

# BCOR Analysis Affect The Adoption of Knowledge Management System (KMS)

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## **Abstrak**

*Knowledge Management as an approach in Information System development is used to develop a Knowledge Management System as supporting technologies. Knowledge Management Systems can be defined by alignment the Knowledge Management Process in organization. Knowledge Management System (KMS) at the present time has become an important requirement for the company. Knowledge Management System (KMS) assist companies to store the knowledge possessed by its employees to deal with employee turnover, provide a competitive advantage, and improve the effectiveness of the company's operations. However, when doing KMS implementation required a readiness and preparation for implementing of a new system does not become a futility. This research intends to identify factors of KMS adopting in private universities as part of a preparation before the implementation of KMS in it. In this study, the author takes a case study at the University XYZ in Palembang as a research media by using Benefit Cost Oppotuniy and Risk (BCOR) Analysis as a research method. at this stage of data processing, the Author uses Expert Choice Application as an aid in data processing using AHP stages in order to find the priority factor in adopting KMS in private university. The results showed that the priority factor that affects in adopting KMS at University XYZ in Palembang is the Optimization factor of opportunity criteria.*

**Keywords:** Knowledge Management System, AHP, BCOR Analysis

## 1. INTRODUCTION

Along the times of knowledge is the main thing that must be developed. Knowledge is the result of information processing and data owned or acquired by one or more. Knowledge has become the main source of the country's military strength and economic power [1]. This shows the importance of managing knowledge within an organization or company. In the enterprise, knowledge is one of the assets owned by the company. Knowledge as an asset in a company's knowledge can be either visible or not visible as well as intellectual property such as artifacts (products, patents), service (service methods, procedures), knowledge bases, storage area (repositories), engineering development of Knowledge Management Systems (Knowledge Management System) or so-called KMS (hereinafter referred to as KMS), and knowledge (ideas) and the capabilities of employees in the company [1].

Knowledge Management System as one of Information System development issue, people approach delivering Knowledge Management as one of focus in Information System development. Most of successful Knowledge Management implementation depend on human participation. Many researchers discussed about Knowledge Management System as a tool for supporting Knowledge Management implementation in organization. Generally Knowledge Management System can be divided into four types as knowledge discovery system,

requirement. knowledge capture system, knowledge sharing system and knowledge application system [1].

The objective of KMS is to support creation, transfer, and application of knowledge in organizations. Knowledge and Knowledge Management are complex and multi-faceted concepts. Thus, effective development and implementation of KMS requires a foundation in several rich literatures. To be credible, KMS research and development should preserve and build upon the significant literature that exists in different but related fields [2]. In the enterprise, knowledge is one of the assets owned by the company. Knowledge as an asset in a company's knowledge can be either visible or not visible as well as intellectual property such as artifacts (products, patents), service (service methods, procedures), knowledge bases, storage area (repositories), engineering development of Knowledge Management Systems (Knowledge Management System) or so-called KMS (hereinafter referred to as KMS), and knowledge (ideas) and the capabilities of employees in the company [1]. Many organizations adopting KMS as one of the company's strategy. This is due to several advantages KMS itself, such as reducing the cost of technology, increasing data storage capacity, maximize the automation of the process of Information Technology (IT), data access can be done anywhere at any time, and relieve the burden on the IT department [3]. Private colleges as a company engaged in educational services would require a Knowledge Management System as one of the Management Strategies to compete the competitor. Private colleges are the second alternative priority prospective students in choosing a college other than public universities. Actually it is a sizeable business opportunity for businesses in education considering the number of prospective students compared to the number of quotas that will be accepted by the public universities through the selection. Successful implementation of a new system that relies heavily on thorough preparation and readiness [3]. In determining the readiness of KMS implementation, certainly need the analysis of its the main factors that affect all adopt KMS. The fact that the adoption of the latest technology or IT solution has always been an important topic for technology or IT solution is viewed from a business standpoint rather than just as a tool but as a spur to improvement of organizational competitiveness [4]. Research question in this paper is What are the factors that affect all adopt a Knowledge Management System (KMS) in private universities in Palembang as the form of college readiness in adopting KMS. This Research Purposes to Determine the factors that affect all adopt KMS at private universities in Palembang as part of organizational readiness prior to implementation is done. Case studying in University XYZ in Palembang which is respondents are represent all of managerial and staff level in it. The author only limit on internal factors as managerial perspective.

