



## AHP Approach for Selecting Audit Team to Reduce Audit Report Lag

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**ABSTRACT:** Customs and Excise Audit is the authority held by the Directorate General of Customs and Excise (DGCE) following 125/PMK.04/2007 concerning Customs Audits. In mid-October 2023, this office received a non-regular audit assignment and had to select a team that could be assigned from a total audit team. The average audit completion time from 2017 to mid-2023 has consistently increased. Ideally, audits finish within three months of assignment, per Minister of Finance Regulation No. 125/PMK.04/2007, Article 12, paragraph (1). The author uses the Analytic Hierarchy Process (AHP) method in the decision-making process to determine seven audit teams with the slightest potential for audit report lag. Collaboration with experts and previous research results are also used to determine the criteria in the process. Identifying audit teams 1 and 5 as having the highest potential for audit report lag, based on criteria derived from expert collaboration and previous research, was empirically validated. When assigned audits under real-world conditions, both teams produced reports with completion times exceeding the average, underscoring the predictive validity of the study's methodology.

**Keywords:** AHP selection, customs and excise auditor, audit completion time, audit team, decision-making



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## INTRODUCTION

The Directorate General of Customs and Excise (DGCE) of West Java is crucial in ensuring compliance with customs regulations and maximizing state revenue. Their primary function involves conducting audits on businesses engaged in import and export activities to verify the accuracy of their declarations, assess their adherence to customs laws, and ultimately protect the country's financial interests. However, the DGCE faces a growing challenge in completing these audits within the mandated timeframe. While the stipulated completion time for an audit is three months, the average time taken steadily increased between 2017 and 2022. This delay poses a significant obstacle to the DGCE's ability to meet its audit targets and fulfill its revenue collection mandate.

The implications of this delay are multifaceted. Firstly, prolonged audit completion times can hinder the DGCE's ability to detect and promptly address customs violations. This could lead to revenue leakage for the government and provide an unfair advantage to businesses that engage in non-compliant practices. Secondly, delayed audits can strain the resources of the DGCE, as audit teams may need to dedicate more time and effort to complete their assignments. This can, in turn, affect their ability to conduct other essential tasks, such as risk assessment and intelligence gathering. Finally, the delay can create uncertainty and frustration for businesses undergoing audits, potentially impacting their operations and hindering trade facilitation.

Several factors contribute to this escalating problem. One significant factor is the rise in audit assignments, which can be attributed to the growth in international trade and the increasing complexity of customs regulations. This surge in workload puts immense pressure on the existing audit teams, making it challenging to complete audits within the stipulated timeframe. Another contributing factor is the decrease in audit team leaders, who play a critical role in overseeing the audit process, providing guidance to team members, and ensuring the quality of audit reports. The shortage of experienced leaders can impede the efficiency and effectiveness of audit teams, further contributing to the delay.

Furthermore, the complexities involved in examining all aspects of an audit within the given timeframe also play a role. Modern businesses often have intricate supply chains and sophisticated accounting systems, requiring auditors to examine vast amounts of data and documentation meticulously. This process can be time-consuming, mainly when dealing with complex industries or businesses engaged in high-risk activities.

Despite these challenges, the DGCE of West Java remains committed to increasing state revenue. They have set an ambitious target of IDR 43.6 trillion for 2023 and are actively seeking ways to optimize audit completion times to achieve this goal. One promising approach involves implementing the Analytic Hierarchy Process (AHP). AHP is a multi-criteria decision-making method that enables objective and systematic selection of audit teams based on their capacity, expertise, and experience. By assigning weights to different criteria, such as the complexity of the audit, the industry sector, and the team's track record, the DGCE can ensure that the most suitable team is assigned to each audit. This method aims to streamline the audit process, reduce potential delays, and ultimately enhance the efficiency and effectiveness of customs audits.

The implementation of AHP is expected to bring several benefits. By optimizing team selection, the DGCE can ensure that audits are conducted by individuals with the necessary skills and knowledge, leading to more thorough and timely audits. This, in turn, can help identify potential customs violations more effectively, safeguard state revenue, and promote fair trade practices. Moreover, AHP can help reduce the workload on individual auditors and teams, allowing them to focus on higher-risk areas and contribute to a more efficient allocation of resources.

In conclusion, the DGCE of West Java faces a critical challenge in optimizing audit completion times. The increasing trend of delays threatens their ability to meet audit targets, enforce customs regulations effectively, and maximize state revenue. However, by proactively addressing the issue and implementing innovative solutions like the Analytic Hierarchy Process, the DGCE can enhance its audit capabilities, ensure timely completion of audits, and contribute to achieving its

revenue goals. This will strengthen customs control and revenue collection and foster a more transparent and compliant trading environment in Indonesia.

