

Development of Integration Audit on Integrated Management System in Order to Increase Organizational Performance of Construction Company

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Abstract: Organizations can use various management practices in innovation and gain competitive advantage. The integrated management system is ultimately seen as an effective tool in optimizing organization performance in implementing management construction projects of construction company. To achieve performance of organization, organization need to ensure that their process doing well, so we need an audit system. Several studies have been concerned in audit of integrated management system, but their clauses are still in individual system management (quality, health and safety, and environment). In this study we will focus on audit integration consist of audit checkpoint integrated management system between quality, health & safety, environment in only 7 HLS (High Level Structure) clauses of 10 HLS clauses ISO:2015. For that purpose, author used descriptive analytical approach, where we tried to show the most important ideas used questionnaire in multiple company and analysis variable used in integration audit with RII. As a result, leadership is the highest weight to consider in integration audit through integrated management system.

1 INTRODUCTION

Every construction company has to implement management system in order to increase their organization performance. To implement a Management System Standard (MSS), organizations must establish processes that meet previously designed objectives and requirements. Therefore a system audit processes and requirements are necessary to ensure implementation in the organization process is doing well (Neppach, Nunes and Schebek, 2017). Full audit integration requires the establishment of a single audit system in all functions and has a complete incorporation of all cross-functional, process, and resource objectives (Bernardo et al. 2009; Karapetrovic and Rosenbloom, 1999).

The quality of organizational performance is not only determined on the final product of work, but the process of achievement becomes important (Latief and Utami, 2009). Strict supervision of the quality management system will produce excellent and quality products in accordance with agreed upon

specifications at the project planning stage (Lenhardt and Beck, 2016). During reengineering, it is very important to write what has been done. Furthermore, written text is one pattern that can support the understanding of software: encode assumptions in text and check whether the tests fail or succeed (Demirkesen and Ozorhon, 2017).

Organizations, that have integrated management systems, must have a certain extent expected to conduct internal audits intensified to some extent, since internal audit is a subsystem of the entire management system (Bernardo, Casadesus, and Karapetrovic, 2010). If an organization has more than one management system, internal audit can be integrated as a means to optimize resources (Bernardo et al. 2015). The audit process includes: planning, execution, report writing and follow-up corrective actions or improvements required (Simon et al. 2012). Audit is the most important part to ensure the organization performance running well (Latief and Utami, 2009).

Several researches look forward for audit in integrated management system. Application of

integrated management system (SMM and SMK3L) in construction companies in Indonesia had been applied to construction contractor BUMN companies and construction management (Wibowo and Waluyo, 2015), but not yet explore about integration audit that can establish the implementation of integrated management system in construction company. Therefore research question in this research are:

1. What variable in integration audit are most important to improve organization performance through integrated management system Construction Company?
2. How does integration audit effect organization performance through integrated management system in Construction Company?

2 LITERATURE REVIEW

2.1 Literature Review

In recent years, the standard of management system (MSS) that is appropriate to be applied in many organizations has become a central part for continuous improvement and business excellence (Lo Lacono Ferreira, Capuz Rizo, and Torregrosa Lopez, 2018). Implementation The ISO 9001 and ISO 14001 management system (MSS) standards are one of the most commonly used management practices (Bernardo et al. 2009). The implementation of the management system in the Republic of Indonesia is mainly related to the practice of construction projects based on the laws and regulations that have been issued by the government of the Republic of Indonesia. Indonesian legislation addressing the quality and environmental management system has been published since 2009, while the regulation on occupational health and safety was published in 2012. The regulation is Government Regulation No.50 of 2012 on Quality Management System (QMS), Regulation of the State Minister of Environment No.31 of 2009 on Environmental Management System (EMS), and Regulation of Minister of Public Works no. 5 Year 2014 on the implementation of Occupational Safety and Health Management System (OHSAS).The implementation of different management systems has the potential to create conflicts between management systems, management system integration is expected to minimize conflict between management systems (Ferreira et al. 2016). At this time, many organizations have chosen to implement Integrated Systems Management (IMS) covering

ISO 9001, ISO 14001 and OHSAS 18001 as an alternative to optimizing efforts and resources (Sampaio and Arezes 2014)(Oliveira et al. 2018). The Integrated Management System (IMS) integrates all organizational systems and processes into a complete framework, allows an organization to work as a whole with an integrated goal to achieve its goals and mission (Mourougan, 2015).

