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Risk Management Maturity Assessment based on ISO 31000 - A pathway toward the Organization's Resilience and Sustainability Post COVID-19: The Case Study of SOE Company in Indonesia

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Abstract.

The study aims to understand how the ISO 31000 based risk management maturity assessment conducted in a large State-Owned Enterprise (SOE) could help the organization map out its journey in building its organization's resilience and sustainability. Aside from the conducted observations, the study is mainly based on a qualitative approach through document reviews, questionnaires, focused group discussions, and interviews. The assessment produces a score of 1.62 (a scale of 0.00 – 5.00) or at the repeatable level of their risk management maturity. Such a level indicates a substantial lack of resiliency and sustainability attributes upon which a road map is defined and proposed to the board of directors (BOD) of the organization. The road map has been well accepted by the BOD and used as a reference and a pre-requisite to the success of their organization's business transformation program (BTP). As a case study, however, we note some shortcomings of generality and comparability. Further similar research is recommended with more SOEs as the object of study.

Keywords: ISO 31000, Risk Management Maturity, Resilience, Sustainability

1. Introduction

The global pandemic of Covid-19 gave a harsh lesson to organizations around the world, especially those who have no resiliency and sustainability posture to face the turbulences. Many organizations collapsed as they could not overcome the economic and social impact of the pandemic. Ineffective risk management combined with breakdowns in financial reporting accounts for business breakdown and/or bankruptcy (Obrenovic et al., 2020). The collapses and breakdowns are mostly due to the sudden change of consumer behaviors, disruption of the supply chain, and the effect of Working from Home (WFH) approaches due to the city lock-down or physical and social distancing adoption in many countries.

As far as surveys are concerned, the world GDP has been estimated to shrink around -5% by the end of 2020, which is much worse than the latest economic crisis in 2008, where the shrink of world GDP was only around -0.01 %. While some experts say that we could expect the world GDP to start having positive figures back by early 2021, others are more pessimistic and say that the whole of 2021 could be a bumpy year as the economic crisis might prolong. Nevertheless, the new normal will come in any case, hence the need to build and have resiliency and sustainability upsurging. The need is also rising for SOE (State Owned Enterprise) in many parts of the world, including Indonesia.

One particular SOE in Indonesia, i.e., XYZ, is in the midst of their attempt to strive for their strategic objective through business transformation efforts in which risk management maturity becomes the other side of the coin toward the successful transformation. To map out their pathway to have better maturity in which resiliency and sustainability attributes are considered sufficient and aligned with their strategic direction, the company needs to assess and determine the current existing risk management maturity level and then build a road map upon the result of such assessment. The facts of the Covid-19 impact on the national economy increase the sense of urgency to carry out the assessment and accelerate the need to have a higher risk management maturity with a more robust footing of resiliency and sustainability.

To effectively carry out the assessment, the company needs to adopt the Risk Management Maturity Model (RM^3), which aligns with its enterprise risk management standard, i.e., ISO 31000. Such a need is well fitted by ERMA ISO31000 RM^3 that has been designed and built upon such standard covering the required principles, framework, and process of managing risk. It suggests six levels of maturity: ad hoc, initial, defined, repeatable, managed, and optimized and consists of 6 attributes, 22 indicators, 52 parameters, and 168 testing factors (ERMA, 2020).

2. Methodologies

The object is one of the Indonesian largest SOEs that serves public interests in the energy sector. This company is a group of companies that facilitates its customers throughout Indonesia's archipelagos who live in more than 1000 islands across the equator line. However, the company name could not be disclosed due to confidentiality.

This study uses document reviews supported by questionnaires, focused group discussions, and interviews with the data and field research. While questionnaires are sent to a large audience, focused group discussions and interviews are made only with their board of directors and several general managers and senior vice presidents. The results are compiled and mapped to ERMA ISO31000 RM^3, which consists of 6 attributes, 22 indicators, 52 parameters, and 168 factors. The study further develops a road map for the SOE by using its risk management maturity level result to obtain a higher maturity to the level where the organization's resilience and sustainability attributes are considered well in place.