Audit completion times at the DGCE of West Java regional office vary significantly depending on the customs facilities used, with no audits completed in under three months. Despite a decrease in completed audits compared to the previous year (34 vs 43), the average completion time has steadily increased over the past three years. The average audit completion time in 2023 was 162.82 days, the highest since 2017. This extended timeframe is likely due to the complexities of thorough audits, as expressed by audit team leader Muhammad Romadhoni Ashari. As of November 17, 2023, only 34 reports were finalized, indicating a potential strain on resources and a growing concern for timely audit completion.

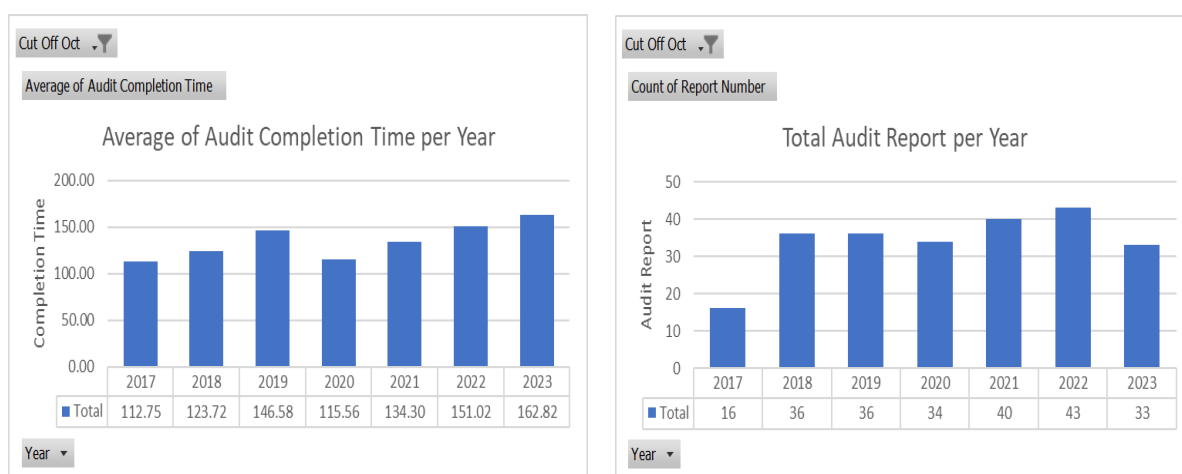


Figure 1. Average audit completion time with several audit reports until October 31, 2023.

As of October 31, 2023, the audit unit at the DGCE of West Java Office had collected IDR 202.9 billion (13.45%) of the IDR 1.52 trillion audit bill, making it the third highest contributor after the Audit Head Office and Jakarta Office. While the audit unit itself doesn't have a state income target, it contributes to the overall revenue target of the DGCE West Java Office, which is IDR 43.6 trillion for 2023. This target is 18.17% higher than the 2022 target. Since audit receipts for 2022 totaled IDR 80.2 billion, a similar ratio for 2023 can be anticipated.

This study aims to optimize audit completion time by identifying and selecting the best teams based on stakeholder expectations. The research objectives include (1) determining stakeholder expectations in audit team selection to reduce audit report lag, (2) providing alternative audit teams that meet stakeholder expectations, and (3) selecting audit teams for new non-regular audit assignments that meet stakeholder expectations.

**METHOD**

This study employs a rigorous and comprehensive research design, systematically structured to ensure the validity and reliability of its findings. The research process unfolds several vital phases, each meticulously executed to understand the subject matter thoroughly. Initially, the study embarks on a thorough conceptualization process, wherein the relevant variables are explicitly defined, and appropriate measurement techniques are established. This foundational step ensures clarity and precision in the investigation, enabling accurate data collection and analysis. Next, a

representative sampling strategy is employed to select participants, ensuring that the findings can be generalized to the broader population of interest. This careful selection process enhances the study's external validity, allowing for confident extrapolation of the results.

