The Strategic Implementation Asset Management System Basis ISO 55000: A Case Study On Indonesian Railways Company

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ARTICLE INFO	ABSTRACT
ISSN: 2723-1097	<i>The purpose of this study is to investigate the implementation asset management system basis on ISO 55000. State-owned companies (SOE's) in railways industry has a big asset across Sumatra, Java and Sulawesi Island. Railways SOE's have a vision of becoming the best railroad service provider that focuses on customer service and meets stakeholder expectations. To relize the vision, Implementing ISO 55000 as asset management standards in corporation is important accordance to the vision in and mandatory of the Ministry of SOEs as stakeholders in managing strategic assets that are considered effective and efficient. In asset management, ISO 55000 Series is the international accepted standard which implemented in across industry. The purpose of this study is to determine the level of maturity in the existing asset management system against ISO 55000 and suggest improvements to the asset management system to achieve the certification of ISO 55000-based asset management. The method used is qualitative methods in case studies. The data from this study from deep interview by top managerial on Railways SOE's. The analysis shown there is some clause whose level of maturity is doesn't achieved competent level. Which raises a gap in the existing asset management system compared to ISO 55000 standards. One of these objects is the subject group Support, Context of Organization, and Performance Evaluation in ISO 55000 context and Risk & Review, Life Cycle Delivery, Asset Information, and Organization & People in the AM landscape developing level of maturity. As a result, an improvement in 2 aspects of asset management is recommended such as improvement on the basis of the asset management system and improvement on key performance indicators at Indonesia railways company.</i>
Keywords:	
<i>Asset Management, ISO 55000 series</i>	

Introduction

Indonesian railways company (IRC) is a part of the state-owned companies (SOE's) that manages assets arround 270,670,000 m² spread across Sumatra, Java and Sulawesi island. Indonesia railways company has a vision of being the best railway service provider that focuses on customer service and meets stakeholder expectations. The points of fulfilling stakeholder expectations on IRC's vision are the basis of the company to fulfill the wishes of IRC stakeholders, namely the Ministry of SOEs. Based on Per-03 / MBU / 2017 regulations, IRC as a SOE's holding company must have good SOP management and asset management. Corporates who operate under Ministry of SOEs must be obedient to the establish policy, including asset management policy on railways SOE. In addition, such

implementation can affect innovation and the whole organisation, including its stakeholders and external providers (British Standard Institution, 2014a) Corporate (SOE's) with good asset management systems have more capabilities to manage their assets towards achieving corporate (SOE's) strategy by using the available knowledge and tools for optimisation of costs, risk, and performance ([Institute of Asset Management, 2012](#)). Ministry of SOEs makes influence to Indonesian railways company to apply good asset management standards it show in figure 1.

Figure 1 Influence of Government Against Asset Management in SOE's

A study case for implementation a asset management system on SOE's in PGN (oil and gas) is show fact a good asset management can be impact to corporate quality and performance, especially to increasing the asset utility value ([Ali, 2016](#); [Ardiansyah, 2016](#)). The implementing Asset Management system ca be increase the value based, process and good decision in organization. ([Roda, Kumar, Macchi et al, 2015](#); [Roda, Kumar, Macchi et al, 2015](#); [Ruiter, Robert, 2015](#); [Srinivasan R., Parikad A, 2015](#); [Swart. Vlok. Jooste, 2016](#)) Studies indicate that, while the main motivations for firms to certify their quality systems are related with the markets, the benefits are generally the improvement of the internal organization and reporting procedures and quality improvements ([Lipovatz et al., 1999](#)). The one of the best practices standard of asset management, that becomes a global reference is ISO 55000 series. This ISO 55000 standard series is designed as a guide for organizations involved in building, implementing and maintaining asset management systems and for planning, design and implementation of asset management activities ([Hastings, 2015](#)). ISO 55000 series consists of several parts, namely ISO 55000, ISO 55001 and ISO 55002.