### **Knowledge Management System**

According to Bercerra, Knowledge Management System is a variety of Knowledge Management Mechanism and Technology that defined from Knowledge Management Process in organization [1]. Knowledge Management System also can be explained as a tool to support Knowledge Management Process in various type of technology implementation such as repository, database expert, discussion list [5]. Bera and Rysiew explain that Knowledge Management System is a technology that delivering knowledge management process in organization in a specific type of information system that use for manages organizational knowledge [6]. Knowledge Management System can be derived as information system that implemented to manage organizational knowledge [7].

### **Knowledge Management Process**

Many researchers discuss about knowledge management process in different perspective and type. Nonaka and Taekuchi claim that knowledge management process was a spiral model as a continuous activities of knowledge flows include socialization, externalization, combination and internalization around individual, community and organization

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[8][9][10][11][12]. Other researcher explains that Knowledge Management Process in organization focus on creation and transfer knowledge within organization, process transformation of knowledge and capabilities that exist in organization [10]. Alavi describes Knowledge Management Process Model as a process of know how in order to increase product and customer satisfaction, alavi knowledge management process are acquisition, library knowledge activity (indexing, filtering, linking), distribution and application [11][12]. Embrapa Knowledge Management Models discuss about knowledge management process trough creation and generation knowledge, codification knowledge, sharing and protection knowledge, use knowledge [13]. Knowledge management process also can be defined as an activity for supporting knowledge management in organization in order to reach organizational objective such as discovering, capturing, sharing and applying knowledge [1].

Bercerra explain knowledge management process such as [1]:

1. Knowledge discovery, describe as creating new knowledge either tacit nor explicit from data and information, this process also can be synthesizing prior knowledge into new knowledge. Knowledge discovery divided into two types, combination knowledge into another form and socialization.
2. Knowledge capture, explains as process to catch tacit or explicit knowledge from knowledge resources around organization. Two activities in knowledge capture are internalization as a converting process of tacit knowledge into explicit knowledge while internalization is converting process explicit knowledge to tacit knowledge trough learning.
3. Knowledge sharing, defines as process to communicate and transfer tacit or explicit knowledge to the other individual. Activities of knowledge sharing can be defined as socialization process and exchange.
4. Knowledge application, known as used or applied knowledge trough direction to another individual and routines for facilitate knowledge embedded in procedure and regulation in organization.

### **Knowledge Management Mechanism and Technology**

Knowledge management mechanism define as organizational or structural means that used to promote or facilitate knowledge management process such as learning by doing, lesson learn, face to face meeting, discussion, on the job training, best practice, policy and other. Knowledge management technology is various of technologies that support and facilitate knowledge management process in organization such as teleconference, database, electronic discussion, expert system and other [1]. Both of knowledge management mechanism and technology has a collaborative work during identified the suitable knowledge management system for each organization.

### **BCOR Analyses The Internal Factors Affected The Adoption of KMS**

In the decision-making process to adopt a technology in general to identify the positive and negative value of the technology. Positive values and the negative opposite from each other, as opposed to a cost benefit, opportunity as opposed to risk, so that a positive value of technology is not just at this time the advantage, but on occasion in the future. So is the case with the negative value of the technology is not just the costs, but also the risks that must be faced by the organization [14]. BOCR is a means of Multi-Criteria Decision-Making (MCDM) based mathematics used in the inter-related issues and is influenced by a lot of attributes (multi-criteria) [14]. To obtain a picture of the internal condition of the organization, then the method of interview about BCOR KMS implementation in the perspective of the organization is done by the chairman of the foundation, the foundation and the owner of the rector as expert judgment. Analysis of the current state of company results obtained through questionnaires distributed to a sample of employees and conducting several interviews with Staff Ahli University XYZ, head of Biro Pelayanan Teknis (BPT) and head of Biro Administrasi dan

Akademik (BAA). Making the questionnaire using the concept of acceptance of technology by employees. It aims to determine the needs of the organization in the implementation of KMS.