2.2 Integration Audit

Audits are defined in the ISO 19011: 2011 and ISO 9000: 2005 standard "Systematic, independent and documented process for obtaining audit evidence and evaluating objectively to determine the extent to which audit criteria are met" (ISO, 2005, 2011). According to the same standards, internal audits are conducted by, or on behalf of, the organization itself for management review and other internal purposes, and may form the basis for the assertion that the organization meets conformity (ISO, 2005, 2011). External audits is held by second parties who have an interest in the organization, such as customers, or others in the company and external third parties such as independent audit organizations and such as certify (ISO, 2005, 2011).

The research on integration of audit in system management integration starts from Simon's research (2012) studying the integrated management system model through example about the stages, strategies, advantages and organizational challenges in implementing the integration of management and audit system. Different management system audits for the same process are proving complex (Bernardo et al. 2017 and Simon et al. 2012). Therefore, it is better to have integration audit to optimize cost and time (Mourougan, 2015). High levels of MS audit integration, leading to more synergy and effectiveness in auditing (Bernardo et al. 2009).

Research on audit integration practices from management system standards is very limited. A very helpful study of the authors is a study conducted by (Mourougan, 2015) using the literature review method, which provides integrated audit system planning steps and checkpoint audits consisting of 7 HLS clauses from ISO 9001, ISO 45001, ISO 14001 and ISO 27001. Bernardo et.al. (2010) conducted a study by conducting a survey of 1615 organizations in Spain using at least ISO 9001 and ISO 14001, the study intends to find out how organizations that use ISO 9001 and ISO 14001 perform an audit of their management system (Bernardo et al. 2010). The study divides audit integration based on variables related to the

integration of the audit itself and the variables associated with the audit methodology. In the study they provide a structured approach on how to integrate audits of ISO 9001 and ISO 27001. Bernardo in his research found that organizations with a high degree of MS standard integration also

showed more integrated auditing. In addition, the degree of integration is generally higher for internal audit than with external auditing (Bernardo et al. 2010; Muzaimi, Chew, and Hamid, 2017; Carvalho et al. 2015).

Table 1: Novelty of Integration Audit.

Author	Clause of Integration Audit							Variable of Audit Programmed				
	CO	LD	PL	SP	OP	PE	IM	SA	EA	IA	MA	RA
Mourougan 2015	√	√	√	√	√	√	√	-	-	-	-	-
Bernardo et al. 2010	-	-	-	-	-	-	-	√	√	√	√	√
(Forteza, Carretero-Gómez, and Sesé 2017	-	-	-	-	-	-	-	√	√	√	√	√
Simon et al. 2012	-	-	-	-	-	-	-	√	√	√	√	√
Bernardo et al. 2017	-	-	-	-	-	-	-	√	√	√	√	√
Bernardo et al. 2015	-	-	-	-	-	-	-	√	√	√	√	√
Bernardo et al. 2009	-	-	-	-	-	-	-	√	√	√	√	√
Merce et al. 2016	√	-	√	-	-	√	-	-	√	√	√	-
(Bernardo 2011	√	-	√	-	-	√	-	-	√	√	√	-
Merad, Dechy, and Marcel 2014	-	-	√	-	-	√	-	-	√	√	√	-
Sanz-calcedo et al. 2015	-	-	√	-	-	√	-	-	√	√	√	-
Implementation, Study, and Netzwerk 2016	-	-	√	-	-	√	-	-	√	√	√	-
Muzaimi et al. 2017	√	-	√	-	-	√	-	-	√	√	√	-
Gianni, Gotzamani, and Tsiotras 2017	√	-	√	-	-	√	-	-	√	√	√	-
Nunhes, Motta Barbosa, and de Oliveira 2017	√	-	√	-	-	√	-	-	√	√	√	-