Asset Management is a value added process to the core business of an organisation and should be considered so by corporate ([El-Akruti et al. 2013](#); ISO 55000, 2014). Based on corporate strategic asset management plan, Indonesia railways company will be implement strategic asset management based on

international standard. Based on research have investigated the impact of ISO implementation ([Aba, Badar, & Hayden, 2016](#); [Bernardo, Simon, Tari, & Molina-Azorín, 2015](#); [Heras-Saizarbitoria, Arana, & Boiral, 2015](#); [Ochieng et al., 2015](#); [Tari, Molina-Azorín, & Heras, 2012](#)). The steps towards strategic asset management based on ISO 55000 are initial studies and self assessment, development and improvement, preparation of ISO 55000, and ISO 55000 certification. According to ISO 55000 standards if IRC can be applied, the advantages implementing asset management systems include improved financial performance, better knowledgeable decisions, increased management of risk, improved services and outputs, confirmed social responsibility, verified compliance, good reputation, improved organisational sustainability, and improved corporate efficiency which is corresponding to Ministry of SOE's Goals.

Literatur Review

Asset

The studies states that the type of asset considered based on physical and organizational part. Types of assets based on physical parts consist of factories, machinery, buildings, parts, pipes and networks as well as information, engineering controls, and software systems used to achieve business and organizational functions. Types of assets by organization consist of financial assets, physical assets, human assets, information assets, intangible assets ([Hastings, 2015](#)). In addition, assets can also be interpreted an accounting perspective ([Sugiama, 2014](#))

1. Current asset
2. Long-term assets or fixed assets (real estate, factories, equipment, and equipment)
3. Prepaid asset (insurance, rental rights and interest)
4. Intangible assets (trademark rights, trademarks, patents, copyrights, and goodwill).

Asset Management

Asset management is a flow of process in some organization or corporate to optimize the utility of asset. To understanding of asset management, some basic definitions will first be presented. The asset management is defined as the *"coordinated activity of an organization to realize value from assets"* (ISO 55000, 2014) Researcher from Indonesia said asset management is the science and art to guide wealth management which includes the process of planning asset needs, obtaining, inventorying, conducting legal audits, assessing, operating, maintaining, renewing or eliminating to transfer assets effective and efficient ([Sugiama, 2014](#)).

Another perspective on asset management is the set of activities associated with; identifying what assets are needed, identifying funding requirements, accounting assets, providing logistics and maintenance support for assets, disposing and renewing assets ([Hastings, 2015](#)). From both these opinions can be

concluded the asset management is a wealth management activities which includes a series of processes from planning, procurement, operation and repair until the renewal and disposal oriented towards value. The discipline of asset management is recognized for its ability to promote integration of activities across function an corporate, and provide it with tools that facilitate risk-based, information-driven decision-making that increases corporate performance and promotes regular achievement of corporate objectives (Lloyd, 2010; ISO 55000, 2014)

An asset management system provides structured assistance for the development, coordination and management of asset management activities carried out by organizations in different life cycles. The subject of asset management as defined by [Global Forum On Maintenance & Asset Management \(2014\)](#), leads the asset management discipline to present a variety of potential benefits. To clarify, and perhaps even simplify, choices of the main benefits of asset management have been included in the ISO 55000 series. Based on ISO 55000 The benefits derived from implementing an asset management system are as follows:

1. Improved financial performance, through an enhanced ROI and cost control.
2. Informed asset investment decisions, allowing for an optimal balance between costs,risks and benefits.
3. Managed risk related to financial losses, health and safety and the environment.
4. Improved services and outputs, allowing for regular conformity towards stakeholders.
5. Demonstrated social responsibility.
6. Demonstrated compliance towards legal and regulatory requirements.
7. Enhanced organizational reputation.
8. Improved organizational sustainability.
9. Improved efficiency and effectiveness of organizational processes and asset performance.

Asset Management Life Cycle

In general, asset management has a Life Cycle that includes the process of planning, procurement, operation to write off assets. The asset life cycle (Asset Life Cycle) was formed aimed at ensuring the company to achieve maximum returns from invested capital, implementing process efficiency and effectiveness that provides reasonable control that supports the workforce to eliminate non-value added processes, resources and costs. The asset life cycle in asset management has 9 stages, namely (1) Asset Requirement Planning (2) Procurement of Assets (3) Asset Inventory (4) Asset Legal Audit (5) Asset Valuation (6) Asset Operation and Maintenance (7) Asset Renovation/Rejuvenation (8) Asset Removal (9) Asset Transfer ([Sugiyama, 2014](#)).

