Data Analytics and Artificial Intelligence
Vol: 1(1), 2021
REST Publisher; ISBN: 978-81-948459-4-2
Website: http://restpublisher.com/book-series/data-analytics-and-artificial-intelligence/

Performance Evaluation of Enterprise Resource Planning ERP software Selection using COPRAS Method

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Abstract. Enterprise Resource Planning (ERP) When implementing settings, most of the companies faced some problems, one of them is their requirements and how to decide the best ERP software that meets expectations Choosing Best Custom ERP Software has been around for a long time an important issue, Because the wrongly selected ERP software requires time and A company's expenses and Impact on market share. On the other hand, ERP software selection is Several criteria are used to make the decision MCDM Problems in literature, to assess this type of problem Several methods have been introduced, one of them is Analytical Hierarchy Process (AHP), It is widely used in MCDM selection problems. COPRAS (Complex Proportionality Assessment) and Based on the concepts of AHP (Analytic Hierarchy Process). A new fuzzy MCDM method is proposed to evaluate the potential maintenance strategy. To estimate ratings and weights Linguistic terms are used. Fuzzy AHP estimation used to calculate the weights of criteria; then, fuzzy set theory and A ranking of alternatives is calculated based on COPRAS. The COPRAS method using for Enterprise Resource Planning (ERP) software selection. It includes General System Specifications (GSS), Manufacturing Module (PM), Financial Management Module (FMM), Quality Management Module (QMM), Sales and Distribution Module (SDM), Maintenance Management Module (MMM), Human Resource Module (HRM). Alternative and evaluation parameters Program Supported as Installed (PSI), Supported with Program Link (PSP), Program Code Changed (SCC), Supported in Subsequent Versions (SNV). COPRAS method is best solution short distance and the negative-best solution Determines up to the long-range solution, but the comparison of these distances is not significant. From the result it is seen that quality management module (QMM) has got the first rank general system specifications (GSS) has the lowest rank.

Keywords: MCDM, Parameters Program supported as installed (PSI), Supported with program patch (PSP), Program with code change (SCC), Supported in subsequent versions (SNV).

1. Introduction

Presented in this article in ERP software selection Evaluation criteria related to issues in and Alternative routes are modeled Using ANP. in the sample problem objective, Evaluation criteria, Sub-criteria and Contains Alternatives Contains a hierarchical array. Such as Several criteria are used to make the decision Problematic ERP software selection the framework provides a holistic approach. ANP method is very complex for Several criteria are used to make the decision Solving problems a solution can be considered. Although the ANP model for ERP selection actually exists constructed, the opinions of several experts are obtained, and the results these concepts are through methods such as geometric algorithms are obtained by converging on a single value. To solve the ERP selection problem if a new firm opts for the ANP model, a new expert panel should be constituted to get their opinion. Some organizations may have some difficulty in setting up an expert team. Sole decision maker ERP selection decision can be made, Hence the problem of subjectivity and bias may arise. Analytical Hierarchy Process (AHP) and complexity of alternatives Using proportionality assessment (COPRAS-G method) with gray relationships a hybrid MCDM The model is used for quality manager selection. In particular, AHP at the beginning used to calculate the weight of each criterion, Also the COPRAS-G Method Used to rank and select alternatives. gray interval numbers (COPRAS-G) method of the complex proportional valuation system presented the main ideas. Concept of COBRAS-G method is based on criteria values expressed in intervals, actual Decision making conditions and Applications of Gray Systems Theory. COPRAS-G Methodology Gradual ranking and Uses the process of evaluation of alternatives based on degree of importance and utility.

