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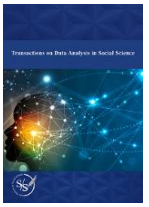

Identification and Prioritization of Factors Affecting Knowledge Management Implementation Using the AHP Method: A Case Study of Pars Pich Company

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ABSTRACT

The current era of human life is characterized by rapid and astonishing developments in science, technology, and organizational structures. Increasing competition in work environments, rising costs of human resources, instability in the labor market, and the declining availability of knowledge-oriented employees have compelled organizations to place greater emphasis on the efficient management of intellectual capital. In this context, knowledge management (KM) has emerged as a critical strategy for sustaining organizational growth, enhancing innovation, and maintaining competitive advantage. Effective implementation of KM processes requires a systematic understanding of the key factors that influence success. This research aims to identify and prioritize the main factors that impact the implementation of KM processes within organizations. To achieve this, the Analytic Hierarchy Process (AHP) method is employed, allowing for a structured evaluation of both primary and secondary factors while incorporating expert judgment in decision-making. Following the identification of these factors, their relative importance is assessed and ranked, providing a clear framework for organizational leaders to allocate resources effectively. Finally, the findings are validated and analyzed through a case study, which offers practical insights and perspectives on the implementation process. The results highlight critical priorities and provide valuable guidelines for organizations seeking to successfully adopt and strengthen knowledge management practices.

1. INTRODUCTION

Today, the tangible assets of organizations such as money, buildings, and equipment are no longer considered competitive advantages; rather, human capital and intellectual assets play a decisive role in enhancing their competitive power. For organizational success, knowledge as a capital must be exchangeable among individuals and have the ability to grow [1]. The expertise and technical skills of humans only grow when each generation teaches what it has learned to the next generation, dedicating its time and energy to advancing existing knowledge and acquiring new technical expertise and skills, rather than rediscovering what has already been discovered [2].

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With the importance of knowledge in the knowledge-based economy, many organizations systematically handle knowledge similar to tangible organizational resources [3]. This has led to significant transformations in the field of management, referred to as knowledge management. Knowledge management is a new way of thinking about organizations and the sharing of intellectual and creative benefits, involving efforts to systematically find, organize, and make knowledge accessible, strengthening a culture of continuous learning and knowledge sharing within the organization [4]. Organizational management must rely on superior knowledge to make more rational decisions on important matters and improve knowledge-based performance. Therefore, knowledge management is considered more important than knowledge itself, and organizations strive to establish it to clarify how information and organizational knowledge can be transformed into individual and group skills and expertise [5].

However, before implementing knowledge management processes, studying and understanding the factors affecting the success of knowledge management is crucial. The need for regular study and further exploration of key knowledge management factors is undeniable. Organizations require identification and awareness of the factors influencing the implementation of knowledge management processes. Neglecting these factors renders organizational efforts in this direction futile [6]. These factors, if absent, need to be created, and if present, should be nurtured and developed. In general, studying the factors influencing the implementation of knowledge management processes is necessary because recognizing these factors can help organizations in needs assessment, design, planning, implementation, and evaluation of the organization's maturity level in knowledge management [6]. Hence, the main issue of this research is the identification and prioritization of factors affecting the success of knowledge management in the Pars Pich industrial and manufacturing company.

Knowledge: Knowledge essentially originates from information and is achieved through four acts: comparison, determining consequences, creating connections, and logical discourse [7]. Knowledge is usually divided into two categories: tacit knowledge and explicit knowledge. Tacit knowledge is primarily acquired through experience and practical learning, representing the unwritten knowledge of the organization, indicating the level of experience and skills of employees. In contrast, explicit knowledge, which has the ability to be expressed through speech or documentation, exists [8].

Creating knowledge refers to an organization's ability to generate new and useful ideas, innovative ways, and concepts [9]. Organizations, by developing and reconstructing their current knowledge structure through various methods, engage in the creation of new realities and new concepts. The process of creating knowledge is essential, involving motivation, indoctrination, experience, and chance [10]. The measure of assessing new knowledge plays an effective role in solving current problems and innovating in the market. However, it does not develop if organizations try to create new knowledge under any circumstances. Various methods exist to re-experience experiences [11].

