)

There are many ERP alternatives in the market. An important point of consideration for ERP evaluation is detailed knowledge about alternatives. Decision makers should consider the vendor's vision, the modifications that the vendor plans to make to its products and services in the future. Best known ERP firms and their market shares are given in Fig.2. Beside, type of ERP software that an organization's decision maker should know is presented in Fig.3.

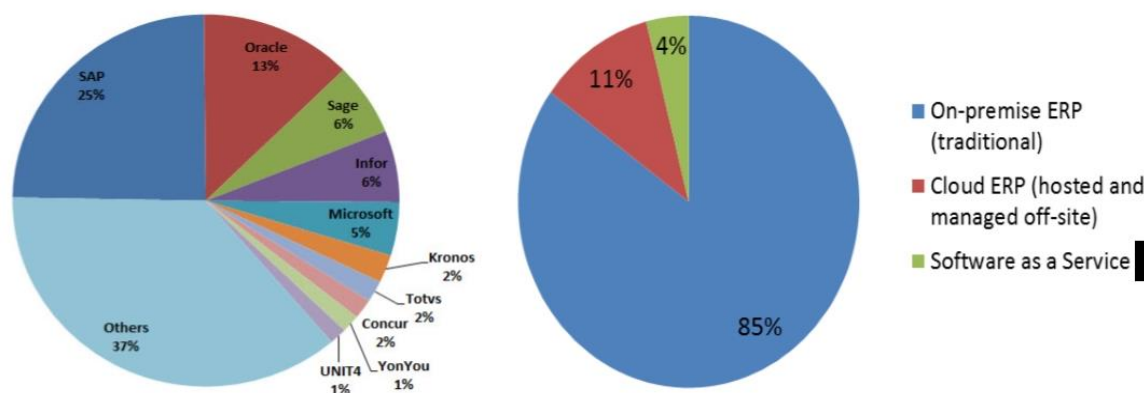


Figure 2. ERP software market share (**Forbes, 2014**) **Figure 3.** Types of ERP software (Beyondplm, 2014)

Step 5. Negotiate determined alternatives

Negotiation is a part of decision making. Basic objective in this process is to obtain what you want. Negotiation may feed some unique idea during evaluation procedure. It is also possible to predict possible cost of ERP system for organization after negotiation.

Step 6. Apply decision making techniques for ERP selection

Multicriteria decision making methods supply a standard method of information evaluation and working to reach a solution. It has proven a useful and flexible method in many situations. From this scope it is well known fact that decision making is a fundamental element to achieve goal in any organization. A decision making technique should be used in this step for determining the best alternative.

Step 7. Select ERP and finalize process

The selection of the best ERP software depends on the values of applied decision making tool. It indicates the relative importance of the alternatives in selection process. A detailed analysis should be carried out for the inter-functional evaluation regarding feedbacks from other governmental organizations according to evaluation factors.

Decision makers choose the most effective ERP software for planned governmental organization in this step.

4. Conclusion

ERP has a wide range of use for every kind of organization, including governmental organizations. It is applicable to all industries. It has a high cost to implement; however, it brings huge benefits after organisations implement it. Therefore, the most critical phase is the ERP selection stage. An inadequate ERP software selection will cause irreparable consequences.

In this paper, an ERP software selection procedure for a governmental organization has been presented in details. Although there are many studies for ERP software selection in literature, few of them presented a full selection procedure. This study focused on ERP software selection procedure especially for governmental organizations and illustrated a method. We suggested 27 criteria to score different ERP systems. We know that this has widened the selection scope and ensured evaluation many aspects of ERP software. The selection criteria included marketers, organizational characteristics and ERP software features. This study also recommend useful references for ERP suppliers and vendors as well as different kinds of governmental organizations planning to implement ERP systems.