During the field research conducted from March 2020 until December 2020, there were a couple of formal presentations to validate the risk management team's result and affirmation or acceptance from the Board of Directors (BOD).

3. Literature Review

The first part of the literature review will discuss risk management implementation in SOEs in Indonesia, followed by a review about risk management maturity in general and then the ISO 31000 Risk Management Standard. The last part is a review of a developed ERMA ISO31000 RM^3 to serve ISO 31000 adopters' needs.

3.1 State-Owned Enterprise (SOEs) and Risk Implementation

The Ministry of Indonesian State-Owned Enterprise (MSOE) has issued a directive in 2011 to impose SOEs in Indonesia to implement risk management. While no particular risk management standard nor reference is explicitly mentioned, the features and characteristics mostly refer to ISO 31000 (MSOEs' letter No PER- 01/MBU/2011).

At the same time, the government Agency of Standardization (Badan Standarisasi Nasional) has attempted to fully adopt the ISO 31000:2009*) to become National Standard or SNI (Standard Nasional Indonesia). Since the SNI has been fully ratified and available in 2011, the name of the standard in Indonesia is SNI ISO31000:2011 **) or shortly SNI ISO 31000 (Standard).

The MSOE directives and the birth of SNI ISO 31000 (Standard) have stimulated most MSOE to consider and start adopting the standard for their Enterprise Risk Management (ERM) practices. However, it is hardly observed as the implementation has driven more by compliance spirit and ad-hoc base than by the indigenous need to make their company sustain operationally and strategically. Based on the OECD survey results, in the majority of surveyed countries in Asia, most SOEs are reportedly not incorporated according to company law and are therefore not, as a rule, subject to the same risk management requirements as privately-owned corporations (OECD, 2018). Besides, the motives and risk understanding and management are also limited merely to the downside risk rather than to both the downside and the upside risks. The downside risk is the risk that relates to the situation whereby "Bad Things that could happen' which will damage the firm value if that risk becomes a reality. The upside risk is, on the other hand, will not damage the firm value; although, it will not create value either. In other words, the upside risk refers to a potential failure of exploiting the opportunity.

However, when the global pandemic of covid-19 arose in quarter one of 2020, the impact on SOEs' business performance has been severe and became a wake call for many SOEs. As such, they turned their eyes beyond compliance-driven and started seeking a more effective ERM that could help them be more resilient to withstand the turbulences and be more sustainable in the post-COVID 19 environment or the new normal onward. COVID-19 is a trans-boundary crisis that presents a significant challenge for organizations, including businesses and public institutions (Bryce et al., 2020), such as SOEs.

The rising awareness of the need for ERM beyond just compliance brings about many SOEs introspect themselves to know how effective they are currently in managing risks and how resilient they are to sustain in the future. 'Unexpected events often audit our resilience', where the resilience is not an outcome but rather a process by which organizations

continuously work to anticipate and respond to external threats (Bryce et al., 2020). Since the risk resiliency and sustainability mirror an organization's risk management maturity, many SOEs start their risk assessment initiative to understand the current level or the baseline and build their organization's maturity upward to a higher level.

3.2 Risk Management Maturity

According to Schulte and Hallstedt (2017), a firm with low- level maturity in risk management would experience difficulties in realizing its ERM program to become sustainable. In that sense, the company would not be able to establish the foundation of risk management within the organizations owing to the lack of strong firm culture in embedding the principles and the concepts of risk management in the firm's activities.

The firm's risk management implementation maturity determines the firm's quality and effectiveness in identifying and managing risks. Hence, the risk management maturity assessment will provide some benefits to the organizations regardless of their current risk management maturity level. For example, based on the research conducted by the Center for Risk Management Studies Indonesia (2018), a firm with low-level risk management maturity has experienced an improvement in their human resources efficiency and staff's performance. In contrast, a firm with a moderate-high level risk management maturity has improved its risk-based strategic decision-making process. The same research also discovered positive affirmation and encouragement from the senior management who participated in a survey. They suggest the firm's maturity in implementing the concepts and the principles of risk management contribute to the firm's capabilities in identifying and mitigating risks that have the potentials to jeopardize the firm's effort in achieving its objectives.