Source: Own Research

Table 1 shown that to audit system management effectively, it is important to understand the requirements of international management standards. A quick review of standards suggests that it is structured following the TQM movement philosophy of Plan, Do, Check, Improve. Audit checkpoints for audit integration include only 7 HLS (High Level Structure) clauses of 10 HLS Management System and the variable needed for implementation of audit

program (Mourougan, 2015). 7 HLS clauses that used in this research are:

- A. Organizational Context (CO) clause that contains:
 - CO1: Organizations define external and internal issues of the organization.
 - CO2: The organization determines interested parties relevant to the IMS and determines the needs and expectations of each party.

- CO3: The organization determines the scope of the IMS (quality, OSH, and environment).
- CO4: The organization establishes, implements, maintains and continuously improves in accordance with the requirements of IMS (quality, OSH, and environment).
- CO5: Organizations issues relevant to organizational goals, achieving customer satisfaction and strategic direction of the organization.
- B. Leadership (LD) clause variables are:
- LD1: Top management takes responsibility and demonstrates leadership and commitment with respect to IMS.
- LD2: Top management directs and supports people to contribute to the effectiveness of IMS.
- LD3: Top management establishes policies for setting IMS (quality, health and safety) objectives.
- LD4: IMS policies (quality, OH & S, in the environment) are available as documented information.
- LD5: The organization establishes and communicates the responsibility and authority.
- C. Planning (PL) clause are:
- PL1: The organization establishes the risks and opportunities that need to be addressed.
- PL2: Organizations plan actions to address these risks and opportunities and integrate them into the IMS business process.
- PL3: Organizations develop processes in managing the implementation of IMS.
- PL4: The organization defines the goals and objectives of the IMS.
- PL5: The organization maintains documented information.
- D. Support (SP) consists of:
- SP1: The Organization determines, provides and maintains the resources needed for the IMS (including persons, infrastructure and environmental requirements).
- SP2: The organization ensures that people have competencies.
- SP3: The organization ensures that people doing work under the control.
- SP4: The organization determines, provides and maintains infrastructure for IMS process operations.
- SP5: The organization determines internal and external communications.
- SP6: Organizations define, establish and maintain the documented information required by IMS standards.
- SP7: The organization ensures that the documented information is always up-to-date with proper identification, descriptions and formats.
- SP8: The organization ensures that documented information can be controlled for distribution, access, retrieval, storage, preservation, retention and disposition.
- E. Operation (OP) contains of:
- OP01: The organization ensures that documented information can be controlled for distribution, access, retrieval, storage, preservation, retention and disposition.
- OP02: The organization ensures that the established process can handle risks and opportunities and in accordance in the IMS (quality, OSH, and environment).
- OP03: The organization ensures that the established process can handle risks and opportunities and in accordance with the policies, legal goals and requirements and other requirements set forth in the IMS (quality, OSH, and environment).
- OP04: The organization ensures that third party processes in relation to IMS (quality, K3, and environment) controlled.
- F. Performance Evaluation (PE) can be described:
- PE01: The organization determines what needs to be monitored and measured.
- PE02: The organization defines methods to ensure legitimate results and to analyzing monitoring and measurement.
- PE03: The organization establishes a method for the need or opportunity for improvement in the IMS.
- PE04: The organization conducts internal audits at planned intervals.
- PE05: Organizations take action on findings in the internal audit process and report to top management.
- PE06: The organization maintains documented information from the results of an IMS performance evaluation.
- G. Improvement (IM) consists of:
- IM01: The organization determines and selects opportunities for improvement as well as implements necessary actions to meet customer needs and improve customer satisfaction.
- IM02: The organization implements the appropriate process to manage the nonconformities and corrective actions involved.

IM03: The organization decides how it will handle the need to continuously improve the suitability, adequacy, and effectiveness of IMS.