Asset Management System

A basic illustration of the role of physical assets and asset management in an organization is shown in Figure 2. In the picture ([Hastings, 2015](#)) that is the main driver in an organization is customer demand that determines business goals and business plans. To meet business objectives, organizations need business operations that are supported by physical assets. Asset management works to provide assets that support business operations. This requires an asset management system that supports asset planning, acquisition, maintenance and logistics. Other support services such as information technology, finance and legal services are also needed in all activities.

Sources: [Hastings, 2015](#)

Figure 2 The Role of Asset Management System

In managing an organization there are various assets that must be managed by the company. Good asset management is created from relationships or management relationships between assets within an organization ([Health Estate Journal, \(2015\)](#)). The management relationship between assets is vital for companies that consider business objectivity, risk management, regulation, policies and performance standards. According to [ISO 55000 \(2014\)](#) a management system is a set of elements that are interrelated or interact within an organization to set policies and objectives and processes to achieve management goals.

Another definition of an asset management system according to (ISO 55000,2014) is a management system in asset management that functions to set policies and objectives for asset management as well as processes for achieving asset management goals. The management relationship between assets is vital for companies that have an impact on business objectivity, risk management, regulations, policies, and performance standards (IAM, 2015).

Sources: The IAM (2015)

Figure 3 The Relationship Asset Management and Business

Asset Management Standards ISO 55000 Series

The ISO 55000 series was written by the world's top asset management experts to overcome the challenges faced in operating large scale asset management. The challenge is to ensure consistent performance of physical assets used in high environments, increase reliability, and maximize value while reducing risk and minimizing costs. The [ISO 55000](#) series offers a broad-scale response to these challenges, focusing on the requirements for asset management systems. The studies discussed the challenges of implementing [ISO 55000](#) in an educational institute. The challenges identified in that study include the absence of asset management basic elements and KPIs, inadequate risk management approach and lack of competence on educational institut ([Albalghouni et al, 2018](#)).

Based on [ISO 55000 \(2014\)](#); [Alsyounf, Imad; Maitha et al \(2018\)](#), an asset management system enables organizations to achieve their goals, consistently on an ongoing basis by providing a way to manage all activities that affect the performance of assets throughout the life cycle of assets. This holistic approach encourages the realization of value without sacrificing financial, quality and safety considerations. This provides the "structured approach" needed to coordinate large-scale asset management operations in the long run. The [ISO 55000](#) series that currently exists, is divided into 3 such as:

1. ISO 55000: Overview, principles and terminology Contains an overview of asset management, a statement of basic principles, and a set of definitions and terms.
2. ISO 55001: Asset Management: management system – requirements ISO 55001 contains a series of detailed clauses regarding standard

requirements. There is a "mandatory" clause, which states what an organization must do to meet the standard.

3. ISO 55002: Asset Management. Management System - Guidelines for application of ISO 55001 ISO 55002 contains clauses with the same title as in ISO 55001. Under each post provides guidance on how clause requirements that comply with ISO 55001 must be implemented.

ISO 55000 Self Assessment

In order to implement Aasset Mamangement value-based ISO 55000, certain capabilities are needed in an corporate. Self assessment method is a tools to knowing the current condition of the corprorate management system. Self assessment can show the position of current condition comparing ideal condition standard (ISO 55000). The Institute of Asset Management publishes the maturity scale of the asset management system in accordance with the requirements in ISO 55001. The maturity scale and capability of the asset management system issued by [the Institute of Asset Management \(2015\)](#) are divided into 6 categories: innocent, aware, developing, competent, optimizing , and excellence. The scale can be seen in figure 4.

Sources: The IAM (2015)

Figure 4 Asset Management Maturity "Bow Tie"

Measuring the maturity level of an asset management system should be determined in advance what will be measured. Based on the conceptual model of asset management there are 2 benchmarks of asset management readiness based on the asset management clause in system management and AM Landscape. The ISO 55000 standard clauses that are measured based on system management are 10 clauses, but only 7 clauses will be measured in the management system of the ISO 55000 clauses, namely Context of Organization, Leadership, Planning, Support, Operation, Performance Evaluation, Improvement.