2. ERP software Selection

ERP software automates business processes and integrates and in various business activities Allows information sharing. Additionally, ERP software finance, human resources, activities and can help Logistics, very effective and efficient in sales and marketing activities Supports through manufacturing Business process. At the same time, by controlling Improves company performance its activities although companies Their own ERP Can develop software; others reduce the usage cycle Prefer ready systems. Different platform in the market and Vendor's sales ERP software built on database. When companies want to buy off-the-shelf systems that would be a very high cost. Monitoring business processes The Company is looking for an ERP software package because it is difficult. For this reason, the company proposed Six ERP software candidates in order to reassess from every field by selecting managers a project committee has been formed. These software programs from organizational

structure Independent packages. The company under consideration the most suitable software package (without further modifications) selecting the group aims to. The objective of this thesis is to under cost and quality criteria both the company's demands and the characteristics of the ERP system Considerations for choosing an appropriate ERP software vendor is to propose a framework. ERP software selection problem Multiple size and Multiple Criteria Considered as an of quality criteria Decision-Making (MCDM) problem, it is possible including a package should be considered in the selection process. ERP software evaluation Regarding there is limited research. How decisions are made regarding the acquisition of ERP systems and with ERP implementation issues ignoring their correctness of academic literature A comprehensive system deals exclusively with in previous evaluation of ERP software Identify key issues, emphasizes for a company The importance of choosing the right ERP software. This is the objective of this thesis. In the ERP software selection process Modules are tested by the client system, then his company's customer knowledge increases, Probability of project failure is reduced and huge Consulting costs are saved. ERP vendor and We propose a two-phase approach to software selection. In the first stage, Initial steps are being taken. These activities include: A project team and Business process re-engineering (BPR), ERP software packages and Collect information from vendors Filter out unqualified sellers. Nominal panel technique and AHP based framework for selecting an ERP system. For ERP evaluation in elaborating some general criteria His research focused on However, company strategies and How to create a specific objective structure that is relevant it does not explain how to extract the right criteria to meet Company requirements. To evaluate ERP systems the problem of objective structure little research has addressed this. In this study, taking into account the company's strategies to create an objective framework a systematic procedure is proposed, thus extracting relevant attributes for evaluating ERP systems. Decision makers with multiple ERP system competing motives inherent in selection and this study uses AHP's Uses an analytical framework to integrate intangible measures and Facilitates team decision making process. ERP systems and between traditional information systems A key difference It's ERP applications Comes from a unified nature. Implementation of ERP system Brings dramatic changes, to get the benefits of ERP solution they should be managed carefully. Holland and Light (1999) Implementing an ERP Software Package They cite that business process change involves a combination of with business processes a software framework for debugging software. In that respect, by reviewing the literature, of leading companies by studying experiences, Implementation of ERP system from the development of traditional systems it is clear that it is completely different.

3. Complex Proportionality Assessment (COPRAS)

COPRAS (Complex Proportionality Assessment) is Most used in decision making One of many criteria (MCDM) methods, It also has a better resolution ratio By determining the solution with the best-to-worst ratio as well In a set of possible and alternatives Provides a better alternative solution. This technique is used to solve decision-making problems used by various researchers. Developing a risk-based methodology in an ambiguous environment we expand on Cobras' approach. COPRAS-F in dealing with uncertainty its efficiency and effectiveness, Best solution and best-worst solution of ratio Concurrent consideration is accepted due to ratio and logical considerations. Fuzzy to solve MCDM problems We propose integrated approach, linguistic norms. Calculated by Fuzzy AHP Relative importance of criteria. To assess maintenance strategies COPRAS technique was used with gray spaced numbers (COPRAS-G) method of complex proportionality Presented key ideas estimation system. Concept COPRAS-G System, will be expressed in intervals Criterion values, Actual COPRAS methodology based on degree of importance and application A stepwise ranking of substitutions and Uses an evaluation process. According to ranking of performance measures Comparisons of non-confidential COPRAS, confident COPRAS, COPRAS-G and Fuzzy COPRAS methods. According to optimistic values, a better performance measure Unscheduled maintenance count (equipment failures); Desperate According to values, the best performance metric is MTTR; According to Gray Values of Performance Measures (COPRAS-G), A better performance measure is unplanned number of maintenance (equipment failures); According to fuzzy values (proposed Fuzzy COPRAS), And better performance measurement reduces yield. Ranked last in performance measurement is Confident, gray and vague related to Cobras Methods Organizational problems and labor unrest. Used to select a machine tool, Triangular fuzzy numbers are chosen because of their computational efficiency. to assign weights Three domain experts were selected and by incorporating the Fuzzy COPRAS method, the results reveal Javadskas et al Introduced COPRAS method. Reliability of the COPRAS method and Accuracy is acknowledged by many scholars, currently various engineering and Management is used to solve many attribute problems. Also, the accuracy of performance measurements in the COPRAS method, in the system of criteria Importance of alternatives explored and Direct and of use volume Assumes proportional bias. COPRAS with ambiguous information is uncertainty conditions a developed system, in contemporary rural buildings Assessment of Environmental sustainability and Key factors of priority Analysis is done by Fuzzy COPRAS method. In 2016 Beheshti et al. For strategic portfolio optimization COPRAS did the method. Pichipoo et al. To improve blind spots in heavy vehicles COPRAS method was used. In addition, Bylinskas et al to assess neglected areas in Vilnius The specified method was used. By using COBRAS method, In terms of environmental sustainability Appraisal of construction projects of hotels Hashemkhani Solfani et al. Also, Polat et al. For Mechanical Designer Examination He used COPRAS method as a tool.