Data collection proceeds through a multifaceted approach, incorporating interviews, observations, and surveys. This triangulation of methods provides a rich and nuanced understanding of the phenomenon under investigation, capturing diverse perspectives and insights. Interviews allow in-depth exploration of individual experiences and perceptions, while observations provide direct access to real-world behaviors and interactions. On the other hand, surveys enable the collection of quantitative data from a larger sample, facilitating statistical analysis and generalization. Subsequently, the collected data is subjected to rigorous statistical analysis, employing appropriate techniques to evaluate hypotheses and address the central research questions. This analytical phase aims to identify significant patterns, relationships, and trends within the data, providing empirical evidence to support the study's conclusions. Finally, the research findings are synthesized and interpreted, culminating in developing valuable insights and actionable recommendations for policymakers. This culminating phase translates the research findings into practical knowledge, offering informed decision-making and policy formulation guidance. With its systematic progression through these phases, the entire research process is visually illustrated in Figure 2, providing a clear and concise overview of the study's design and methodology.

This study employed a mixed-methods approach to data collection, integrating primary and secondary data sources to ensure a comprehensive understanding of factors contributing to delays in audit report submissions. Primary data from structured interviews and questionnaires with individuals involved in the customs and excise audit environment provided empirical evidence regarding the variables impacting report timelines, stakeholder perspectives, and potential solutions. This was complemented by secondary data from scholarly publications, book reviews, and audit reports, offering contextual and comparative insights. The data collection period, spanning May 20th to 31st, 2024, aligned with a newly established non-routine audit assignment objective. This multifaceted approach ensured the data's accuracy, depth, and reliability, enabling a thorough analysis of the research problem.

This study employed a two-stage data analysis approach encompassing qualitative and quantitative methodologies. Qualitative data gathered through interviews, observations, and document analysis were subjected to content analysis to identify factors contributing to audit report lag. This approach emphasized understanding the context and meaning behind the observed delays. Complementing this, a quantitative approach utilized survey data to analyze stakeholder influence and inform the selection of an audit team using the Analytic Hierarchy Process (AHP). Stakeholder analysis involved calculating average interest and power scores, while AHP employed a paired comparison rating scale to elicit expert opinions for decision-making. This mixed-methods approach allowed for a comprehensive analysis of the research problem by combining interpretive and numerical data.

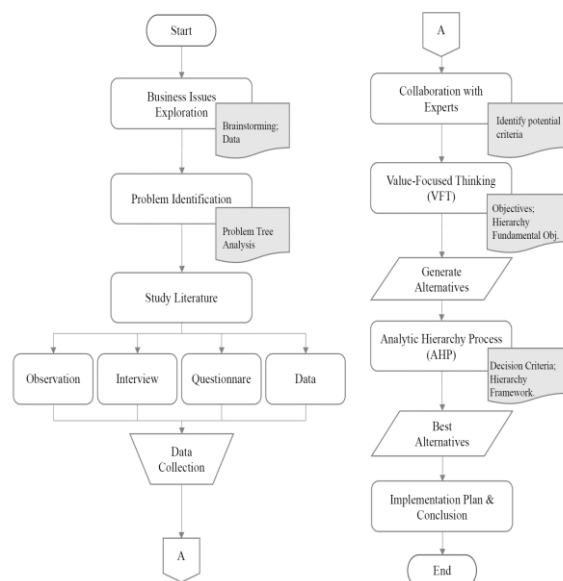


Figure 2. Research design flow.

Following the collection of questionnaire data, a pairwise comparison matrix was generated. This involved constructing a table to compare individual respondent ratings at both the criteria and alternative levels, with geometric means serving as inputs for the matrix. This process was replicated for alternative-level comparisons. Subsequently, the Super Decisions AHP software was employed to analyze and prioritize the data. The resulting insights provide decision-makers with an optimal audit team selection strategy aimed at mitigating the risk of audit report delays.

## RESULT AND DISCUSSION

The assignment of seven new engagements necessitates careful consideration of team deployment criteria to mitigate potential audit report lag. Analysis of expert brainstorming sessions and relevant literature indicates that meticulous audit team selection is crucial to avoid delays. Factors contributing to potential lag, as identified by subject matter experts, should be rigorously evaluated in the deployment process.

The judicious allocation of audit teams is paramount, especially in light of the recent influx of seven new audit assignments and the attendant risk of audit report delays. Effective audit team deployment requires careful consideration of various factors that can significantly influence the timely completion of audits. These factors, identified through rigorous brainstorming sessions with subject matter experts (SMEs) and an extensive review of pertinent literature, encompass a range of critical considerations:

**Auditor Workload:** The existing workload of individual auditors and audit teams is a crucial determinant of their capacity to undertake new assignments. Overburdening auditors can lead to decreased efficiency, compromised quality of work, and delays in report submission. Therefore, a careful assessment of current workloads is essential to ensure equitable distribution of assignments and prevent undue strain on auditors.

