Optimizing Change Management Using the Analytical Hierarchy Process Method: Analysis with Super Decisions Software

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ABSTRACT

A major challenge in change management lies in selecting unbiased policy alternatives that promote effective decision-making. To overcome this obstacle, this research utilizes Super Decisions software to perform AHP calculations and assess various change management policies. The methodology used includes identifying key criteria affecting change management, structuring the problem into an AHP hierarchy, collecting data through expert surveys or interviews, and analyzing the data using Super Decisions software to determine the criteria weights and optimal policy alternatives. The study revealed that improving Standard Operating Procedures (SOPs) emerged as the most optimal policy alternative. The implementation of AHP demonstrated its ability to provide a systematic and unbiased framework, assisting top management in strategic decision-making. Overall, this study underscores the value of AHP in reducing bias and informing sound change management policies. The study recommends continued adoption and adjustment of the AHP method to suit organizational needs.

1. Introduction

In the realm of production activities, change management significantly influences business processes. Efficient and effective production processes are essential for producing high-quality products at manageable costs. Changes in production processes are often necessary to boost productivity, reduce production cycle time, and optimize resource utilization [1]. However, implementing changes in the production process commonly encounters obstacles such as employee resistance, operational disruptions, and the need to tailor existing systems. The utilization of a Decision Support System (DSS) can be instrumental in evaluating and enhancing the change management process [2]. Decision Support Systems can enhance decision-making by supplying relevant data and analysis. Through this method, organizations can pinpoint areas for enhancement and determine the most effective strategies for enhancing business process performance. This case study will concentrate on the implementation of change management in the Deployment to Production activity utilizing the Decision Support System (DSS) approach. Change is a critical component in contemporary business dynamics. Organizations that struggle to adapt to change may find it challenging to maintain their competitive edge. Therefore, change management is crucial in ensuring organizational continuity and

sustainability [3]. Change management entails a series of structured actions designed to facilitate the transition from the current state to the desired state, with the aim of enhancing organizational effectiveness and efficiency. Change management aids businesses in navigating these changes adeptly. Skillful utilization of change management can enhance acceptance and utilization of new technology, while ensuring smooth operations without complications [4]. It is crucial to assess the effectiveness of change management during the implementation of new initiatives to identify areas of success and areas needing improvement. To address this challenge, the Decision Support System approach can serve as a valuable tool in decision-making related to change management [5]. A Decision Support System is an information system that aids in decision-making by providing pertinent information, data analysis, and scenario simulation. In the context of change management, a Decision Support System (DSS) can assist managers in planning, implementing, and assessing changes more efficiently.

This study examines the impact of change management on business processes within the context of production activities, utilizing the Decision Support System methodology as a case study. The research aims to identify key factors influencing the effectiveness of change management initiatives within organizations and explores the potential role of

Decision Support Systems in supporting this process. As such, the author undertook an investigation titled "Optimizing Change Management Using the AHP Method: Analysis with Super Decisions Software ".

The research methodology employed in this study is characterized as descriptive quantitative, specifically utilizing the Analytical Hierarchy Process (AHP) method. Furthermore, the AHP method is recognized for its utility in aiding decision-making processes within change management contexts. AHP is a decision-making tool that assists in prioritizing options and enhancing decision quality by considering multiple criteria [6]. By breaking down complex problems into more manageable components, AHP promotes structured and objective decision-making. This study seeks to identify optimal strategies for enhancing change management in production processes through the application of both AHP and the Decision Support System (DSS) method in a case study [7]. The focus is on identifying critical factors influencing change management success and exploring the integration of DSS and AHP to streamline the change process.

This study holds significance in furthering knowledge on change management dynamics within an IT setting and presents practical solutions utilizing Decision Support System (DSS) techniques. The findings are anticipated to have implications for organizations undergoing digital transformation, offering valuable insights and recommendations to enhance the efficiency of their change management processes.