On the other hand, multiple and diverse definitions of knowledge management have been presented. Depending on the perspective of management visionaries and the emphasis of each on a specific factor, the types of their definitions differ. Approaches to knowledge management depend on the organization's management view. Differences may arise from information-based perspectives, technology-based perspectives, and culture-based perspectives. Information-based perspectives focus on accessing information, technology-based perspectives focus on information technology tools, and culture-based perspectives emphasize the dissemination of knowledge. The main focus in selecting these approaches depends on the organization's situation. If the recreation of information plays a crucial role in the organization, the information-based approach is essential. If technology in the organization does not even have the ability to provide basic services to knowledge users, the technology-based approach is emphasized. If knowledge workers in the organization are isolated and uninterested, the culture-based approach is essential [12]. In general, knowledge management refers to a specific organizational and systematic process for obtaining, organizing, maintaining, applying, disseminating, and recreating explicit and implicit knowledge of employees to enhance organizational performance and value creation [13].

2. FACTORS AFFECTING THE SUCCESS OF KNOWLEDGE MANAGEMENT PROCESS

Implementing any program or activity requires a set of factors and infrastructures to ensure its success. Various factors influencing the implementation of the knowledge management process have been discussed by different

management experts and scholars. Since humans differ in terms of abilities and willingness to work, and various factors are involved in maintaining and creating the knowledge management process, the performance of employees is shaped by various and diverse factors. The most important key factors influencing the implementation of the knowledge management process are as follows:

1. Technological Factors: One of the essential enablers of knowledge management is information technology. Information technology is not only for communication and knowledge sharing but also serves as a means for collecting, storing, and retrieving knowledge. It is widely accepted as a primary facilitator of knowledge management within organizations [15].

2. Leadership Factors: One influential organizational aspect on creativity is leadership style, which can stimulate creativity in a specific organizational domain. If the leadership style does not match the expectations of employees, and individuals perform their work solely because of the authority the leader holds, then the leader may be successful but not effective. Successful leadership for creativity and innovation is considered participative, where individuals are involved in setting long-term goals and organizational vision, collaboratively solve problems, freely act without being directive and authoritative, provide valuable rewards for creative work, encourage collaboration among employees, and celebrate employees' successes [16].

3. Organizational Factors: Another key aspect in knowledge management is an appropriate organizational structure. An appropriate organizational structure involves creating roles, teams, and designing a structure for the implementation and execution of tasks related to knowledge [7].

4. Individual Factors: Various studies over the years on creative individuals show astonishing commonalities. The most important individual-level variables influencing creativity include:

- Intrapersonal Intelligence: Comprising three elements—innate intelligence, domain-specific knowledge, and technical skills. Innate intelligence is inherent competence in a specific field. For example, if someone has an innate curiosity or charisma, this is a form of intelligence that is unique, intrinsic, and acquirable. Every human can be creative in a specific field. Knowledge: To build capability, two types of knowledge related to intrapersonal intelligence and creativity are required. Both are acquirable and learnable [17].

5. Strategic Factors: One of the success factors in knowledge management is having a clear strategy with an appropriate implementation plan, forming a formal knowledge management strategy across the organization, providing educational and development programs for knowledge management. Strategy is the foundation for employing the capabilities and resources of the organization to achieve knowledge management objectives [18].

6. Cultural Factors: Organizational culture is one of the most critical factors in the implementation of the knowledge management process. Organizational culture not only defines the knowledge that is valued but also determines what knowledge should be preserved to maintain competitive advantage [19].

7. Human Resource Factors: The importance of human resources in the context of knowledge management is very high. Individuals are the only resources for creating knowledge. Individuals play a significant role in the social-cultural aspects of the organization, shape the organization, and are crucial for its success. The importance and role of human resources in knowledge management have been extensively examined by many researchers. In fact, knowledge management is the management of people, and vice versa [20].

8. Measurement and Evaluation Factors: Measurement in knowledge management is essential to ensure the correct movement towards the intended goals. Measurement enables organizations to track progress in knowledge management, determine benefits, and assess effectiveness. Certainly, measurement provides the basis for evaluating, comparing, controlling, and improving the performance of knowledge management in organizations [21].