4. Analysis and Discussion

Shows the table 1 data set for ERP software selection. Alternative GSS, PM, FMM, QMM, SDM, MMM, HRM and Evaluation Parameters Program supported as installed (PSI), Supported with program patch (PSP), Program with code change (SCC), Supported in subsequent versions (SNV).

TABLE 1. Data set for ERP software selection

	PSI	PSP	SCC	SNV
GSS	3.25	7.26	10.28	11.27
PM	4.29	6.26	4.24	6.22
FMM	10.25	0.26	6.28	9.27
QMM	7.22	9.26	8.24	3.22
SDM	11.13	8.13	9.14	6.18
MMM	8.15	7.17	10.15	4.11
HRM	7.19	6.09	11.06	8.10

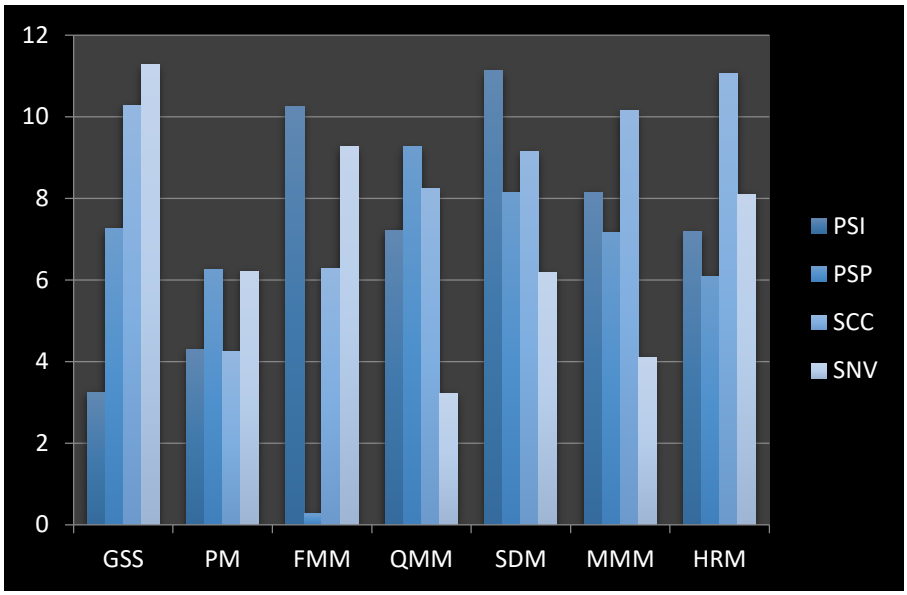

FIGURE 1. Data set ERP software selection

Shows the Figure 2 data set for using ERP software selection. alternatives general system specifications (GSS), production module (PM), financial management module (FMM), quality management module (QMM), sales & distribution module (SDM), maintenance management module (MMM) and Human Resources Module (HRM) there are alternatives.