Another research conducted by Radner and Shepp said that implementing the concepts and the principles of risk management enables the firm to formulate unique strategies to minimize the potential losses from the threats faced by the firm and to exploit the opportunities to put the firm in an advantageous situation (Radner and Shepp, 1996). Moreover, it also enables the firm to respond to unexpected threats, gives them the flexibility to cope with the risks, and acquires a competitive advantage through opportunities (Armeanu et al., 2017). The higher the risk management maturity, the more effective risk management integration with all management systems to support its performance is reflected.

According to Bongomin et al. (2017) and Songling et al. (2018), the firm's maturity risk management's improvement does not solely lie on the firm's performance and its ERM implementation alone to obtain a competitive advantage. The formal risk management practice implementation should also accompany it. The firm top managers need to have adequate financial education to efficiently perform the risk management practice. In which an optimum ERM implementation in a firm enables the top management to cope with a different type of risk effectively (Annamalah et al., 2018).

According to Alijoyo (2019), risk management maturity improvement is not only considered as an objective but as a tool to improve the firm's capacity and capability in managing the risks which, the more extensive the firm on managing the risks, the higher value

and impact of ERM to the firm's decision-making capabilities, as well as to the execution of their plan and actions. Therefore, the organization needs to know its current risk management maturity level and identify room for improvement to a higher maturity level.

3.3 ISO 31000 - Risk Management Guidelines

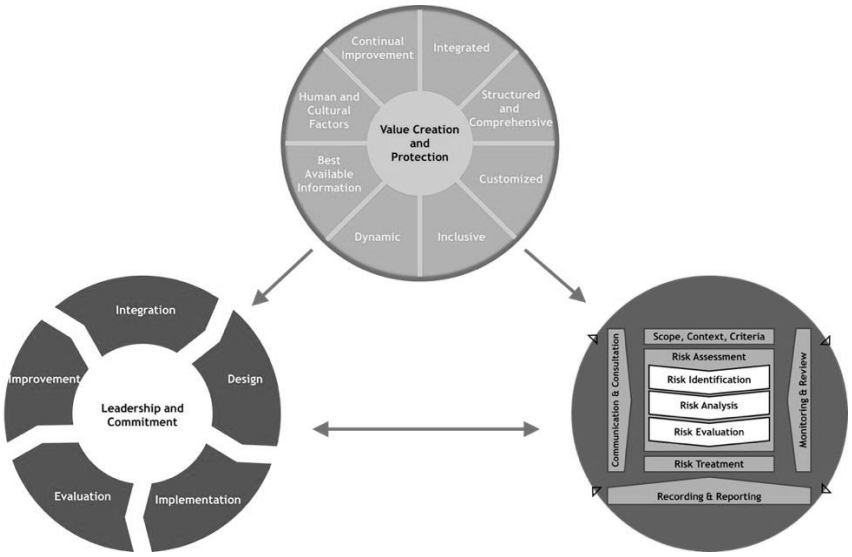
The International Organization for Standardization (ISO) has issued versions or editions of ISO 31000; the initial version in 2009 and the second in 2018. The Government of Indonesia (GOI), through their National Standardization Body (BSN), adopted both versions as a national standard. The national standard was called ISO 31000:2011 Prinsip dan Pedoman Manajemen Risiko (as the adoption of the first version of ISO 31000:2009) and SNI ISO 31000:2019 Pedoman Manajemen Risiko (as the adoption of the second version of ISO 31000:2018). This study will use just ISO 31000 Standard from now onwards, which refers to ISO 31000:2018 or identically the same as SNI ISO 31000:2019.

