Activity and risk identification in audit process on integrated management system to increase performance efficiency of construction services organization in Indonesia

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Abstract. The audit process of integrated management system is combining efforts to ensure or compare whether the work results is compatible with the criteria that have previously determined. Likewise, the benefit of audit process of integrated management system is means to achieve continuous improvement. Integrated management system itself is a combination of two or more management systems that make it easier for organizations to achieve their objectives. Specifically, in this research is talk about combine the quality management system, environmental management system and occupational health & safety management system. The purpose of this study is to identify the activities, objectives and risks in the audit process if the management system is integrated (quality, environment, and occupational health & safety). Also, to know whether that activities, objectives and risks affect the increased efficiency of the performance of construction services organizations in Indonesia. After identified all of them, the next step is to find out the dominant risks that may can happen in the audit process of integrated management system. And then, the final step is to find out how to manage those dominant risks. This study uses the respondent's survey strategy to identify activities, objectives, and risks and uses a case study strategy to find out the dominant risk management strategies. The results of this study in the form of activities, objectives, and risks in the integrated management audit process and find out whether the activities, objectives and risks affect the increase in the efficiency of the performance of construction services organizations in Indonesia and how to manage these dominant risks.

1. Introduction

1.1. Background
A management system is one of the main process or procedure of a company or organization to complete a task, reach a standard and achieve its objectives. In recent years, appropriate management system standards have become a central part of continuous improvement and business excellence in many organizations [7]. One of the most commonly used management standards in construction projects is ISO 9001 and ISO 14001 [2]. But currently, the occupational and health management system is also one of the highlights in construction works. That’s because working in construction field is a high-risk job. And for everyone’s safety and well-being, both contractor and project owner are giving more attention to reduce the work accident.
The application of different management systems potentially causes conflicts between management systems. That is why one of the benefits of the integrated management system is expected to minimize conflicts [8] [14].

To implement a management system standard an organization must establish a process that meets previously designed objectives and requirements. In consequence, the audit system is one of the important things to ensure that the processes and requirements are correctly implemented [1]. To optimize costs and time it is better to have an integrated audit, because auditing different management systems for the same process has proven complicated [9].

There are many of the benefits and efficiency with implemented the audit integration, such as optimize the use of resources, increasing the competencies of auditor with different management system, the audit process of the three management system (quality, environmental, occupational health & safety) is evaluated only once, reducing duplication work of audit process during the planning, implementation, and even follow-up stages of the audit.

To be able to implement a good audit integration that is expected to improve the efficiency of organizational performance, one of the things that must be done is to know what risks will affect the efficiency of organizational performance. The first step to identify the risk that is likely to happen in audit integration is giving an attention to the activities and the objectives of audit integration. From that, if the activities are not going well or the objectives is not reaching its goal, the possibility of the risk to happen is getting bigger. But in general, every activity will have a risk, so this paper is discussing all the risk from all the activity of the audit process that is in accordance with the audit requirements resulting from the integration of ISO 9001, ISO 14001, OHSAS 18001 by using the basic audit standards of ISO 19011. Then after the risks of each activity are described, it can be analyzed for preventive actions and corrective actions for the dominant risks.

1.2. Research Purposes
This study has 4 objectives in answering these problems, as follows:

- Identifying activities carried out in an audit process on an integrated management system that influences the efficiency of the performance of construction services organizations in Indonesia.
- Determining the objectives of the activities carried out in an audit process on an integrated management system that influences the efficiency of the performance of construction services organizations in Indonesia.
- Identifying risks from activities that might occur in the audit process in an integrated management system and influencing the efficiency of the performance of construction services organizations in Indonesia.
- Understanding how to manage the dominant risk so that the integrated management system audit process and improving the efficiency of the performance of construction services organizations in Indonesia are not disturbed.

1.3. Operational Model
For the operational model in this study can be seen in the diagram below:
2. Theoretical Review

2.1. Integrated Management System
An integrated management system is a management system that combines all business components into a comprehensive system that enables the achievement of its goals and mission [12]. A well-integrated standard system will increase the overall value and performance of the company both internally and externally [3] [4] [5] [6], the integration of several components in a sustainable manner is the most potential advantage in implementing an integrated management system [15], integration will trigger a more robust and comprehensive management system [16] [17], save resources, eliminate things that are not needed significantly, and improve the cleanliness of production, profitability, and efficiency of an organization [11], optimizing costs and time is better to have an integrated audit. Quoted from the Airport Services module 2005 "Efficiency is a comparison between benefits obtained with costs incurred". Information about organizational performance can be used to evaluate whether the work process undertaken by the organization has been in line with the expected goals or not. However, in reality there are many organizations that are lacking or even rarely have information about performance in their organizations.