**Audit Finding Disputes:** Another critical factor to consider is the potential for disputes arising from audit findings. Disagreements between auditors and auditees regarding the interpretation of

regulations, the validity of conclusions, or the proposed corrective actions can significantly prolong the audit process. Anticipating and mitigating such disputes requires careful selection of audit teams with strong communication and conflict resolution skills and a proactive approach to stakeholder engagement.

**Auditee Cooperation:** The level of cooperation extended by the auditee organization plays a crucial role in the efficiency of the audit process. Prompt provision of necessary documents, access to relevant personnel, and a collaborative approach to addressing audit queries can significantly expedite the audit. Conversely, uncooperative or obstructive behavior from the auditee can lead to delays and hinder the timely completion of the audit report.

**Auditor Competency:** The knowledge, skills, and experience of the auditors assigned to a particular assignment are pivotal to its successful and timely completion. Matching the complexity of the audit with the competency level of the audit team is essential to ensure that the audit is conducted effectively and efficiently. Industry-specific knowledge, technical expertise in relevant areas, and experience in conducting similar audits should be carefully considered during team deployment.

In conclusion, the deployment of audit teams represents a strategic decision of paramount importance, necessitating a nuanced understanding of the multifaceted factors that can influence audit outcomes. It is not merely a matter of assigning auditors to tasks but rather a complex process that requires careful consideration of various interconnected elements.

Firstly, the workload of individual auditors and audit teams must be judiciously evaluated. An excessive burden can lead to diminished efficiency, compromised quality of work, and delays in submitting audit reports. Therefore, a meticulous assessment of current workloads is essential to ensure an equitable distribution of assignments and prevent an undue strain on auditors, safeguarding against the detrimental effects of overextension.

Secondly, the potential for disputes arising from audit findings represents a critical consideration. Disagreements between auditors and auditees regarding the interpretation of regulations, the validity of conclusions, or the proposed corrective actions can significantly impede the audit process and contribute to delays. Anticipating and mitigating such disputes requires the careful selection of audit teams possessing strong communication and conflict resolution skills, coupled with a proactive approach to stakeholder engagement, fostering a collaborative environment conducive to resolving disagreements constructively.

Thirdly, the anticipated level of cooperation from the auditee organization is crucial. A cooperative and transparent approach from the auditee, characterized by the prompt provision of necessary documents, access to relevant personnel, and a willingness to address audit queries, can significantly expedite the audit process. Conversely, uncooperative or obstructive behavior can lead to delays and hinder the timely completion of the audit report. Therefore, assessing the anticipated level of cooperation and proactively engaging with the auditee to establish clear expectations and foster a collaborative relationship is essential.

Finally, aligning the required auditor competency with the complexity of the audit assignment is pivotal. The auditors' knowledge, skills, and experience must be commensurate with the specific demands of the audit. Factors such as industry-specific knowledge, technical expertise in relevant areas, and experience conducting similar audits should be carefully considered during team

deployment to ensure the audit is conducted effectively and efficiently. Matching the right expertise to the right task optimizes resource allocation and maximizes the likelihood of timely and successful audit completion.

By meticulously considering these interconnected factors – auditor workload, the potential for audit finding disputes, the anticipated level of auditee cooperation, and the required auditor competency – the DGCE can optimize team allocation, mitigate the risk of audit report lag, and ensure the timely and effective execution of its audit mandate. This strategic approach to team deployment not only enhances operational efficiency but also contributes to the overall effectiveness of the audit function in safeguarding state revenue and promoting compliance with customs regulations.

This study employs Value-Focused Thinking (VFT) to identify criteria for selecting audit teams, aiming to optimize audit completion time in alignment with stakeholder expectations. Through interviews with subject matter experts, a means-end objective hierarchy was established, revealing four key objectives: minimizing auditor workload and audit finding disputes while maximizing auditee cooperation and auditor competence. These objectives are further operationalized into six criteria, as detailed in Table 1, and will be used in the decision-making process using the Analytic Hierarchy Process (AHP).

Table 1. Mean objectives (VFT) to criteria design (AHP) conversion table with criteria description.

No.	Mean Objectives (VFT)	Criteria (AHP)	Description
1	Minimizing the audit workload of each audit team	Workload	Limited audit resources lead to longer hours for some team members and delayed reports. This negatively impacts focus and prioritization, causing further delays.
2	Minimizing the audit finding dispute of the audit process	Finding Dispute	Disagreements between auditors and auditees, known as audit finding disputes, lead to delays in the audit process.
3	Maximizing the auditee cooperative nature factor	Cooperative Nature Factor	Auditee cooperation, or their willingness to provide data and respond to findings, directly impacts the duration of customs and excise audits.
4	Minimizing the auditor competence	Auditor Competence	Competent auditors, with their expertise and adherence to standards, take longer to complete audits, resulting in delayed reports.