Total asset management have an 39 subjects. The IAM's conceptual model for asset management is fully approved and endorsed by the GFMAM ([Global Forum On Maintenance & Asset Management, 2014](#)). the asset management subjects, the reader should note that it is essential to understand that 39 asset management subjects state on the six subject groups (Asset Management Landscape. ISO 55000 is based on AM Landscape measured in asset management maturity is divided into six groups of subjects Strategy and planning, Asset management decision making, Life cycle delivery, Asset information, Organization and people, Risk and review.

Methods

Companies need specific methodologies for ISO 55000. Research methodology used in this study is qualitative research which is defined according to [Creswell, \(2010\)](#) adapted by the self assessment method for ISO implementation. Qualitative methode combine with adapted self assessment methodology effectively to show detail information ([Gulliksen, 2017](#)). Deep interview with managerial level can show detail information related to critical data and management view (eagle view) to capture general problem asset management process in corporation. Self assessment methodology can get some detail technical information related to clause and AM lanscape from ISO 55000. The Self-Assessment methodology (SAM) (IAM, 2014) contains more or less the same as the used list of questions. The interview subject is 4 responden in top management level (Director, Executive Vice President, amd Vice President) and 8 responden in middle management level (Manager and Senior Manager) from 2 Directorate. Data from qualified person from top and middle management level can be describe detail condition about exsisting asset management process. Each question is preceded by an introduction to the respective organization, as well as an introduction to the selected interviewees. Due to a matter of company and personal confidentiality will this thesis not directly name or refer to any individuals, names, or detail position.

In order to evaluate the impact of ISO 55000 on organizational performance, relevant KPIs to the asset management system are identified through literature review, and qualitative data about the asset management is required to conduct the analysis. The presentation of the analysis results is done in two parts, through a section of written text and a corresponding radar chart. The radar chart is presented first, as it effectively outlines the respective organization's degree of compliance with the seven requirements of ISO (55001, 2014). The indicators contained within the radar chart are derived from a more comprehensive scorecard that is developed to indicate the respective organization's degree of compliance with all the 7 requirement from 24 clauses of ISO (55001, 2014) and 39 asset management subjects by dividing them into six separate subject groups ([Global Forum On Maintenance & Asset Management, 2014](#)). The scorecard of each respective organization is enclosed together with its corresponding radar chart in the presentation of the analysis results. The specific indicator scale used to develop the scorecard indicators is adapted from the IAM's Asset

Management Maturity Scale, using slightly different criteria and numeration (IAM, 2016). The indicator scale is based on a 0-5 scoring system with the following criteria:

Table 1 Asset Management Maturity Scale

Scale	Description	Definition
0	<i>Innocent</i>	The organization does not recognize the need for these requirements and / or does not have evidence of commitment to be made to these requirements
1	<i>Aware</i>	The organization has identified the need for these requirements, and there is evidence of intention to progress.
2	<i>Developing</i>	The organization has identified the intent of systematic and consistent achievement of requirements, and can demonstrate that these requirements are in progress with a credible plan and the resources needed
3	<i>Competent</i>	The organization can demonstrate that these requirements systematically and consistently achieve the relevant requirements set out in ISO 55001.
4	<i>Optimizing</i>	The organization can demonstrate that it can systematically and consistently optimize asset management practices, which are in line with the organization's objectives and operating context.
5	<i>Excellence</i>	Organizations can demonstrate that they have used leading practice, and achieved maximum value from asset management, in line with the organization's objectives and operating context.

The type of data depends on the regulation of each company in providing data. This company share their critical data only for prove this company have a documentation for implementing ISO 55000. The qualified data from interview can be adobt in self assessment method to knowing the position of current asset management system based on clause and AM landscape on ISO 55000. Cotempotent level (3 on scale) is a minimum score from maturity scale to achieved ISO 55000. The data from interview session is presented in further detail, providing deeper insights into the content of its corresponding radar chart and scorecard. The average requirement scores are further rounded to comply with the initial 0-5 scale and then plotted into the corresponding radar chart. The rounding of the average requirement scores is based on the following intervals, where X represents the average score of a given requirement prior to rounding:

- (X = 5 gives a rounded score of 5)
- (4 ≤ X < 5 gives a rounded score of 4)
- (3 ≤ X < 4 gives a rounded score of 3)
- (2 ≤ X < 3 gives a rounded score of 2)
- (1 ≤ X < 2 gives a rounded score of 1)
- (0 ≤ X < 1 gives a rounded score of 0)

This research is chosen Indonesian railways company as SOE's to participate for a case study. Adapted qualitative method with self assessment method to doing this research. The proposed framework consists of four stages, which are explained in details method presented of the flow chart in the figure 2.