2.2. Audit Integration
An audit is basically an effort to ascertain or compare whether a work results in accordance with the criteria or plan that was previously determined and as a means to achieve continuous improvement (continuous improvement). Audit process of integrated management system or in other words audit integration is expected to improve the efficiency of organizational performance because it can minimize conflicts between management systems. Some of the benefits from audit integration are optimizing business and resources; make organization to work as a unit with integrated goals to achieve its goals and mission; also create a lighter workload; reduce the time of certification, costs,
and documentation requirements of the system. Mourugan [10] said that in order to audit an integrated management system effectively it is important to understand the requirements of international management standards where these standards follow the TQM philosophy of Plan-Do-Check-Act. The PDCA concept itself adopts a process approach to establishing, implementing, operating, monitoring, reviewing, maintaining and improving organizational processes. Also, the PDCA concept itself is implemented in ISO 9001, ISO 14001, and ISO 45001 / OHSAS 18001. Then from quality management system, environmental management system, safety and health management system each of them has 10 High-Level Structure (HLS) clauses, but only 7 High Level Structure clauses apply to audit integration where the 7 clauses are the basis for conducting an audit checkpoint and from that the activities that needs to be done in the audit integration is identified. The 7 HLS clauses include organizational context, leadership, planning, operations, supporters, performance evaluation, repairs [10] [14] [15] [11] [3] [4] [5] [6].

3. Research Method
This study used the Delphi method in analysing the data obtained, and conducted a survey using questionnaire instruments and interviews with experts who had experience in the audit process and integrated management system (quality, environment and occupational health & safety). Delphi method is a structured communication technique or method, originally developed as a systematic, interactive forecasting method which relies on a panel of experts. The technique can also be adapted for use in face-to-face meetings and is then called mini-Delphi.

The first stage is the collection and analysis of data for the validation of activities and the objectives of the integrated management system audit process and the validation of the definition of efficiency in the performance of construction services organizations in Indonesia, at this stage the process of collecting and analyzing data using the Delphi method.

The second stage is the collection and analysis of data for the validation of risk related activities in the integrated management system audit process. Where at this stage also uses the Delphi method.

The third stage is the collection and analysis of data for the final validation of the activities, objectives and risks of the integrated integrated management system audit process. This is because in this study analyzed using the Delphi method, it must be validated at least twice a round.

The fourth stage is the collection and analysis of pilot survey data which aims to determine whether the variables that have been validated in step 3 are understandable and can be used for the primary respondent survey.

The fifth stage is the collection and analysis of data for the main respondent survey related to the assessment of the frequency of risks and the impact of the integrated management system audit process on improving the efficiency of the performance of construction service organizations in Indonesia. At this stage the analysis uses the Probability and Impact Matrix to get the risk rating / level whether high, medium or low.

![Figure 2. Probability and Impact Matrix][13]
The sixth stage is the collection and analysis of data for the strategy to face or manage the dominant risk.

The seventh stage is the collection and analysis of data to validate the dominant risk management strategy.

4. Research Result and Discussion

Based on the four formulations of existing problems with seven stages of data collection and analysis, the results of the research are in the form of activities, objectives, risks, and dominant risk responses in audit process on the integrated management system. Where in this paper focuses on dominant risk, dominant risk response, and from what activities cause these risks to occur.

4.1. Dominant Risk Rating and Response

The following table is discussed about the dominant risk rating and response from the highest three risks. Which is divided into two parts, table 1 is discussed about the highest three risks from the audit program and table 2 is discussed about the highest three risk from high-level structure (ISO). The dominant risk response consists of causes and effects of risks, the preventive actions to prevent risk happen, and the corrective actions to correct the risks that have happened.

Table 1. Dominant Risk Response for Audit Program Risks

| Rank | Code | Risk Description | Value of Risk | Preventive Actions | Corrective Actions |
|------|------|-----------------|---------------|--------------------|--------------------|
| **Carrying Out Audit Program (R3)** | | | | | |
| R3.5 | The results of the audit program are incomplete, making conclusions difficult. | 0.372 | Prepare a clear list of work and detailed results that should be collected before conducting a program audit. | Make standard operational procedures related to the audit program in detail and in accordance with reality, detailing the things that need to be audited in detail. |
| **Establish an Audit Program (R2)** | | | | | |
| R2.3 | The chosen person cannot properly manage and be responsible for the audit program. | 0.282 | Make a binding responsibility agreement and clear sanctions if the person chosen cannot be responsible for the audit program. | Give a warning to the parties concerned, give advice to improve their performance, or replace the person with someone who meets the criteria / experience. |
| **Monitor Audit Program (R4)** | | | | | |
| R4.1 | The implementation of the audit program is late, not according to the schedule and audit objectives. | 0.280 | Make standard operational procedures related to the audit program in detail and in accordance with reality, make a realistic audit schedule and set clear objectives, identify things that can hinder the audit program and prepare a back up plan when this happens. | The implementation of the audit program should be carried out immediately, with providing a deadline so that the level of delay is not too high, also assigning a team that has experience in the audit program so that the implementation can be conducted effectively, and correcting the existing schedule according to the current conditions. |
| Rank | Code | Risk                                                                 | Value of Risk | Preventive Actions                                                                 | Corrective Actions                                                                 |
|------|------|----------------------------------------------------------------------|---------------|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
|      |      | **Operations (RH4)**                                                 |               |                                                                                  |                                                                                  |
| 1.   | RH4.3| People who do work under control do not follow the policies of the integrated management system properly, are not informed of the objectives of the integrated management system, and do not contribute to the effectiveness of the integrated management system. | 0.317         | Conduct publications and provide understanding regarding the importance of following IMS policies so that IMS effectiveness can be achieved, ensuring that IMS targets are informed throughout the workforce by conducting two-way communication. | Impose sanctions on workers who do not follow the STI policy, carry out more unique / creative ways from publications related to targets that were previously carried out to inform the target so that the workers pay more attention. |
| 2.   | RH4.5| The existing communication process does not work well. So, much information is not delivered. | 0.268         | Providing training on how to communicate well, instills a culture of good communication from top management to workers. | Conduct activities that can improve communication between workers. |
|      |      | **Leadership (RH2)**                                                |               |                                                                                  |                                                                                  |
| 2.   | RH2.4| Work policies and commitments are not properly implemented by workers | 0.269         | Involving the opinions of workers when making policies and issuing work, carrying out two-way communication between top management and workers related to policies and improving work can be well implemented by workers making policies and supporting challenging work. | Provide a re-understanding of workers regarding policies and frameworks, improve policies and frameworks if there is a realistic input from workers that causes workers unable to implement policies and frameworks, imposes sanctions on workers who do not follow policies and frameworks there is. |