Discussions with subject matter experts (SMEs) indicate that the most effective strategy to optimize the completion of seven new audit assignments is to utilize the default audit team composition from 2023, as outlined in ND-43/WBC.092/2023, dated 27 January 2023. This approach leverages existing team structures and leadership (Teams 1 through 9) to ensure efficient and timely completion of the audits.

This study utilizes a multi-criteria decision-making (MCDM) methodology to address the complexities of audit team selection. Four critical criteria, derived from extensive collaboration

with subject-matter experts (SMEs) in the field, form the foundation of this evaluation. This technique enables the decomposition of the problem into a hierarchical structure, allowing for pairwise comparisons of criteria and alternatives to establish their relative importance. The analysis uses the AHP Super Decisions software, a specialized tool designed for AHP model construction and analysis. A visual representation of the hierarchical structure, depicting the relationships between the goal, criteria, and alternatives (see Figure 3). This model is a framework for systematically evaluating and prioritizing potential solutions based on the defined criteria and expert judgments.

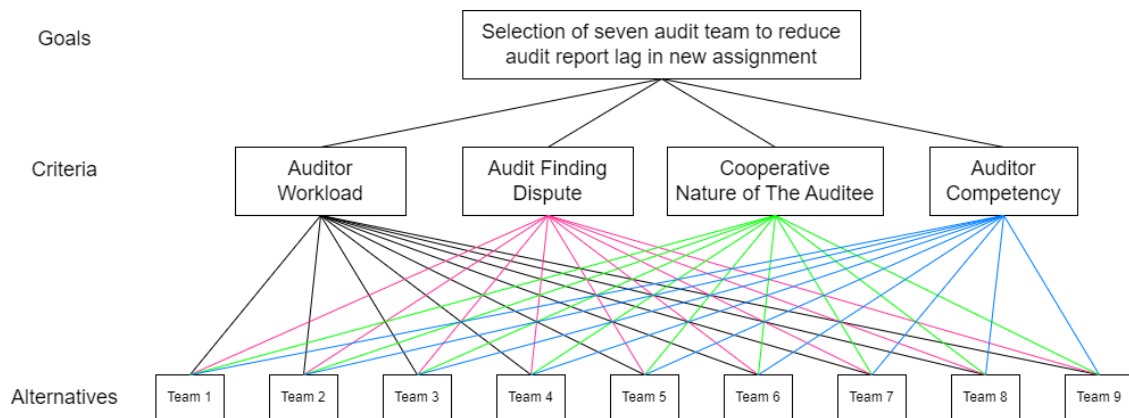


Figure 3. The structure is a Hierarchy of AHP Model.

The assessment of criteria for audit team selection involved a mixed-methods approach. Initially, a quantitative survey utilizing pairwise comparisons and a numerical scale was administered to elicit preferences regarding critical criteria. This was followed by qualitative interviews with four Subject Matter Experts (SMEs) to gain deeper insights into the relative importance of each criterion and to gather comparative data on potential solutions. The combined quantitative and qualitative data will inform a robust and comprehensive evaluation and selection process for optimal audit team composition.

A structured questionnaire employing pairwise comparisons was developed to elicit expert judgments on the relative importance of the predefined criteria and sub-criteria. Respondents identified as Subject Matter Experts (SMEs) utilize a standardized numerical scale to express the strength of their preferences. This scale, ranging from 1 (equal importance) to 9 (extreme importance), allows for nuanced comparisons and quantifies qualitative judgments. The resulting data will be used to construct a hierarchical model for decision-making.

Analysis of interviews with five Subject Matter Experts (SMEs) in the West Java Customs and Excise Regional Office reveals diverse perspectives on audit team selection criteria. These expert opinions are synthesized using a geometric mean approach to determine the relative importance of each criterion and alternative team composition (see Figure 4). This aggregated data will inform the final selection process.

Question:																		
Which one of the following <b>criteria</b> do you think is more preferable for selecting audit team to reduce audit report lag in Audit Customs of West Java																		
Criteria	Pairwise Numerical Rating												Criteria					
Workload	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Finding Dispute
Workload	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Cooperative Nature Factor
Workload	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Auditor Competence
Finding Dispute	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Cooperative Nature Factor
Finding Dispute	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Auditor Competence
Cooperative Nature Factor	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Auditor Competence



Question:  
Based on criteria "Auditor competency; Auditee Cooperative Factor; Audit Finding Dispute; Auditor Workload" Which one of the following **alternative** audit team do you think is more preferable for selecting audit team in new seven audit assignments to reduce audit report lag in Audit Customs of West Java.