Sources: Adaptation from Albagouni, Asayel et al (2018)

Figure 5 Research Procedure

Understand The Work Process

The first stage, researcher must be observe in the existing asset management system process. These observations will produce information on the extent to which the utilization and management of existing assets in the Division and business units that have been implemented by IRC.

Perform ISO 55000 Measurement

The second, this stage of conducting an assessment of the business process and asset management that has been running using ISO 55000 Standards. The assessment process is carried out using the interview method combined with filling in technical interviews to the managerial level at IRC. After that, the assessment process must be compare to exsisting condition to minimum standards of ISO using asset management scale.

Analyze The Gaps

This stage of comparing the results of assessments in the field with ideal conditions according to ISO 55000 Standards. The comparison will produce gaps which are then analyzed to shown how the position of asset management must be improve in IRC.

Initiate An Improvement Process To ISO 55000

The existing gap in the utilization and management of assets with ISO 55000 will show deficiencies in IRC in leading to ideal asset management conditions in accordance with ISO 55000. In the final stage, researchers obtain and suggest things that need to be developed and improved in the IRC asset management system.

A Case Study

A case study will be discuss the fenomena in existing condition compare to ideal condition based on ISO 55000. The object of a case study in this research is the asset management system in the GCG & Quality Assurance Division under the Main Directorate and the Asset Management Administration Division under the Directorate of Asset Management and Technology on Indonesian railways company.

Result and Discussion

Understand The Work Process

The result from the work process observation, existing work process at Indonesian railways company is strongly influenced by government policy. Based on interview from 4 top management and 8 middle management, current condition of IRC's asset management process in good level. IRC can be operate and doing commercial by asset as a generate revenue for the corporation from non train service. But, IRC doesn't implement good documentation for the process and standard for asset management. The standard used by IRC, mostly following the regulation from Ministry SOE's. The regulation caused by IRC planning asset management as an important strategic function so that asset management in IRC is managed by a Directorate of Asset Management and Information Technology (D.8). However, IRC still has to adjust and improve internal standards to achieve strategic asset management based on ISO 55000 to.

Figure 6 General Work Process Asset Management IRC

Perform ISO 55000 Measurement

In order to identify gaps, an assessment of the existing condition compare to ideal condition based on ISO 55000 standard needs to be conducted. This can be achieved using the self assessment methodology which show in radar chart.

Self Assessment ISO 55000 Context

As previously outlined, each of the seven requirements of (ISO 55001, 2014) contains a set of corresponding clauses, which must be met to successfully implement an asset management system. This chapter presents the results of the

analysis of asset management practices found within Railways SOE's. There is a total of 24 clauses within the seven requirements, all of which will be presented throughout section. Self assessment ISO 55000 context can be identify detail of existing asset management process by interview session with 4 top management and 8 middle management level. The interview session asking 7 requirement from 24 clause from every responden to get detail information to assess current positioning in maturity scale.

The result from self assessment carried out in the ISO 55000 context from 7 requirement from 24 clauses of ISO (55001, 2014) shown that the maturity level of the IRC asset management system has reached an average level of competence (3 on scale). However, there are still 3 groups of clauses that have not yet reached competence level such as support, performance evaluation and improvement.

Figure 6 Self Assessment ISO 55000 Context

Self Assessment Asset Management Landscape

This chapter presents the results of the analysis of asset management landscape assessment found within Railways SOE's. Asset management landscape subjects are a group of 39 subjects from 6 element that have been established by the Global Forum On Maintenance & Asset Management. The 39 asset management subjects have been derived from an international review of an extensive list of asset

management models and assessment methodologies. Self assessment of asset management landscape can be identify detail of existing asset management process by interview session with 4 top management and 8 middle management level. The interview session asking 7 requirement from 24 clause from every responden to get detail information to assess current positioning in maturity scale.