TABLE 2. ERP software selection in Normalized Data

	PSI	PSP	SCC	SNV
GSS	0.0632	0.1634	0.1731	0.2329
PM	0.0833	0.1408	0.0715	0.1287
FMM	0.1992	0.0058	0.1057	0.1916
QMM	0.1402	0.2084	0.1388	0.0666
SDM	0.2162	0.1830	0.1539	0.1277
MMM	0.1582	0.1614	0.1708	0.0850
HRM	0.1396	0.1370	0.1863	0.1675

Table 2 shows the various Normalized Data High values of multiple criteria decision making (MCDM), ERP software selection, Channel decision. The normalized value is obtained using formula.

TABLE 3. Weight

	PSI	PSP	SCC	SNV
GSS	0.25	0.25	0.25	0.25
PM	0.25	0.25	0.25	0.25
FMM	0.25	0.25	0.25	0.25
QMM	0.25	0.25	0.25	0.25
SDM	0.25	0.25	0.25	0.25
MMM	0.25	0.25	0.25	0.25
HRM	0.25	0.25	0.25	0.25

Shows the Table 3 ERP software selection Weight used for analysis. We took the same weight for all the parameters for analysis.

TABLE 4. Weighted normalized decision matrix

	PSI	PSP	SCC	SNV
GSS	0.02	0.04	0.04	0.06
PM	0.02	0.04	0.02	0.03
FMM	0.05	0.00	0.03	0.05
QMM	0.04	0.05	0.03	0.02
SDM	0.05	0.05	0.04	0.03
MMM	0.04	0.04	0.04	0.02
HRM	0.03	0.03	0.05	0.04

Table 4 shows weighted normalized decision matrix for general system specifications (GSS), production module (PM), financial management module (FMM), quality management module (QMM), sales & distribution module (SDM), maintenance management module (MMM) and Human Resources Module (HRM) weighted normalized decision matrix, we used the formula.

TABLE 5. Bi, Ci and Min (Ci)/Ci

	Bi	Ci	Min(Ci)/Ci
GSS	0.057	0.102	0.4929
PM	0.056	0.050	1.0000
FMM	0.051	0.074	0.6731
QMM	0.087	0.051	0.9742
SDM	0.100	0.070	0.7106
MMM	0.080	0.064	0.7822
HRM	0.069	0.088	0.5658

This table 5 shows that from the Bi, Ci, Min (Ci)/Ci, Values Evaluation Parameter: Program supported as installed (PSI), Program supported with patch (PSP), Supported with program code change (SCC), Supported in next versions (SNV).

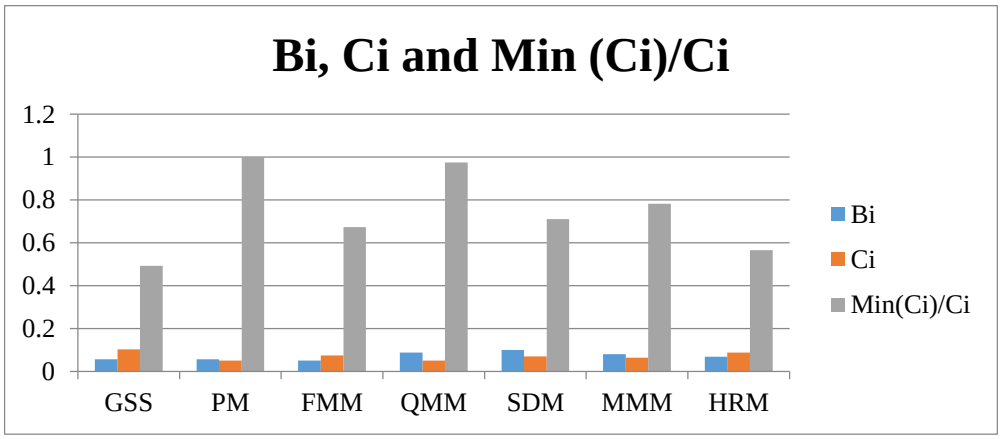

FIGURE 2. Bi, Ci and Min (Ci)/Ci

TABLE 6. Qi, Ui and Rank

	Qi	Ui	Rank
GSS	0.101	58%	**7**
PM	0.146	84%	**4**
FMM	0.112	64%	**6**
QMM	0.175	100%	**1**
SDM	0.164	94%	**2**
MMM	0.151	86%	**3**
HRM	0.120	69%	**5**