The table below illustrates the main factors and dependent variables for each of these key factors.

Table 1: Key Factors Influencing the Implementation of Knowledge Management Process and Associated Variables

Factor variables	Factors	row
,Creating a secure network for accessing and entering information from different locations [7] using the Internet and intranet to access information resources [22], and using appropriate software .for knowledge management [23]	technology	**1**
,Support and commitment from senior management, provision and allocation of resources [7] encouragement of knowledge creation and sharing [24], consideration of knowledge in goal setting .and policies [25]	Leadership	**2**
The speed of knowledge transfer in the organization [13], providing an appropriate infrastructure for knowledge collaboration, creating a reward system based on the evaluation of the knowledge .provided [26], and specific roles and responsibilities [7]	Organizational	**3**
Knowledge transfer skills, learning skills from others, learning skills from one's own experience high level of participation, employee awareness of the benefits and advantages of knowledge ,[25] .management [27]	Individual	**4**
Having a common vision by all employees [7], using coding and personalization strategies in knowledge management [25], aligning knowledge management strategy with the organization's .strategy [22]	Strategy	**5**
Having a high level of trust and confidence among employees to share knowledge, having a culture that values the search for knowledge and problem solving [7], paying attention to the value of .teamwork [28], and considering knowledge sharing by employees as a value and strength [25]	Cultural	**6**
,Employing expert human resources [29], maintaining and improving knowledgeable individuals promoting based on knowledge competence [26], providing study opportunities and career .advancement and professional development activities for employees [7]	Human Resources	**7**
Fair evaluation system Performance, evaluation and measurement of knowledge management effectiveness [30], determining indicators for measuring knowledge management [13], measuring .the progress of knowledge management [26]	Measurement	**8**

3. ANALYTIC HIERARCHY PROCESS (AHP) METHODOLOGY

The analysis and process of Analytic Hierarchy Process (AHP) for achieving a goal takes place in four stages [31].

Step 1 - Pairwise Comparisons Initially, a set of pairwise comparisons is conducted. Comparative tables are prepared based on the hierarchy tree, arranged from bottom to top. The comparison of pairs is performed using a scale designed for equal to equally preferred.

Step 2 - Extraction of Priorities from Group Comparison Tables Only the group comparison tables are considered for extracting priorities. To determine priorities, the concept of normalization and weighted average is employed. There are various methods for normalization, and in AHP, the following relation is utilized to normalize the numbers in the comparative tables.

$$r_{ij} = \frac{\bar{a}_{ij}}{\sum_{i=1}^{m} \bar{a}_{ij}} \quad (1)$$

Step 3 - Weighting the Desired Criteria The average values of each row in the normalized matrix indicate the weight of the criteria for the respective row.

Step 4 - Consistency Ratio Calculation The significance of AHP, in addition to combining different hierarchy levels of decision-making and considering multiple factors, lies in calculating the Consistency Ratio (C.R). This consistency ratio evaluates the consistency of comparisons. Experience has shown that if the Consistency Ratio (C.R) is less than 0.1, the comparisons can be considered consistent. Otherwise, the comparisons need to be reconsidered, and a ratio of zero indicates perfect consistency in pairwise comparisons. The consistency index for some group comparisons is calculated based on the formula above, where n represents the number of competing options.

$$C.I = \frac{\lambda Max - n}{n} \quad (2)$$

where in that n is the number of variables, max is the average consistency vector, and C.I is the consistency index. Finally, the Consistency Ratio (C.R) is calculated using the following formula:
where R.I represents the random index.

4. DATA ANALYSIS

This research was conducted in the knowledge-based production and industrial company Pars Pich. The statistical population of the study includes the employees working in the company, amounting to 123 individuals. Due to the appropriateness of the sample size, no sampling is required. The reliability of the research questionnaire is 0.89, which is acceptable. The validity of the questionnaires is in the form of formal validity. All measurement tools were provided to a number of experts and managers in the organization, and they were asked to express their opinions on the validity of the questionnaires after studying them. After collecting the opinions and making some corrections, it was concluded that the questionnaires have a high validity. To analyze the questionnaire and identify the factors affecting the success of the knowledge management process, the opinions of three expert managers were first used. Then, the standard deviation and the average of each factor were calculated, and the options with lower standard deviations were selected. Finally, to classify the collected information and answer the research hypotheses, the AHP method was used.