### **Analytic Hierarchy Process (AHP)**

Analytic Hierarchy Process (AHP) is a theory developed by Thomas L. Saaty in 1980. Theory of AHP in the form of a method that is used to make decisions or solve complex and unstructured. AHP helps decision makers to find the best suitable solution to the problems faced. AHP provides a comprehensive framework and rationale for structuring the problem, represent and measure the elements, connecting these elements with the goal or solution is needed, and to evaluate alternative solutions in the form of priorities. According to Saaty (2008), the steps that need to be done to make a decision in a structured manner to produce the priorities of the decision are as follows:

1. Defining the problem and determine the type of knowledge needed for the decision making.
2. Structuring the decision of the upper hierarchy based on the goals and objectives of decision making from a broader view to the bottom of which generally are alternatives.
3. Forming a matrix that contains a collection of pairwise comparisons. Each element is located at the top are used to compare the elements beneath it.
4. Uses priorities obtained from the comparisons to give priority to the elements beneath it. This is done for all the other elements until all elements already have a priority value.

The author conducted a literature review through several journals related searches according by similar topics. Several previous studies that the author use as research material in this journal are summarized in Table 1

Table 1. Previous Study

No	Author	Title	Finding
1	Jia, Zhiyang et.all [14]	A Framework of KnowledgeManagement System for Tourism Crisis Management.” Object: Government	Framework KMS developed from knowledge-based crisis management (combining KM and artificial intelligent with technology) by identifying type of knowledge resource, activity KM, and efficiency KM.
2	Woodman, Mark and Aboubakr Zade [15]	Five Grounded Principles for Developing Knowledge Management Systems	Methodology for developing KMS are sense making the problematic situation, envisioning an improved situation, designing KMS, exploring IT options for KMS and managing the evolutionary potential of the KMS
3	Edwards, et. al. [16]	Knowledge management system: finding a way with technology	Approach considering technology to assist KM by finding the way to make the best use technologies the organization must resolve: between the quantity and quality of information/knowledge, between centralized and decentralized organization, between head office and organizational knowledge and push and pull process.
4	YC Lee, H Tang, V Sugumarana [17]	A Deployment Model for Cloud Computing using the Analytic Hierarchy Process and BCOR Analysis	By using the analytic hierarchy process (AHP) and benefit-cost-opportunity-risk (BCOR) analysis to select the best cloud computing deployment model with a holistic view based on the benefit, cost, opportunity, and risk factors.

Some of the above studies, the author gets an overview of the concept of AHP, BCOR analysis and KMS.

## 2. RESEARCH METHODOLOGY

This research would present priority of factors in adobting knowledge management system for private colleges as a support of preparing knowledge management system implementation case study. The method used in this study to collect the required data is done in two ways, ie method of collecting data through interviews and through questionnaires to determine the resistance of employees against KMS implementation.