Alternative	Pairwise Numerical Rating																Alternative	
Team 1 (APP)	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Team 2 (AG)
Team 1 (APP)	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Team 3 (AWJ)
Team 1 (APP)	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Team 4 (DAH)
Team 1 (APP)	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Team 5 (HK)
...																		...
Team 8 (NW)	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Team 9 (S)

Figure 4. Pairwise questionnaire of criteria and alternatives

The analysis utilizes the geometric mean to aggregate individual judgments for each criterion, effectively capturing the relative importance of compared elements in pairwise comparisons. This method is preferred as it offers a more robust and nuanced understanding of the priorities within the decision-making process. The resulting values represent the synthesized priorities of the criteria and the alternative designs, providing a comprehensive overview of the factors under consideration. This mathematically sound approach ensures a reliable foundation for subsequent decision analysis, enabling more informed and confident choices.

Following the execution of pairwise comparisons for criteria and alternatives, the next step involves synthesizing the collected data. This is done using specialized software like Super Decisions, which aids in analyzing and deriving meaningful insights from the comparisons. However, before utilizing the software, it's crucial to organize the pairwise comparison data into matrices for both the criteria and alternative levels, as illustrated in Tables 3 and 4. These matrices provide a structured representation of the respondents' preferences.

The software then calculates the consistency ratio, a measure of the reliability of the pairwise comparisons. In this case, the consistency ratio for the criteria and alternative levels fell below the acceptable threshold of 0.1 (see Table 2). This indicates that the respondents' judgments were relatively consistent and free from significant contradictions, ensuring the reliability of the subsequent analysis and decision-making process.

Table 2. Pairwise comparison matrix of criteria

No.	Item	Consistency Ratio (CR)	Result	Remarks
1	Pairwise comparison level 1	0,026	CR<0,1	Acceptable
2	Pairwise comparison level 2			
2	Auditor Workload	0,068	CR<0,1	Acceptable
3	Audit Finding Dispute	0,032	CR<0,1	Acceptable
4	Audit Finding Dispute	0,036	CR<0,1	Acceptable
5	Auditor Competence	0,053	CR<0,1	Acceptable

Table 3. Pairwise comparison matrix of criteria

	Workload	Finding Dispute	Cooperative Nature Factor	Auditor Competence
Workload	1	2.70	3.37	5.19
Finding Dispute	0.37	1	2.35	3.37
Cooperative Nature Factor	0.30	0.43	1	2.35
Auditor Competence	0.19	0.30	0.43	1

Table 4. Pairwise comparison matrix of workload

	Team 1 1 (APP)	Team 2 2 (AG)	Team 3 3 (AWJ)	Team 4 4 (DAH)	Team 5 5 (HK)	Team 6 6 (LD)	Team 7 7 (MRA)	Team 8 8 (NW)	Team 9 (S)
Team 1 (APP)	1	0.461	2.550	0.392	2.766	0.401	2.168	0.297	0.287
Team 2 (AG)	2.169	1	2.168	0.574	2.047	0.425	0.297	0.314	0.250
Team 3 (AWJ)	0.392	0.461	1	0.349	2.168	0.378	0.461	0.314	0.280
Team 4 (DAH)	2.551	1.742	2.865	1	3.565	2.550	1.888	2.352	0.297
Team 5 (HK)	0.361	0.488	0.461	0.280	1	0.264	0.361	0.297	0.218
Team 6 (LD)	2.493	2.352	2.645	0.392	3.787	1	0.574	0.461	0.322
Team 7 (MRA)	0.461	3.367	2.169	0.529	2.770	1.742	1	0.425	0.361
Team 8 (NW)	3.367	3.184	3.184	0.425	3.367	2.169	2.352	1	0.378
Team 9 (S)	3.484	4.000	3.571	3.367	4.587	3.105	2.770	2.645	1

A pairwise comparison of workload criteria reveals a positive correlation between workload and the potential for audit report lag. Based on these results, Team 1 (APP) appears to have a smaller workload than Team 2 (AG), as indicated by a geometric mean of 0,461 (less than 1). Conversely, Team 1 (APP) has a higher workload compared to Team 3 (AWJ), with a geometric mean of 2,550 (more than 1). This comparative assessment continues for each team, comparing Team 8 (NW) and Team 9 (S).