The results of self-assessment carried out at AM Lanscape is 39 asset management subjects by dividing them into six separate subject groups show that the maturity level of the IRC asset management system has reached an average competent level (3 on scale). But there are still 2 groups of clauses that have not yet reached, namely Risk & Review and Life Cycle Delivery. However, in the group that has reached an average of competent items also there are clauses that have not yet reached the competent level.

	Strategy & Planning	AM Decision Making	Lifecycle Delivery	Asset Information	Organization & People	Risk & Review
Elemen 1	5	5	2	2	2	3
Elemen 2	4	4	3	3	4	3
Elemen 3	3	3	3	3	3	2
Elemen 4	4	4	2	3	3	3
Elemen 5	4	3	4	4	4	2
Elemen 6			2			3
Elemen 7			3			2
Elemen 8			3			3
Elemen 9			3			4
Elemen 10			4			2
Elemen 11			3			
Average	4.0	3.8	2.9	3.0	3.2	2.7
Rounded	4	3	2	3	3	2

Figure 7 Self Assessment Asset Management Landscape
Analyze The Gaps

After determining the gaps in the current asset management system, challenges need to be studied causing this gap and preventing corporate from achieving ISO requirements. Based on the gap analysis in tables 2 and 3, there are several priorities in the current asset management system for asset management based on ISO 55000. The basis for improvement of the gap is the clause criteria and elements that do not reach level 3 (Competent). Level 3 (Competent) is a standard requirement of a company that can achieve ISO 55000-based asset management as a best practice management system on assets approved by the International.

The scale of priority for repairing the gap is based on the amount not reached by the value of the clause of the basic items in the clause. Furthermore, at the top of the order of callus / elements that exist at ISO 55000 which is a standard set by ISO 55000. Based on the radar chart ISO 55000 context and AM landscape, the following challenges found:

Overview Gaps Profile ISO 55000 Context

The existing performance gaps analysis based clause ISO 55000 context shows the biggest gap occur on clause of support. Support clause can be first priority for doing improvement. Other priority shown by the gap such as priority Context of Organization, and Performance Evaluation which must be improve to achive ISO 55000 certification.

Table 1 Overview Gaps Profile ISO 55000 Context

Section	Clause	Element Title	Gaps Score	Priority
4	4.1	Understanding the organization and its context	0	2
	4.2	Understanding the needs and expectations of stakeholders	0	
	4.3	Determining the scope of the asset management system	0	
	4.4	Asset management system	1	
5	5.1	Leadership and commitment	0	4
	5.2	Policy	0	
	5.3	Organisational roles, responsibilities and authorities	0	
6	6.1	Actions to address risks and opportunities for the asset management system	0	5
	6.2.1	Asset management objectives	0	
	6.2.2	Planning to achieve asset management objectives	0	
7	7.1	Resources	0	1
	7.2	Competence	0	
	7.3	Awareness	1	

Section	Clause	Element Title	Gaps Score	Priority
	7.4	Communication	0	
	7.5	Information requirements	0	
	7.6.1	Documented information general	1	
	7.6.2	Creating and updating documented information		
	7.6.3	Control of documented information		
8	8.1	Operational planning and control	0	6
	8.2	Management of change	0	
	8.3	Outsourcing	0	
9	9.1	Monitoring, measuring, analysis, and evaluation	0	3
	9.2	Internal audit	1	
	9.3	Management review	0	
10	10.1	Nonconformity and corrective action	0	7
	10.2	Preventive action	0	
	10.3	Continual improvement	0	
Total				

Overview Gaps Profile Am Landscape

Gaps analysis based asset management landscape shows the biggest gap occur on element risk & review. The Analysis can show some other priority such as Life Cycle Delivery, Asset Information, and Organization & People. All the priority must be evaluated and makes improvement to achieve ISO 55000 certification.