Figure 1. Stages of Research

The first method is the interview, which was conducted to obtain information on the internal state of the organization and assigning weights to each criterion that has been defined through analysis of BCOR and AHP method. This interview was also conducted to determine the purpose of the implementation of KMS and to see the readiness of management to implement KMS in University XYZ in Palembang. In this study, conducted the interviews, semi-structured. Researchers first prepare the questions, but when the interview was conducted, the author can provide the additional questions that have not been previously prepared. The interview process is conducted face to face, which the authors interviewed the owner of the foundation, the foundation's president and university rector as the person responsible in the implementation process and the use of KMS later. The second method is to spread out a questionnaire to determine the current level of University XYZ requirement in adopting KMS. In this study, the sampling technique used is probability sampling because the writer knows the number of the population so that each element has an equal opportunity to be sampled. This study also uses simple random sampling approach because each member of the population has an equal chance to be sampled. This study uses two ways to collect data, interviews and questionnaires. Instruments used in the data collection form interview questions are open-ended (open question). The questions were based on the results of a literature study authors to CSF (Critical Success Factor) of KMS implementation. Questions compiled by the author related to the criteria generated by the analysis BOCR then developed with some views of the CSF KMS implementation. The second instrument used was the questionnaire distributed to each division in UIGM. Then, the scale of measurement used in this study is a nominal scale of measurement to determine the division and the position of the respondent in UIGM and ordinal scale to measure respondents' answers to questions or statements in the questionnaire. Questions on the questionnaire are questions related to the readiness and employee resistance to the implementation of KMS. The questionnaire consisted of 25 statements to be answered by the respondents give one mark on the box that corresponds to the respondent answers on a Likert scale. Likert scale questionnaire consists of 4 categories, namely 1 = disagree, 2 = somewhat agree, 3 = agree, and 4 = strongly agree.

## 3. RESULT AND ANALYSIS

In this study the author used simple random sampling which does not consider strata and random sampling as a sampling technique. The author used a nominal scale of measurement to determine the division and the position of the respondent in University XYZ and ordinal scale

to measure respondents' answers to questions or statements in the questionnaire. The questionnaire were made based on the following references.

To determine the number of samples, the authors use the following formula Slovin 3.1

$$n = \frac{N}{1 + Ne^2}$$

$n$ : number of samples

$N$ : numbers of population

$e$ : error tolerance value

By using the above formula where the number of populations are all employees, 276 employees and by using an error tolerance of 10% (0,1), then the number of samples used in this study are 100 respondents. The summary describes on Table 2.

Table 2. Summary of Result

Code	Reference	Result (percentage)
Questionnaire 1	Knowledge of KMS	47
Questionnaire 2	IT capability of employee	85
Questionnaire 3	Social factor	73
Questionnaire 4	Attitudes toward use of KMS	52
Questionnaire 5	Conditions that Facilitate	69

From Tabel 2 above, it can be seen that the knowledge of the KMS has not been good enough for UniversityXYZ employees, but employees fairly good IT skills so necessary socialization KMS to employees before adopting. Social factors also quite influential in adopting KMS in University XYZ it is visible from a fairly high percentage is 73%.

### 3.1. Analysis BCOR

For each criteria Benefit-Opportunity-Cost-Risk, the authors conducted a study of literature to search for factors that could represent these criteria. After finding many factors that could represent BOCR criteria, grouping the authors of these factors with reference to research using AHP method [15]. The author provides a summary of the benefit criteria, cost, opportunity, and risk in Table 3.

Table 3. BCOR Factors and Indicators

Factors	Indicators	References
<b>1. Benefit</b>	<ul style="list-style-type: none"> <li>Economics, benefits associated with the efficiencies gained from the economic side</li> <li>Managerial, The benefits due to the ease or freedom organization in a managerial perspective, by adopting a company can make excess KMS as management strategy</li> <li>Satisfaction, the benefits focus on the satisfaction that comes from the organization's needs are met</li> <li>Effort, the benefits in terms of</li> </ul>	<ol style="list-style-type: none"> <li>Alavi, Maryam, and Dorothy E. Leidner. "Knowledge management systems: issues, challenges, and benefits." Communications of the AIS 1.2es (1999): 1.[21]</li> <li>Hung, Yu-Chung, Shi-Ming Huang, and Quo-Pin Lin. "Critical factors in</li> </ol>