The components used to integrate in table 1 the audit process of the management system are divided into two categories namely variables related to integration and variables associated with the methodology. Audit components whose integration is specifically studied are objectives (eg, audit plan), resources (eg, auditor and audit time) and processes (eg, audit plan as inputs, methods used in the audit process, and audit reports as outputs). The methodology used in the audit is investigated through questions about audit implementation methods, applicable audit guidelines, individual audit frequencies, and reported types of findings (Bernardo et al. 2010; Bernardo et al. 2017; Simon and Casadesus, 2014 and Merad et al. 2014) are:

A. Setting Audit Program Objectives (SA) are:

SA1: The planning and execution of the audit and shall ensure that the audit program is carried out effectively.

SA2: The objectives of the audit program must be consistent and support the policies and objectives of the STI (quality, OSH, and environment).

B. Establish an Audit Program (EA)

EA1: The organization defines the roles and responsibilities of the person who will manage the audit program as well as the audit / auditor team.

EA2: The organization determines the competence of the person managing the audit program as well as the audit / auditor team.

EA3: The organization selects the person who manages and is responsible for the audit program.

EA4: The organization establishes the level of the audit program.

EA5: The organization establishes procedures for the audit program.

EA6: The organization identifies and evaluates the risk of the audit program.

EA7: The organization identifies the resources of the audit program.

C. Implementing the Audit Program (IA) are:

IA1: The organization defines the objectives, scope, schedule and criteria of the audit including the auditor's competence and the auditor's evaluation process.

IA2: The organization chooses an audit method.

IA3: The organization selects members of the audit team.

IA4: The organization assigns responsibility for the audit to the audit team leader.

IA5: The organization manages the results of the audit program.

IA6: The organization manages and maintains audit program records.

D. Monitor Audit Program (MA) consists of:

MA1: The organization monitors compliance with the audit program, schedule and audit objectives.

MA2: The organization monitors the performance of members of the audit team.

MA3: The organization monitors the ability of the audit team to implement the audit plan.

MA4: Organizations monitor feedback from top management, auditees, auditors and other interested parties.

E. Reviewing and Improving the Audit Program (RA) are:

RA1: The organization reviews the audit program to assess whether its objectives have been achieved.

RA2: Lessons learned from audit program reviews should be used as input for ongoing program improvement processes.

RA3: The organization reviews the overall implementation of the audit program, identifies areas of improvement, modifies the program if necessary.

2.3 Organization Performance

Performance measurement is one very important factor for a company. During traditional performance measurement only focus on the financial side. Managers who achieve a high profit rate will be considered successful and earn good rewards from the company. Conversely, poor financial performance in the short term can occur due to the company investing in long-term interests. To overcome this deficiency, then it is created an audit approach method that measures the performance of the company by considering four aspects of financial aspects, customers, internal business processes and learning and developing process (Olaru et al. 2014).

Organization performance can improve its workers productivity. The work productivity of an organization is strongly influenced by the productivity of its employees. While employee productivity is very influenced by factors of supervision, motivation and an effective work culture, as well as other factors such as leadership, education level and so forth. There are some factors

affecting productivity (Simon et al. 2012; Bernardo et al. 2009; Bernardo et al. 2015 and Adeleke et al. 2017).

3 METHODOLOGY

The research design adopted in this study is qualitative quantitative research in which the data are analysed statistically by using RII method and basic statistic. Respondents are the 20 employees of construction company workers in Jakarta Construction Company. These respondents were choosing because construction company worker in Jakarta have high risk accident/death accident. Characteristic of respondents are 10% worker handle more than 30 project of construction, 40% worker handle 10 – 30 project of construction, and 50% worker handle less than 10 project of construction. 10% of the worker works for under 5 years in construction company, 45% works for 5 – 10 years, and 45% works more than 10 years in construction company.

These data is in the form of questionnaire. The score is obtained by weight in each questionnaire. As we are having RII method to configure variable is most important in integration audit, we consider to have normalization of matrix and priority first in table 1. After we are consider that weight that used in this paper are normal, so we concluded weight that used for integration audit in integration management system variable in table 2.

Table 2: Normalization of Matrix And Priority.

