

ERP selection: A step-by-step application of AHP Method

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ABSTRACT

A successful implementation of an ERP project in an organization requires the selection of a suitable ERP system. Indeed, the selection of an ERP system has a significant effect on future operations and profitability of the enterprise.

Many research works identified major factors influencing the selection of an ERP in SMEs, and proposed criteria and methods related to the optimization of the selection process.

Several ERPs selecting methods use AHP, on one hand in order to determine the weight of the criteria, and on the other hand to evaluate ERP systems. Some methods use only AHP, where other methods use a combination of AHP with other Multi decision criteria Methods (hybrid methods).

The first objective of this paper is to present a review of literature on ERP selection process: after describing the methods used to select the ERP systems, the criteria list that companies use to select their ERP systems is presented.

The second objective is to propose a detailed example of using the AHP method in an ERP selection context, a step-by-step application of AHP will be demonstrated.

Keywords

ERP, Selection, criteria, Process, AHP

1. INTRODUCTION

Companies need to increase productivity, shorten lead times, reduce stock, maximize return on investment, reduce total costs, and have a better communication with customers and suppliers.

Enterprise Resource Planning (ERP) is very important to help companies achieve these goals because of its ability to integrate the flow of information, material, and finance, and to support organizational strategies. An ERP system integrates all necessary business functions, such as purchasing, sales, product planning, financial, inventory control, through modules that share a single database. However, given the diversity of the business processes and the sector of activity of each company, there is no ERP commercial packages can meet all company functionalities or all special business requirements. Thus, it is necessary to select a suitable ERP system that can meet the needs of the company and its organizational requirements.

Recent studies show that the majority of ERP projects do not end in success. One of the most common reasons that can lead to this failure is the selection phase study [1]. The selection of a particular ERP system has a decisive effect on the future operations and profitability of the enterprise, this is why the applied selection criteria for ERP systems and the method used should be analyzed very carefully.

Several methods have been applied to ERP selection including scoring, ranking, mathematical optimization, and multi-criteria decision analysis.

The analytic hierarchy process (AHP) method is applied for dealing with the ambiguities involved in the assessment of ERP alternatives and relative importance weightings of criteria. To apply AHP, weights of the criteria are determined after the consultation session realized by the selection team. To determine weights of the criteria in the AHP hierarchy, each criterion is compared using a pairwise comparison method with respect to their immediate higher-level criteria in the hierarchy. According to Saaty, quantitative or qualitative assessments can be used in the comparisons; a nine-point numerical scale, is recommended for the comparisons.

In this paper a step-by-step application of AHP Method will be demonstrated.

2. STATE OF THE ART

In literature, several evaluation models have been proposed to improve the selection process of an ERP. A part of these methods has a theoretical foundation based in mathematic programming and decision theories: multi-criteria decision-making methods (MCDM) are used to prioritize alternatives and calculate the relative efficiencies of ERP solutions. Other methods have focused on identifying success factors in ERP selection process [2].

The review of the state of the art on ERP selection Methods revealed the following methods: AHP (Analytic Hierarchy Process), ANP (Analytic Network Process) [3], [4], [5], [6], [7] PROMETHEE [8], SHERPA (Systematic Help ERP Acquisition), FL (Fuzzy Logic) [9], PM (Priority Matrix), TOPSIS (Technique for Order Preference by Similarity to Ideal Solution) [6].

2.1 AHP Method

Introduced by Saaty (1980), The AHP method directs how to determine the priority of a set of alternatives and the relative importance of attributes in a multiple criteria decision-making problem.

This method has been widely discussed in various studies:

The ERP selection method proposed by Wei, Chien and Wang is based on AHP method and presented in seven steps [10]. The AHP and ANP methods are discussed in the literature, and some applications of these methods are described in research papers, [11], [12].

Unal and Güner proposed a methodology based on AHP for ERP provider selection for an organization in the textile industry [13]. In the same sector, Cebeci presented another ERP supplier selection methodology based on fuzzy AHP [14]. An illustrative example of the application of fuzzy AHP

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Uses and Limitations of the AHP Method Nolberto Munier,Eloy Hontoria,2021-02-05 This book examines the Analytical Hierarchy Process AHP method its varied uses as well as its limitations for solving real world scenarios While the simplicity of the method compels users to find shortcuts to a real world problem it also leads to obtaining wrong results that do not represent reality By alerting practitioners about the core necessities of a new scenario this book helps solve this problem as well as contribute to the field of Multicriteria Decision Making Method MDCM The authors use a demonstrative rather than a theoretical approach and examine 30 subjects that displays the shortcomings and drawbacks of the AHP Each one is examined in depth discussed debated and reasoned using examples some of them numeric The book highlights the rationality and common sense of the subjects and in most cases validates the criticism by showing through numerical examples the impossibility of the AHP method to address let alone solve real world projects At the conclusion of each subject a table is built comparing the similarities and differences between the opinions of the authors and other experts along with the respective pros and cons **Hierarchon Vol 2** Thomas L. Saaty,Rafikul Islam,2015-08-18 Researchers have been continually developing ways and means to improve quality in decision making The success of a methodology is judged by its acceptability by the decision makers In this context it is beyond any argument that AHP has been massively successful Readers of this volume will see once again that AHP has been applied in widely diverse areas However there are many more applications of AHP in other areas that are not reported here We also don t claim that the set of applications of AHP in the reported areas is exhaustive it is far from complete In fact it will not be possible to capture all the real world applications of AHP even by publishing many volumes of this kind We hope that the readers will find the present compilation useful **AHP Model for Identifying Best Health Care Establishment** Mohammed Azam,M. N. Qureshi,Faisal Talib,2016 The purpose of this study is to develop an analytic hierarchy process AHP model utilizing components parameters and factors of a specifically designed Integrated Quality Model for Health Care Establishment HCE In doing so the authors have utilized AHP approach to identify the best health care service quality performer among alternatives of HCEs To select the best HCE three HCEs of North India namely HCE A HCE B and HCE C were chosen The criteria components of the integrated quality model for the HCE designed and suggested by Azam Rahman Talib 2012a and Azam Rahman Talib Singh 2012b were adopted Further this study has undertaken an extensive in depth literature review about AHP and its applications for HCEs from various aspects A specifically developed integrated quality model for HCE with its components parameters factors thereof duly coded as criteria and sub criteria have been utilized It thus facilitates the development of an AHP model to rank the chosen HCEs helping to identify potentially the best HCE among them On the basis of the proposed hierarchical model the findings suggest that the HCE A may be selected first followed by HCE C and HCE B based on overall rating The study

provides a mechanism through AHP model to select potentially best HCE utilizing specifically developed integrated quality model for HCE with impacts both for the clients and the patients to enjoy the service of best HCE as well as for the managers to improve the services of HCE and the business The study thus adds a new perspective by developing a selection process to select the best HCE through an AHP model utilizing criteria and sub criteria of an integrated quality model specifically developed for HCE It has practical value for maintaining service quality of HCE to benefit the clients and related stakeholders as well as the managers by improving quality enhancing reputation and business thereof

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