2. Research Methods

2.1 Research Flow Chart

In order to successfully implement the decision support system method in research, a series of research stages must be conducted to arrive at a conclusive result. The subsequent outline provides a structured approach to these research stages [8]:
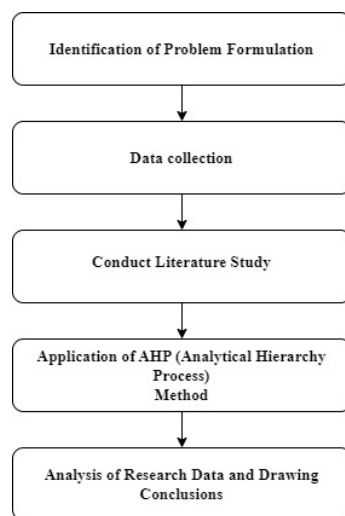

Figure 1. Research flow

The identification of the problem formula: is to analyze the extent to which change management affects the performance of IT business processes and how a Decision Support System (DSS) can assist in managing and optimizing these changes.

Data collection: After identifying the problem formulation, the next step is the data collection stage to strengthen the existing theory. The data used in this study are questionnaire data and interviews with related function management.

Conduct Literature Study: The subsequent phase involves a thorough examination of existing literature. During this stage, researchers undertake a review of relevant studies, specifically focusing on theoretical sources and materials from scholarly journals pertaining to the analysis of change management and utilization of the Analytical Hierarchy Process (AHP) methodology. The primary objective of this stage is to enhance the understanding of the identified issues and serve as a foundation for subsequent research endeavors.

The following are the completion steps in the AHP method [9]:

1. Describe the problem and provide solutions, then organize the hierarchy.
2. Prioritizing elements, i.e. making pairwise comparisons on a scale of 1-9 (comparing elements in pairs according to the criteria). Then display the matrix with decimal numbers.
3. Synthesize the pairwise comparisons, in order to get the respective priority. Then the value is entered into the matrix.
4. Measuring the consistency of the Consistency Index (CI) calculation with the formula:

$$CI = (\lambda \text{ Maks} - N) / (N-1)$$

   where:
   N = number of elements (criteria)

5. Then calculate the Consistency Ratio (CR) with the formula:

$$CR = CI / IR$$

   where:
   CR = Concictency Ratio,
   CI = Consistency Index,
   IR = Random Concictency Index (by looking at the IR table).
6. If the result of the Concictency Ratio (CR) is >10% or 0.1, then the questionnaire must be. But if the result of Concictency Ratio (CR) <= 0.1, then the calculation result can be decided to be correct, calculation results can already be decided to be correct.

Application of AHP (Analytical Hierarchy Process) Method: In applying the AHP method, testing is carried out using super decision software.

Analysis of Research Data and Drawing Conclusions: After processing the data, data analysis is then carried out from the results of data processing so that the research produces the desired data.

2.2 Data Collection Technique

Data collection techniques refer to the methodologies employed to gather data in alignment with research protocols to ensure the acquisition of necessary data. As the primary objective of research is data collection, the selection of appropriate data collection techniques is a critical aspect of the research process. The present study utilized literature reviews and questionnaires as the data collection techniques.

3. Research Result

3.1 Determination of Alternatives and Criteria

At this stage the researcher collected questionnaire data from 10 respondents, then continued using the Analitycal Hierarchy Process (AHP) method where the software that will be used in helping to get decision results is Super Decisions. With the criteria and alternatives described as follows [10]:

Table 1. Criteria Data

Criteria	Type
Process Efficiency (C1)	Benefit
Error Reduction (C2)	Benefit
Inter-Team Coordination (C3)	Cost
Speed of Completion (C4)	Benefit
Quality of Results (C5)	Benefit

Table 2. Alternative Data

Alternative	Description
Improved Standard Operating Procedures (SOPs) (A1)	Develop and update clear and detailed SOPs for each stage in the deployment to production process.
Project Management with Scrum (A1)	Use the Scrum framework to improve team coordination, reduce errors, and speed up task completion.
Testing Process Automation (A3)	Use automated tools to test applications before deployment, to reduce errors and improve quality.

From the criteria that have been determined above, it is necessary to calculate the weight. Edward W.

Saaty introduced a quantitative scale ranging from 1 to 9 for the purpose of comparing the relative importance of an element in relation to other elements. This quantification method can be observed in Table 3.