	Strongly Agree	Agree	Neutral	Not Agree	Strongly Disagree
Strongly Agree	1	3	5	7	9
Agree	0.33	1	3	5	7
Neutral	0.20	0.33	1	3	5
Not Agree	0.14	0.20	0.33	1	3
Strongly Disagree	0.11	0.14	0.20	0.3	1
	1.787	4.676	9.533	16.333	25.000

From the normalization part, we found that weight used for quantitative research is shown in table 3.

Table 3: Normalization of Matrix and Priority.

	Strongly Agree	Agree	Neutral	Not Agree	Strongly Disagree
Weight	1.000	0.535	0.274	0.141	0.068

Table 3 shown weight that used in this paper are 0.068 for strongly disagree, 0,141 for not agree, 0,274 for neutral, 0.535 for agree and 1.000 for strongly agree. That weight used in table 4.

Table 4: Results RII of Integration Audit.

Var	Strongly Agree	Agree	Neutral	Disagree	Strognly Disagree	Total	Weight
KO1	50	24	9	0	0	61.1	3.21
KO2	40	36	3	2	0	51.2	2.69
KO3	45	36	3	0	0	56.2	2.96
KO4	40	40	3	0	0	52.2	2.75
KO5	45	28	9	0	0	57.1	3.01
LD1	75	12	3	0	0	79.8	4.20
LD2	60	24	0	2	0	66.4	3.50
LD3	60	28	0	0	0	67.5	3.55
LD4	35	44	3	0	0	48.3	2.54
LD5	45	36	0	2	0	54.6	2.87
PL1	45	36	3	0	0	56.2	2.96
PL2	45	40	0	0	0	55.7	2.93
PL3	35	44	3	0	0	48.3	2.54
PL4	50	36	0	0	0	59.6	3.14
PL5	50	36	0	0	0	59.6	3.14
SP1	50	28	3	2	0	59	3.11
SP2	40	40	3	0	0	52.2	2.75
SP3	40	36	6	0	0	52.7	2.77
SP4	25	52	3	0	0	40.4	2.13
SP5	35	44	3	0	0	48.3	2.54
SP6	30	48	3	0	0	44.4	2.34
SP7	35	44	3	0	0	48.3	2.54
SP8	40	44	0	0	0	51.7	2.72
OP1	50	36	0	0	0	59.6	3.14
OP2	50	32	3	0	0	60.1	3.16
OP3	35	44	0	2	0	46.7	2.46
OP4	50	32	3	0	0	60.1	3.16
PE1	40	40	3	0	0	52.2	2.75
PE2	35	44	3	0	0	48.3	2.54
PE3	30	48	0	2	0	42.8	2.25
PE4	45	40	0	0	0	55.7	2.93
PE5	45	40	0	0	0	55.7	2.93
PE6	35	40	3	0	0	47.2	2.49
IM1	45	32	6	0	0	56.7	2.98

IM2	30	48	3	0	0	44.4	2.34
IM3	48	30	3	0	0	57.6	3.03

As mention in table 4, leadership is the highest weight for integration audit content variables.

Table 5: Score of Group B (Physical Class).

Var	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total	Weight
SA1	55	24	6	0	0	64.5	3.40
SA2	45	40	0	0	0	55.7	2.93
EA1	40	40	0	2	0	50.7	2.67
EA2	40	40	3	0	0	52.2	2.75
EA3	35	40	0	4	0	45.7	2.40
EA4	35	36	6	2	0	47.7	2.51
EA5	35	48	0	0	0	47.8	2.52
EA6	45	40	0	0	0	55.7	2.93
EA7	35	48	0	0	0	48	2.52
IA1	30	44	6	0	0	45	2.36
IA2	25	44	6	2	0	40	2.10
IA3	30	40	3	4	0	42	2.22
IA4	35	40	3	2	0	47	2.49
IA5	40	36	6	0	0	53	2.77
IA6	45	32	6	0	0	57	2.98
MA1	40	36	6	0	0	52.7	2.77
MA2	40	40	3	0	0	52.2	2.75
MA3	40	36	6	0	0	52.7	2.77
MA4	50	32	3	0	0	60.1	3.16
RA1	5	36	3	0	0	56.2	2.96
RA2	40	40	3	0	0	52.2	2.75
RA3	45	36	3	0	0	56.2	2.96