References

- Adina, U. T. A., Intorsureanu, I., & Mihalca, R. (2007). Criteria for the selection of ERP software. *Informatica Economica*, 11(2), 63-66.
- Carter, L., & Belangar, F. (2005). The utilization of e-government services: citizen trust, innovation and acceptance factors. *Information Systems Journal*, 15(1), 5-25.
- Forbes, ERP market share, <http://www.forbes.com/sites/louiscolombus/2013/05/12/2013-erp-market-share-update-sap-solidifies-market-leadership/>
- Ganapati, S., & Reddick, C. G. (2012). Open e-government in US state governments: Survey evidence from Chief Information Officers. *Government Information Quarterly*, 29(2), 115-122.
- Gürbüz, T., Alptekin, S. E., & Işıklar Alptekin, G. (2012). A hybrid MCDM methodology for ERP selection problem with interacting criteria. *Decision Support Systems*, 54(1), 206-214.
- Haddara, M. (2014). ERP Selection: The SMART Way. *Procedia Technology*, 16, 394-403. <http://beyondplm.com/2014/11/26/why-all-plm-software-will-be-saas-soon/>
- Ke, W., & Wei, K. (2004). Successful e-government in Singapore. *Communications of the ACM*, 47(6), 95-99.
- Kilic, H. S., Zaim, S., & Delen, D. (2014). Development of a hybrid methodology for ERP system selection: The case of Turkish Airlines. *Decision Support Systems*, 66, 82-92.
- Kilic, H. S., Zaim, S., & Delen, D. (2015). Selecting "The Best" ERP system for SMEs using a combination of ANP and PROMETHEE methods. *Expert Systems with Applications*, 42(5), 2343-2352.
- Lim, E. T., Pan, S. L., & Tan, C. W. (2005). Managing user acceptance towards enterprise resource planning (ERP) systems—understanding the dissonance between user expectations and managerial policies. *European Journal of Information Systems*, 14(2), 135-149.
- Linders, D. (2012). From e-government to we-government: Defining a typology for citizen coproduction in the age of social media. *Government Information Quarterly*, 29(4), 446-454.
- Moore, M. H. (2000). Managing for value: Organizational strategy in for-profit, nonprofit, and governmental organizations. *Nonprofit and Voluntary Sector Quarterly*, 29(suppl 1), 183-208.

- Parthasarathy, S., & Sharma, S. (2014). Determining ERP customization choices using nominal group technique and analytical hierarchy process. *Computers in Industry*, 65(6), 1009-1017.
- Pitic, L., Popescu, S., & Pitic, D. (2014). Roadmap for ERP Evaluation and Selection. *Procedia Economics and Finance*, 15, 1374-1382.
- Ram, J., Corkindale, D., & Wu, M. L. (2014). ERP adoption and the value creation: Examining the contributions of antecedents. *Journal of Engineering and Technology Management*, 33, 113-133.
- Shao, Z., Feng, Y., & Liu, L. (2012). The mediating effect of organizational culture and knowledge sharing on transformational leadership and Enterprise Resource Planning systems success: An empirical study in China. *Computers in Human Behavior*, 28(6), 2400-2413.
- Tsai, W. H., Lee, P. L., Chen, S. P., & Hsu, W. (2009). A study of the selection criteria for enterprise resource planning systems. *International Journal of Business and Systems Research*, 3(4), 456-480.
- Umble, E. J., Haft, R. R., & Umble, M. M. (2003). Enterprise resource planning: Implementation procedures and critical success factors. *European journal of operational research*, 146(2), 241-257.
- Wei, C.-C., Chien, C.-F., & Wang, M.-J. J. (2005). An AHP based approach to ERP system selection. *International Journal of Production Economics*, 96, 47-62.
- Yazgan, H. R., Boran, S., & Goztepe, K. (2009). An ERP software selection process with using artificial neural network based on analytic network process approach. *Expert Systems with Applications*, 36(5), 9214-9222.
- Zhang, L., Lee, M. K., Zhang, Z., & Banerjee, P. (2003, January). Critical success factors of enterprise resource planning systems implementation success in China. In *System Sciences, 2003. Proceedings of the 36th Annual Hawaii International Conference on* (pp. 10-pp). IEEE.