	<p>personal or individual with increasing skill and knowledge</p> <ul style="list-style-type: none"> <li>• Time, the benefits due to the time required to perform operations shorter than normal after the implementation of KMS</li> </ul>	<p>adopting a knowledge management system for the pharmaceutical industry." Industrial Management &amp; Data Systems 105.2 (2005): 164-183.[19]</p> <p>3. Shin, Minsoo. "A framework for evaluating economics of knowledge management systems." Information &amp; Management 42.1 (2004): 179-196.[20]</p>
<p><b>2. Opportunity</b></p>	<ul style="list-style-type: none"> <li>• Expansion, opportunities because of KMS can be facilitate the transfer of resources easily and as needed [18]</li> <li>• Innovation, By adopting KMS, company can optimize the capability then make some innovation in the future</li> <li>• Optimisation of Human Resource capability</li> </ul>	<p>Shang, Shari, and Peter B. Seddon. "Assessing and managing the benefits of enterprise systems: the business manager's perspective." Information Systems Journal 12.4 (2002): 271-299.[18]</p>
<p><b>3. Cost</b></p>	<ul style="list-style-type: none"> <li>• Infrastructure, the cost of the IT infrastructure to facilitate</li> <li>• Deployment/Implementation, The cost to do the planting process and implementation of KMS</li> <li>• Service, Unexpected service fee when the adoption and use of technology when implementing KMS</li> <li>• Human Resources, Investment costs in terms of human resources, ex: training, socialitation</li> </ul>	<p>1. Anderson, Shannon W. "A framework for assessing cost management system changes: the case of activity based costing implementation at General Motors." Journal of Management Accounting Research 7.1 (1995): 1-51.[22]</p> <p>2. Implementation cost, integration cost, configure/custom cost (ISACA, July 2012; Martens, Walterbusch, &amp; Teuteberg, 2012);</p>

		3. Migration cost (Martens, Walterbusch, & Teuteberg, 2012);
4. Risk	<ul style="list-style-type: none"> <li>• Data access and integrity, Risks arising from the access and integrity of data</li> <li>• Lack-of-Control, Risks that arise because the difficulty to control the system and the data</li> <li>• Security, Emerging risks related to data security</li> </ul>	Data integrity and segregation, data access and back up, Identity management and sign-in process (Gens, 2009)

BCOR analysis of the results obtained some internal management factor criteria in terms of benefits, costs, opportunity and risk are then referenced conduct interviews to determine the weight of each factor.

3.2. Prioritization of Internal and External Factors in Persepective Management That Affect All Adopt KMS with AHP

After knowing the appropriate criteria, then be weighted against the criteria and weighting of alternatives or strategies to use comparison tables Saaty scale. Weighting of criteria is generated through focus group discussions on Managerial levels as responsible for the implementation of KMS later. The following matrix weighting for each criterion. To compare all adopt factor with benefit criteria, first be weighted against factors that exist for the benefit criteria. Here is a comparison matrix.

1. Benefit, resulting that the factors that affect all adopt KMS in University XYZ with the highest priority is the satisfaction of B2 which can be interpreted that the presence of all adopt in University XYZ KMS will increase satisfaction with the service due to the need for knowledge management are increasingly being met followed by economic factors, effort, and managerial factors. Computation has a value of 0.32 level of inconsistency.

Priorities with respect to:  
Benefit of KMS



Inconsistency = 0.32  
with 0 missing judgments.

Figure 2. Expert Choice Result

2. Cost, For risk criteria can be seen that the infrastructure factors affect the presence of all adopt KMS, with the level of inconsistency 0.27. followed by implemmentation, service and human resources.

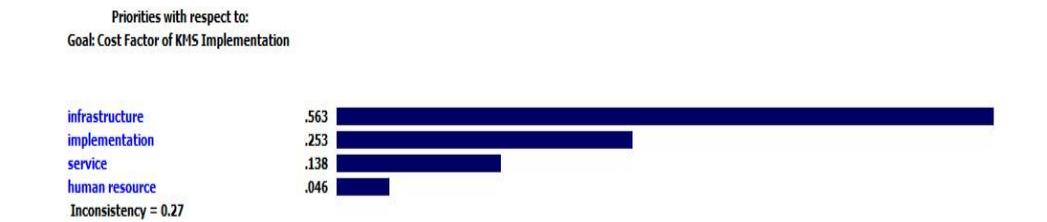


Figure 3. Expert Choice Result

3. Opportunity, using expert choice applications that factors criteria optimization opportunity is a priority factor, followed by expansion and innovation. This can be seen from the following figure.