Shows the table 6 shows that from the Qi, Ui and Ranking Values quality management module (QMM) is got the first rank whereas is general system specifications (GSS) is having the lowest rank.

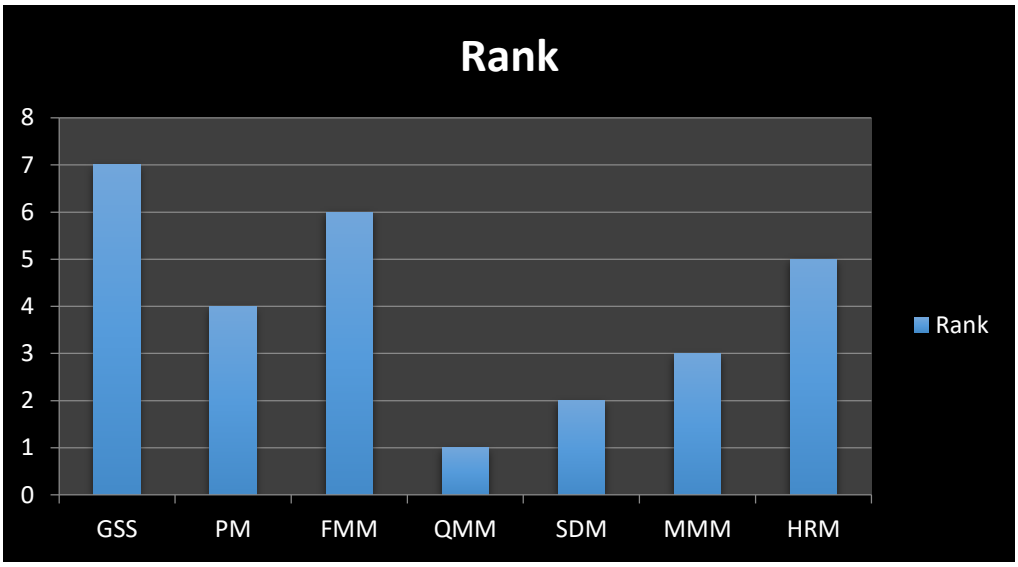

FIGURE 3. Rank of ERP Software selection

Figure 3 shows the rank of graphical view of the end result of this thesis is ERP software selection. The final result quality management module (QMM) is got the first rank whereas is general system specifications (GSS) is having the lowest rank.

5. Conclusion

This article is about ERP software selection Provides a new result framework. A developed framework Obtained from vendors in the market ERP Characteristics and Company Profile and taking into account the strategic selection criteria compiles a list of customer requirements. ERP software selection problem the uniqueness of this study is that with different criteria, For ERP software selection COPRAS method Manager's administration point of study. Despite the diverse a common procedure ERP software selection problem Provides analysis. The MCDM approaches based on COPRAS, on sides and rear of heavy vehicle using the rear view mirror design parameters in It is proposed to reduce the area of blind spots. Human judgment (FARE and AHP) and of mathematical approaches (entropy measurement). Based techniques were used to calculate the weights of the attributes, and those weights were used in the COPRAS model. Used to estimate the utility level of alternatives, it is taken as a percentage, for comparison than other alternatives Shows how good or bad it is. COPRAS method determines the best solution from the short-distance and the negative-best solution to the long-distance solution, but the comparison of these distances is not significant. It is evident from the results quality management module (QMM) is got the first rank whereas is general system specifications (GSS) is having the lowest rank.

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