Table 2. Dominant Risk Response for High Level Structure (ISO)
4.2. Activities that Lead to Dominant Risk

The dominant risk that has been identified comes from activities in the audit process of integrated management system. Therefore, one way to minimize the occurrence of a dominant risk is to pay attention to activities that cause the dominant risk. This does not mean the activity has a negative impact, but it is an early warning to be careful in carrying out activities that if something goes wrong, can lead to a dominant risk. The following table is discussed about the activities that lead to dominant risk. Which is divided into two parts, table 3 is discussed about activities from audit program that lead to dominant risk and table 4 is discussed about activities from high level structure that lead to dominant risk.

Table 3. Activities from Audit Program that Lead to Dominant Risk

| Code   | Risk                                                                 | Activity                                                                 |
|--------|----------------------------------------------------------------------|--------------------------------------------------------------------------|
| R3.5   | The results of the audit program are incomplete, making conclusions difficult. | The organization manages the results of the audit program. |
| R2.3   | The chosen person cannot properly manage and be responsible for the audit program. | The organization selects the person who manages and is responsible for the audit program. |
| R4.1   | The implementation of the audit program is late, not according to the schedule and audit objectives. | The organization monitors conformity with the audit program, schedule and audit objectives. |

Table 4. Activities from High Level Structure that Lead to Dominant Risk

| Code   | Risk                                                                 | Activity                                                                 |
|--------|----------------------------------------------------------------------|--------------------------------------------------------------------------|
| RH4.3  | People who do work under control do not follow the policies of the integrated management system properly, are not informed of the objectives of the integrated management system, and do not contribute to the effectiveness of the integrated management system. | The organization ensures that people carrying out work under the control of the organization are aware of integrated management system policies, integrated management system objectives, and their contribution to the effectiveness of integrated management systems including the benefits of improving performance quality, as well as implications of incompatibility with integrated management system requirements. |
| RH2.4  | Work policies and commitments are not properly implemented by workers | Top management establishes policies that are in line with the objectives of the organization, provides a framework for establishing the objectives of Integrated Management System (quality, K3, and environment) that includes a commitment to meet the applicable requirements, and includes a commitment to continue to improve the effectiveness of Integrated Management System. |
| RH4.5  | The existing communication process does not work well. So, much information is not delivered. | Organizations determine internal and external communication relevant to integrated management systems including what methods are used, when it is |
done, who are the people involved and how to communicate

In audit program, the activities that lead to the dominant risk is contained in the section of carrying out audit program, establish an audit program and monitor an audit program. And then in high level structure section, the activities that lead to the dominant risk is contained in the operation clauses and leadership clauses. So, it can be concluded that the activities that lead to the dominant risk are activities that related to organizational management, communication within the organization, the responsibilities of every individual in the organization for the organization, understanding of integrated management systems and how to apply the integrated management systems properly. Therefore, these things must be considered properly in carrying out activities that can pose a dominant risk. One way to pay attention and carry out these activities properly is to implement preventive measures that have been previously identified.

5. Conclusion

Based on the results of testing and analysis that have been done, it can be concluded as follows:

- The dominant risk in the audit process in an integrated management system is divided into two parts, those that originate from the audit program and originate from the high level structure (ISO).
- Three dominant risks in the audit program are in carrying out audit programs that have a risk value of 0.372, establish an audit program that has a risk value of 0.282 and monitor audit programs that have a risk value of 0.280.
- The three dominant risks in high level structure come from operations clauses that have a risk value of 0.317, leadership clauses that have a risk value of 0.269, and operations clauses that have a risk value of 0.268.
- Things that must be considered in carrying out activities that can pose a dominant risk are organizational management, communication within the organization, the responsibilities of every individual in the organization for the organization, understanding of integrated management systems and how to apply them properly.

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