Identifying Factors Affecting the Implementation of Knowledge Management Process Using SPSS Software By using SPSS software, the standard deviation and average of each option were obtained, and their chart is depicted in Figure 1 for better understanding. The options with the lowest standard deviation are identified as the effective factors. As seen in Figure 1, the 13 options with the lowest standard deviation are, in order: options 3, 4, 7, 8, 10, 12, 13, 17, 20, 23, 24, 25, and 30. Therefore, these options are recognized as the main indicators affecting the implementation of the knowledge management process and are detailed in Table 2.

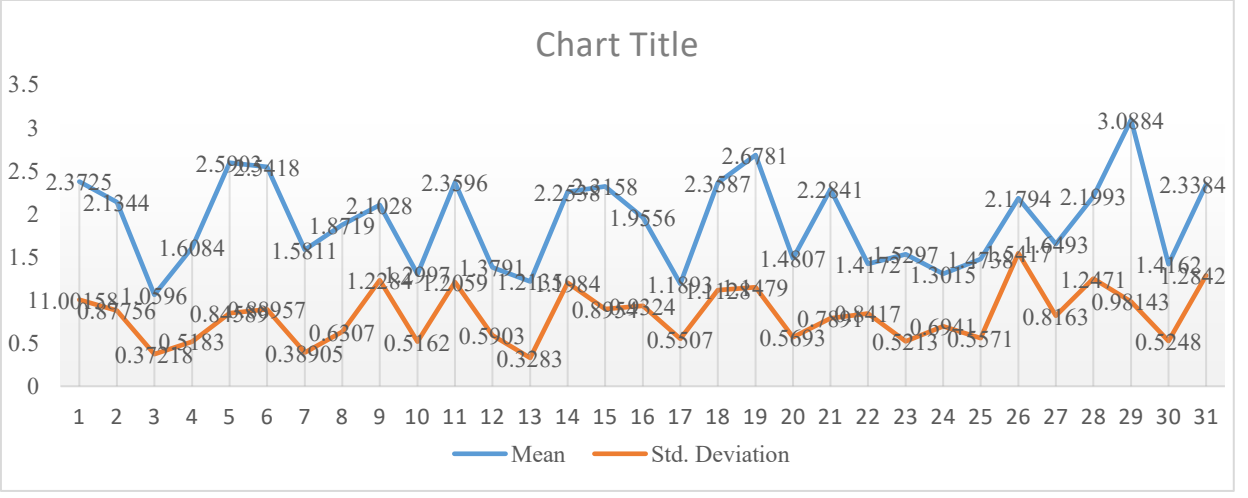

Fig. 1. Chart of Averages and Standard Deviations of Indicators

Table 2. Indicators Affecting the Implementation of the Knowledge Management Process, Categorized by Factors

Indicator	Factors
Using knowledge management software -	**technology**
Support and commitment from senior management - Paying attention to knowledge in goal setting and policies -	**Leader**
Speed of knowledge transfer in the organization - Creating a reward system based on the evaluation of the knowledge provided -	**Organizational**
Knowledge transfer skills - Ability to learn from others -	**Individual**
Having a common vision by all employees -	**Strategy**
Having a high level of trust and confidence among employees to share knowledge - Perceiving knowledge sharing by employees as a value and strength -	**Cultural**
Employing specialized human resources - Maintaining and improving knowledgeable people -	**Human Resources**
Determining indicators for measuring knowledge management -	**Measurement**

Then, using the AHP technique, the importance and priority of criteria have been determined in Tables 3 to 6.