Table 5. Pairwise comparison matrix of finding dispute

	Team 1 (APP)	Team 2 (AG)	Team 3 (AWJ)	Team 4 (DAH)	Team 5 (HK)	Team 6 (LD)	Team 7 (MRA)	Team 8 (NW)	Team 9 (S)
<b>Team 1 (APP)</b>	1	0.314	1.319	0.264	0.461	0.314	0.239	0.209	0.239
<b>Team 2 (AG)</b>	3.184	1	3.365	0.461	1.515	0.757	0.757	0.314	0.314
<b>Team 3 (AWJ)</b>	0.758	0.297	1	0.264	0.461	0.297	0.314	0.209	0.239
<b>Team 4 (DAH)</b>	3.787	2.169	3.787	1	2.55	2.766	1.515	0.461	1.319
<b>Team 5 (HK)</b>	2.169	0.660	2.169	0.392	1	1.148	0.314	0.239	0.297
<b>Team 6 (LD)</b>	3.184	1.321	3.367	0.361	0.871	1	0.314	0.239	0.239
<b>Team 7 (MRA)</b>	4.184	1.321	3.184	0.660	3.184	3.184	1	0.314	0.574
<b>Team 8 (NW)</b>	4.784	3.184	4.784	2.169	4.184	4.184	3.184	1	2.168
<b>Team 9 (S)</b>	4.184	3.184	4.184	0.758	3.367	4.184	1.742	0.461	1

A pairwise comparison of finding dispute criteria shows a positive correlation between the level of dispute and the potential for audit report lag. Based on these results, Team 1 (APP) appears to have a more minor finding dispute than Team 2 (AG), as indicated by a geometric mean of 0,314 (less than 1). Conversely, Team 1 (APP) has a higher finding dispute compared to Team 3 (AWJ), with a geometric mean of 1,319 (more than 1). This comparative assessment continues for each team, concluding with Team 8 (NW) compared to Team 9 (S).

Table 6. Pairwise comparison matrix of auditee cooperative nature

	Team 1 (APP)	Team 2 (AG)	Team 3 (AWJ)	Team 4 (DAH)	Team 5 (HK)	Team 6 (LD)	Team 7 (MRA)	Team 8 (NW)	Team 9 (S)
<b>Team 1 (APP)</b>	1	0.209	0.28	0.297	0.461	0.757	0.314	0.425	0.209
<b>Team 2 (AG)</b>	4.784	1	1.741	2.55	2.766	4.781	2.168	3	1.319
<b>Team 3 (AWJ)</b>	3.571	0.574	1	2.168	3.565	2.766	1.148	2.168	2.168
<b>Team 4 (DAH)</b>	3.367	0.392	0.461	1	2.352	2.766	0.757	0.757	0.314
<b>Team 5 (HK)</b>	2.169	0.361	0.280	0.425	1	2.168	0.314	1.319	0.228
<b>Team 6 (LD)</b>	1.321	0.209	0.361	0.361	0.461	1	0.314	0.425	0.264

<b>Team 7 (MRA)</b>	3.184	0.461	0.871	1.321	3.184	3.184	1	1.515	0.297
<b>Team 8 (NW)</b>	2.352	0.361	0.461	1.321	0.758	2.352	0.660	1	0.392
<b>Team 9 (S)</b>	4.784	0.758	0.461	3.184	4.385	3.787	3.367	2.551	1

A pairwise comparison of the "auditee cooperative nature" factor reveals a negative correlation between this factor and the potential for audit report lag. Based on these results, Team 1 (APP) appears to have a lower "auditee cooperative nature" factor than Team 2 (AG), as indicated by a geometric mean of 0,209 (less than 1). Similarly, Team 1 (APP) has a lower "auditee cooperative nature" factor compared to Team 3 (AWJ), with a geometric mean of 0,28 (less than 1). This comparative assessment continues for each team, comparing Team 8 (NW) and Team 9 (S).