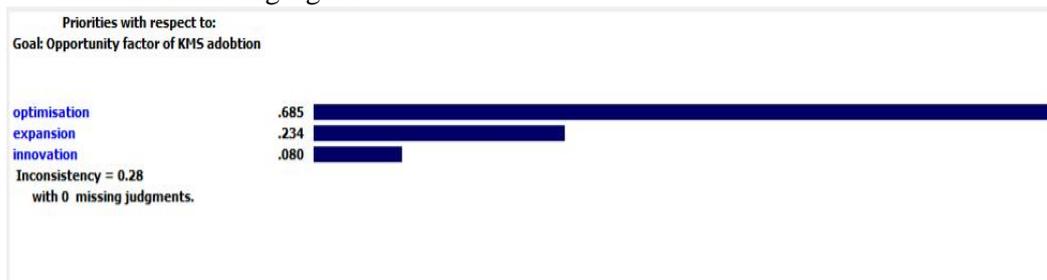


Figure 4. Expert Choice Result

4. Risk, From the above comparison matrix it was found that the priority factor for criteria Risk is the risk of data access and integrity. Here are the results of calculations performed by the Expert Choice.

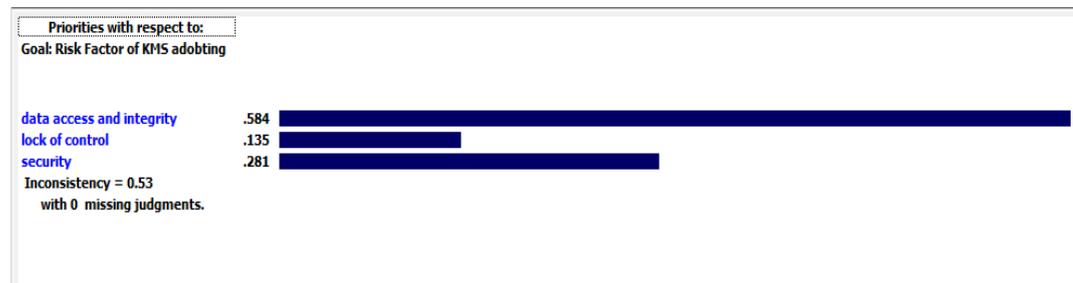


Figure 5. Expert Choice Result

#### 4. CONCLUSION

From result of data processing and analysis can be concluded that:

1. The primary factor of benefit criteria is satisfaction at 0.582, it means by adopting KMS UIGM can be improve the satisfaction of service because requirements of knowledge can be managed and processed well so that the service can be delivered either.
2. The primary factor of cost criteria is infrastructure, it means by adopting KMS University XYZ would be spend a lot of cost for develop the “new” infrastructure. And it would be the main of preparation before abodting KMS.
3. The primary factor of opportunity criteria is optimisation, it means by adopting KMS University XYZ has a big opportunity to optimasation, both in terms of infrastructure and human resource. And it would be some advantages for University XYZ in bussines perspective.
4. The primary factor of risk criteria is data access and integrity, it means by adopting KMS University XYZ has a data access and integrity risk because in general the first company adopting a technology or a new system will use the vendor services. it makes the risk on data access and integrity when the vendor couldn’t be commit.

From some of the conclusions above, University XYZ can make some of the factors that have been analyzed as a reference in adopting KMS in the future. but before KMS actually implemented University XYZ should hold KMS socialisation more for the employee because of the result of questionnaire show that the knowledge of the KMS is still very low at 47%. but in terms of IT skills and infrastructure already exist University XYZ can be considered ready for adopting KMS.

## 5. SUGGESTIONS

In this study, the author uses only one college. Next research can be done in two or more colleges, or to compare private and public universities and research may also limit the internal and external factors affecting the adoption of KMS in college. From the research, author hopes that we can find out the steps the use of AHP in decision making and seek priority. determine the benefits, costs, opportunities and risks to all adopt KMS on private university campuses before applying. The results of this study will be useful for managers who have the intention to adopt KMS for their organization.

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