So, in table 5 we found that setting programme audit objectives is highest weight in variable of audit programme

3.1 Data Normality Test

Data normality test is utilized to see the distribution of the data. In other words, it is to know that the data are normally distributed. To see the chart of the normal distribution of the data, the researcher adopts the method of Normal Probability Plots in testing the data for both groups. The followings are the charts that show the normal distribution of the data of the two groups in this research. The data distribution is normal because the data spread around the diagonal line of the chart.

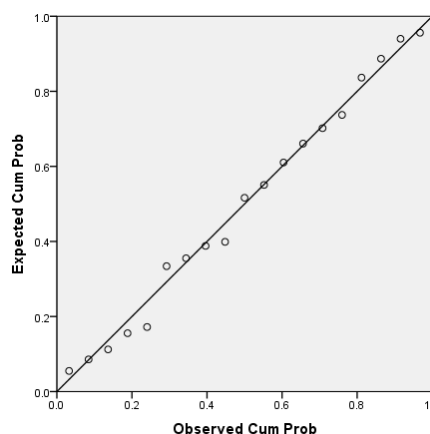


Figure 1: Data distribution of Integration Audit.

To see the normal distribution of the data from the Constanta value or Asymp.sig value, the researcher adopts the method of Kolmogorov-Smirnov Z. Both data show that the Asymp.sig value are larger than 0.05, then the data are distributed normally. The *Asymp.sig* value of of integration audit is .757 and .989

Table 6: Validation of Integration Audit.

N		19
Normal Parameters ^{a,b}	Mean	4.35
	Std. Deviation	1.811
Most Extreme Differences	Absolute	.154
	Positive	.154
	Negative	-.103
Kolmogorov-Smirnov Z		.672
<i>Asymp. Sig.</i> (2-tailed)		.757

Then, the data are calculated by using Wilcoxon Signed Ranked Test because the data in this research is non-parametric data (Prasetyo, 2014).

4 ANALYSIS

Not all studies will have a hypothesis for tested. For research that is an exploration a theory that has not significant and small or absent studies research, it is impossible to draw a hypotheses. For achieve research objectives in this type of research, we used a research question that is based on literature review.

4.1 Mean

Using equation formula of mean as follow:

$$\mu_x = \frac{\sum_{j=1}^N x_j}{N} \quad (1)$$

We found that $\mu = 4.358$. It means that respondent are agree with all variable require in this research.

4.2 Validation

It can be concluded that there is no difference in perception of answers. Based on results of the validation of content and constructs in research methodologies we find that there were 7 clauses are valid for audit content and 5 variables are valid for audit programme. Clauses used for audit content are organizational context (CO), leadership (LD), planning (PL), support (SP), operation (OP), performance evaluation (PE), and improvement (IM). Variable of audit programme consist of setting audit program objective (SA), establish an audit program (EA), implementing the audit program (IA), monitor audit program (MA), reviewing and improving the audit program (RA).

4.3 Results of RII

As we are having valid variable for measure, so next we will find most variable important in integration audit, we consider to have normalization of matrix and priority first as shown in table 3. There were some variable that have highest weight LD1 is the highest weight (4.20), than LD3 (3.55), LD2 (3.50) and SA1.

5 CONCLUSION

Clauses used for audit contact are organizational context (CO), leadership (LD), planning (PL), support (SP), operation (OP), performance evaluation (PE), and improvement (IM). Variable of audit programme consist of setting audit program objective (SA), establish an audit program (EA), implementing the audit program (IA), monitor audit program (MA), reviewing and improving the audit program (RA). There were some variable that have highest weight LD1 is the highest weight (4.20), than LD3 (3.55), LD2 (3.50) and SA1.

For future research, we would develop the standard, procedure and manual for integration audit that can improve organization performance through integrated management system and research for correlation of integration audit to improve organization performance.

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