Table 3. Pairwise Comparison Rating Scale

Intensity of Importance	Definition
1	Both elements are equally important
3	One element is slightly more important
5	One element is essential or very important (more important) than the other elements
7	One element is clearly more important than the other
9	One element is absolutely more important than the other
2, 4, 6, 8	Values between two adjacent considerations

3.2 Testing Implementation Using Super Decision

The following are the steps of testing using Super Decisions [11]:

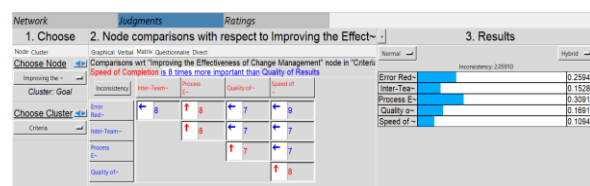1. Input Criteria Comparison Matrix can be seen in Figure 2.

Figure 2. Criteria Comparison Matrix

2. Entering the value of the comparison scale with the Alternative Matrix for all criteria as shown in Figure 2.
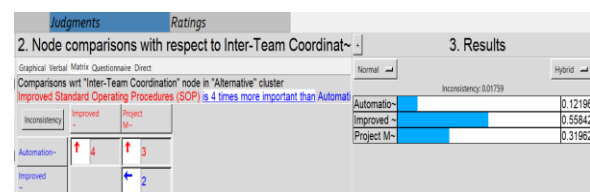

Figure 3. Alternative Matrix for all criteria

110

3.3. Viewing the Consistency Ratio of the Matrix

In the Comparison Tool Box there are Computations, click the Computations to see the ratio of consistency matrix comparison for each Cluster and alternative, then click Show New Priorities.

Here are the priorities.

Icon	Name		Normalized by Cluster	Limiting
No Icon	Automation of Testing Process		0.12196	0.060979
No Icon	Improved Standard Operating Procedures (SO~		0.55842	0.279212
No Icon	Project Management with Scrum		0.31962	0.159809
No Icon	Error Reduction		0.25940	0.129702
No Icon	Inter-Team Coordination		0.15284	0.076421
No Icon	Process Efficiency		0.30915	0.154576
No Icon	Quality of Results		0.16913	0.084563
No Icon	Speed of Completion		0.10948	0.054739
No Icon	Improving the Effectiveness of Change ~		0.00000	0.000000

Figure 4. Ratio Of Consistency

3.4. Perform Matrix Computation Process

After all the values from the matrix comparison or questionnaire are entered and see the consistency of the matrix, the final results of the system in determining best alternative to optimize change management with the AHP method can be seen [12]. Where to see it, click the Computations menu, then select Synthesize. Then the display or the final result of this matrix computation can be seen in Figure 4.
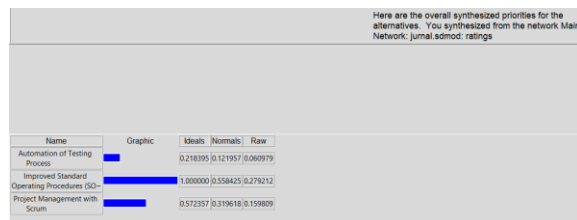

Figure 5. Final Result

3.5 Conclusion of Test Results

Based on the outcomes of the study, the optimal choice for enhancing change management was determined to be the adoption of Improved Standard Operating Procedures (SOP). The ranked alternatives identified in the report are as follows: Improved Standard Operating Procedures (SOP) ranked first, followed by Project Management with Scrum in second place, and Automation of Testing Process in third place [13] [14].

4. Conclusions and Suggestions

4.1 Conclusion

Based on the research that the author conducted on the implementation of AHP to determine the best alternative to optimize change management, the author can draw several conclusions, including:

1. The results of AHP calculations carried out using Super Decisions software.

2. Determination of policies in determining change management optimization based on calculations using Super Decisions software in this study, namely Improved Standard Operating Procedures (SOP).

3. The implementation of AHP in determining alternatives to optimize change management can be used as a reference for policies that need to be taken by top management. With the results of alternative determination of change management optimization, it can be used as a decision reference to avoid bias.

4.2 Suggestions

Following the examination and evaluation of data, experimentation, and findings in this study, the authors can propose the following recommendations for the utilization and advancement of AHP integration:

1. In making decisions with the AHP method using Super Decisions software, the author suggests that you can use ways to operate it and understand what the software can analyze [15].

2. For researchers who want to continue more broadly to determine the determination of alternative optimization of change management, it can be adjusted to the conditions that occur in their respective organizations.

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