Table 2 Overview Gaps Profile AM Landscape

	Element	Element Title	Gaps Score	Priority
1	Strategy and Planning	Asset Management Policy	0	5
2		Asset Management Strategy & Objectives	0	
3		Demand Analysis	0	
4		Strategic Planning	0	
5		Asset Management Planning	0	
6	Asset Management Decision-Making	Asset Capital Decision-Making	0	6
7		Operations & Maintenance Decision-Making	0	
8		Lifecycle Value Realisation	0	
9		Resourcing Strategy	0	
10		Shutdown & Outrage Strategy	0	
11	Lifecycle Delivery	Technical Standards & Legislation	1	2

	Element	Element Title	Gaps Score	Priority
12		Asset Creation & Acquisition	0	
13		Systems Engineering	0	
14		Configuration Management	1	
15		Maintenance Delivery	0	
16		Reliability Engineering	1	
17		Asset Operations	0	
18		Resource Management	0	
19		Shutdown & Outage Management	0	
20		Faults and Incident Response	0	
21		Asset Decommissioning and Disposal	0	
22	Asset Information	Asset Information Strategy	1	3
23		Asset Information Standards	0	
24		Asset information Systems	0	
25		Data & Information Management	0	
26	Organisation and People	Procurement & Supply Chain Management	1	4
27		Asset Management Leadership	0	
28		Organisational Structure	0	
29		Organisational Culture	0	
30	Risk and Review	Competence Management	0	1
31		Risk Assessment and Management	0	
32		Contingency Planning & Resilience Analysis	1	
33		Sustainable Development	0	
34		Management of change	1	
35		Asset Performance & Health Monitoring	0	
36		Asset Management System Monitoring	1	
37		Management Review, Audit & Assurance	0	
38		Asset Costing & Valuation	0	
39		Stakeholder Engagement	1	
Total				

Initiate The Improvement To ISO 55000

Initiative to improve is an action plan was developed based on meetings and interviews with middle managers and top managers to improve it the current

condition of asset management process in IRC. Regarding implementation, the following challenges are identified and observe to doing some improvement to get ISO 55000.

Improvement To Basic Asset Management System

The first step that must be taken is to ensure the basic elements and clauses in the asset management system, namely asset management policies, asset management objectives, and asset management strategic plans (SAMP) can run well and comply with ISO 55000 standard standards. In addition, basic asset management The system must be integrated and contain in each clause or other elements in ISO 55000 and AM Landscape, so that its implementation can be controlled in each process. Asset Management Strategic Planning (SAMP) is the main key in resolving existing gaps. In the Asset Management Context. Priority gap resolution in the clauses that must be done are Priority 1: Support, Priority 2: Context of Organization, and Priority 3: Performance Evaluation. In Asset Management Landscape, IRC's main priority in resolving gaps is in Priority 1: Risk & Review, Priority 2: Life Cycle Delivery, Priority 3: Asset Information, and Priority 4: Organization & People.

IMPROVEMENT TO KEY PERFORMANCE INDICATORS (KPI'S)

One of the main objectives of ISO 55000 is to ensure that an organization can build systems and follow work processes, which will support the achievement of the goals of the organization. In the Asset Management Context the priority gap gap in the clause that must be done is Priority 1: Support, Priority 2: Context of Organization, Priority 3: Performance Evaluation. Whereas in Asset Management Landscape, IRC's priority gap resolution must be done by Priority 1: Risk & Review, Priority 2: Life Cycle Delivery, Priority 3: Asset Information, Priority 4: Organization & People.

Conclusion

Business processes in the existing asset management system at IRC are strongly influenced by policies and regulations from the Ministry of SOEs. From the results of the self assessment it is known that the asset management system that has been implemented at IRC in general has reached a competent level both in terms of asset management context and AM Landscape at ISO 55000. Some gaps must be corrected to achieve ISO 55000 asset management at ISO 55000 Context namely support, context of organization, and performance evaluation. Whereas at AM Landscape that is from risk and review, life cycle delivery, asset information, and organization & people. The entire gap range is only one level difference to reach the competent level to be feasible to manage assets based on ISO 55000. Based on this, it is necessary to improve the asset management system by ensuring policies, goals, and strategies (SAMP) on asset management and integrating by including points of developing gaps in SAMP. In addition, the improvement of KPI in the asset management work process can be done by

including aspects that need to be increased in the gap and entering the asset life cycle in the KPI to be the focus of development and supervision of company performance.

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