Table 7. Pairwise comparison matrix of auditor competence

	<b>Team 1 (APP)</b>	<b>Team 2 (AG)</b>	<b>Team 3 (AWJ)</b>	<b>Team 4 (DAH)</b>	<b>Team 5 (HK)</b>	<b>Team 6 (LD)</b>	<b>Team 7 (MRA)</b>	<b>Team 8 (NW)</b>	<b>Team 9 (S)</b>
<b>Team 1 (APP)</b>	1	0.314	0.264	2.352	0.435	0.231	2.766	0.264	0.341
<b>Team 2 (AG)</b>	3.184	1	0.314	3.177	1.741	0.264	3.565	0.314	1.319
<b>Team 3 (AWJ)</b>	3.787	3.184	1	2.766	2.352	0.314	3.776	1.319	2.168
<b>Team 4 (DAH)</b>	0.425	0.314	0.361	1	0.314	0.264	1.741	0.314	0.435
<b>Team 5 (HK)</b>	2.298	0.574	0.425	3.184	1	0.333	2.766	0.574	0.435
<b>Team 6 (LD)</b>	4.329	3.787	3.184	3.787	3.003	1	4.781	3.177	3.365
<b>Team 7 (MRA)</b>	0.361	0.280	0.264	0.574	0.361	0.209	1	0.314	0.314
<b>Team 8 (NW)</b>	3.787	3.184	0.758	3.184	1.742	0.314	3.184	1	1.515
<b>Team 9 (S)</b>	2.932	0.758	0.461	2.298	2.298	0.297	3.184	0.660	1

A pairwise comparison of auditor competence criteria indicates that higher auditor competence is associated with a higher potential for audit report lag. Since this study aims to find a team with the slightest potential audit report lag, the pairwise comparison is chosen according to these conditions. Therefore, Team 1 (APP) appears to have lower auditor competence than Team 2 (AG), as indicated by a geometric mean of 0,314 (less than 1). Similarly, Team 1 (APP) has lower auditor competence compared to Team 3 (AWJ), with a geometric mean of 0,264 (less than 1). This comparative assessment continues for each team, comparing Team 8 (NW) and Team 9 (S).

The selection of audit teams was conducted using the Analytic Hierarchy Process (AHP) with the aid of Super Decisions AHP software. Analysis of the weighted hierarchy tree revealed the

following prioritized criteria: auditor workload (51.8%), audit finding dispute (25.88%), cooperative nature factor (14.54%), and auditor competence (7.76%).

Table 8. Selected audit team based on research results and compared to actual assignment

No	Audit Team	Synthesized Priorities Result	Research Result	Actual Assignment	Actual Audit Completion Time	Remarks
1	Team 1 (APP)	0.055348	Not Selected	Selected	176 days	Above average
2	Team 2 (AG)	0.094654	Selected	Selected	161 days	Acceptable
3	Team 3 (AWJ)	0.07057	Selected	Selected	161 days	Acceptable
4	Team 4 (DAH)	0.140291	Selected	Not Selected	-	-
5	Team 5 (HK)	0.047401	Not Selected	Selected	189 days	Above average
6	Team 6 (LD)	0.096821	Selected	Not Selected	-	-
7	Team 7 (MRA)	0.103582	Selected	Selected	142 days	Acceptable
8	Team 8 (NW)	0.170147	Selected	Selected	191 days	Above average
9	Team 9 (S)	0.221186	Selected	Selected	121 days	Acceptable

Pairwise comparison results, synthesized using Super Decisions AHP software, indicated the following team ranking: Team 9 (S) at 22.11%, Team 8 (NW) at 17.01%, Team 4 (DAH) at 14.02%, Team 7 (MRA) at 10.35%, Team 6 (LD) at 9.68%, Team 2 (AG) at 9.46%, Team 3 (AWJ) at 7.05%, Team 1 (APP) at 5.43%, and Team 5 (HK) at 4.74%. Based on the result, to minimize the potential for audit report lag, the top seven ranked teams were selected: Team 9 (S), Team 8 (NW), Team 4 (DAH), Team 7 (MRA), Team 6 (LD), Team 2 (AG), and Team 3 (AWJ).

An evaluation of audit team assignments against the average audit completion time of 162.82 days reveals that three teams exceeded this benchmark (see Table 5). This observation is consistent with the AHP-driven audit team selection process findings, which suggested that Team 1 (APP) and Team 5 (HK) were less suitable for these assignments. This finding indicates that the audit team selection methodology utilizing the Analytic Hierarchy Process (AHP) effectively identifies Team 1 (APP) and Team 5 (HK) as unsuitable candidates for the seven new assignments.

## CONCLUSION

Based on the research results, the following seven audit teams were identified for new, non-routine audit assignments: Team 9 (S), Team 8 (NW), Team 4 (DAH), Team 7 (MRA), Team 6 (LD), Team 2 (AG), and Team 3 (AWJ). Also, based on the results, the audit teams with the highest potential for audit report lag are Team 1 (APP) and Team 5 (HK). However, in actual conditions, the two audit teams received the assignments and audit reports from the two teams exceeding the average completion time of 176 and 189 days.

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