Table 3. Pairwise Comparison Matrix Based on Primary Factors

Factors	Technology	Leadership	Organizational	Individual	Strategy	Cultural	Human Resources	Measurement
Technology	1	0/714	0/769	0/769	0/909	1/4	0/833	**1/3**
Leadership	1/4	1	1/3	1/4	0/769	0/833	1/3	**0/909**
Organizational	1/3	0/769	1	1/2	1/4	0/714	0/833	**0/769**
Individual	1/3	0/714	0/833	1	0/769	1/3	1	**1/4**
Strategy	1/1	1/3	0/714	1/3	1	1/4	0/909	**0/833**
Cultural	0/714	1/2	1/4	0/769	0/714	1	0/833	**1/3**
Human Resources	1/2	0/769	1/2	1	1/1	1/2	1	**0/769**
Measurement	0/769	1/1	1/3	0/714	1/2	0/769	1/3	**1**
Plural	8/783	7/566	8/516	8/152	7/861	8/616	8/008	**28/8**

Table 4. Normalized Matrix and Priority Values Based on Primary Factors

Factors	Technology	Leadership	Organizational	Individual	Strategy	Cultural	Human Resources	Measurement	Weight
Technology	0/113	094/0	091/0	094/0	115/0	0/162	104/0	0/157	**0/116**
Leadership	159/0	0/132	0/152	0/171	097/0	096/0	0/162	109/0	**0/134**
Organizational	148/0	101/0	0/117	147/0	0/178	082/0	104/0	092/0	**0/121**
Individual	148/0	094/0	097/0	0/122	097/0	0/151	0/124	0/169	**125/0**
Strategy	125/0	0/171	083/0	159/0	127/0	0/162	0/113	101/0	**0/131**
Cultural	081/0	0/158	0/164	094/0	091/0	0/116	104/0	0/157	**0/121**
Human Resources	136/0	101/0	0/141	0/122	139/0	139/0	0/124	092/0	**0/124**
Measurement	087/0	145/0	0/152	087/0	0/152	089/0	0/162	0/121	**0/124**

Table 5. Priority Based on Primary Factors

Weight	Criteria	Priority
0/134	Leadership	**1**
0/131	Strategy	**2**
125/0	Individual	**3**
0/124	Human Resources	**4**
0/124	Measurement	**4**
0/121	Cultural	**5**
0/121	Organizational	**5**
0/116	Technology	**6**

Table 6. Priority Based on All Criteria Affecting Knowledge Management Process Implementation

Weight	Criteria	Priority
0/131	Having a common vision by all employees	**1**
0/124	Determining indicators for measuring knowledge management	**2**
0/116	Using knowledge management software	**3**
0/111	Senior management support and commitment	**4**
0/1	The skill of learning from others	**5**
099/0	Employing specialized human resources	**6**
091/0	Speed of knowledge transfer in the organization	**7**
081/0	Having a high level of trust and confidence among employees to share knowledge	**8**
041/0	Perception of knowledge sharing by employees as a value and strength	**9**
031/0	Creating a reward system based on the evaluation of the knowledge provided	**10**
025/0	Knowledge transfer skills	**11**
024/0	Maintaining and improving knowledgeable people	**12**
022/0	Paying attention to knowledge in goal setting and policies	**13**

5. CONCLUSION

The main goal of this research was to prioritize the factors affecting the implementation of the knowledge management process in Pars Pich Industrial and Manufacturing Company. In this regard, thirty-one variables were selected as independent variables, representing the main factors influencing the implementation of the knowledge management process. Thirteen criteria were identified as effective factors. The result of the analysis and prioritization of these factors shows that, in order of priority, the strategy factor, the existence of a common vision among all employees, the assessment factor, determining indicators for knowledge management assessment, the technology factor, the use of knowledge management software, and the leadership factor, the support and commitment of senior management, obtained the first to fourth priorities. This indicates the importance of these criteria, and it is necessary for the responsible manager to pay more attention to these indicators for the successful implementation of the knowledge management process. The options related to these criteria, ranked fifth to thirteenth, are also presented in Table 7. It is recommended that these factors also be developed and nurtured in subsequent priorities within the organization.

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Transparency Statement

The data supporting this study are available upon reasonable request to the corresponding author, subject to ethical and confidentiality considerations.

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Declaration of Interest

The authors declare that they have no competing interests.

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