ISO 31000 Standard defines the risk management process as "coordinated activities to direct and control an organization concerning risk." It also defines risk management framework as "a set of components that provide the foundations and organizational arrangements for integrating, designing, implementing, evaluating, and improving risk management throughout the organization."

ISO 31000 Standard gains broad acceptance in many countries and large corporations as it is practical and business-oriented. ISO 31000 attempts to harmonize risk management practices and tries to achieve the position as a global benchmark for risk management even though there are still some challenges to address (Almeida et al., 2019). ISO 31000 ERM framework sets out the principles, a framework, and a process for the management of enterprise risk that applies to different types of organizations (Choo and Goh, 2015). It consists of three components: principles of managing risks, a framework of managing risk, and the process of managing risks. Therefore, ISO 31000 captures ERM as an integrated way of managing risk rather than merely an ERM framework. Furthermore, its universal characteristics make them applicable for any type of organization, public or private, large-size or small-size corporations.

The implementation of the ISO 31000 standard is adjusted to meet the respective firm's needs, culture, and structure (Mikes and Kaplan, 2015). It consists of a systematic approach to help the organization manage risks due to uncertainties on their objectives. As such, the ISO 31000 Standard provides the required principles of managing risk, the framework, and the suggested process of managing risks, described in Figure 1.

Figure 1. The architecture of ISO 31000 Standard



Source: ISO 31000:2018

The relationship between the principles, framework, and process:

- These core elements are interdependent;
- The principles are fundamental to the effective management of any risks, and therefore, need to be reflected in the other two elements;
- The management framework provides the arrangements for risk management that will embed it throughout the organization at all levels. The risk management success will depend on the framework effectiveness;
- The risk management process should be a part of the business process and corporate culture and tailored to its needs and context.

Below are a short explanation of each respective element:

3.3.1. Risk Management Principles

Risk management aims to protect and create value. This purpose means that risk management improves the organization's performance, encourages innovation within the organization, and supports the achievement of the organization's objectives. There are eight risk management principles based on ISO 31000: integrated, structured and comprehensive, customized, inclusive, dynamic, best available information, human and cultural factors, and continual improvement.

3.3.2 Risk Management Framework

The risk management framework is a set of components that provide the foundations and organizational arrangements for designing, implementing, monitoring, reviewing, and continually improving risk management throughout the organization.

The risk management framework components are leadership & commitment, integration, design, implementation, evaluation, and improvement. The risk management framework based on ISO 31000 aims to help the organization integrate risk management into significant activities and functions. Risk management's effectiveness will depend on its integration into the organization's governance, including decision making.

3.3.3 Risk Management Process

The risk management process emphasizes on iterative nature of risk management, noting that new experiences, knowledge, and analysis can lead to a revision of process elements, actions, and controls at each stage of the process. The risk management process consists of communication & consultation; scope, context, & criteria; risk assessment (risk identification, risk analysis, risk evaluation); risk treatment; monitoring & review; and recording & reporting. The risk management process based on ISO 31000 should be an integral part of management, embedded in the culture and practices, and tailored to its business processes.

3.4 Risk Management Maturity Model for ISO 31000 Adopters

The model is known as ERMA ISO31000 RM3, which provides five maturity levels:

- Initial;
- Repeatable;
- Defined
- Managed; and
- Optimized.

The following table describes the interpretation of the respective maturity level:

Table 1: Maturity Level ERMA 31000 RM3

Maturity Level	Interpretation
1. Initial	**Risk management is still ad-hoc, relies on individual initiative**. It is silo or limited to a particular risk aspect and used to manage only certain risks and relied on corrective actions.
2. Repeatable	**Risk management starts systematically implemented**. However, it is not integrated with organizational governance and organizational management. Competency, leadership, and commitment to risk management are not evenly distributed.
3. Defined	**Risk management has been implemented systematically and consistently practiced as per ISO 31000 Risk Management Guideline or Standard**. It has begun to be integrated with organizational governance and most of the organizational management. Competency, leadership, and commitment to risk management have been evenly distributed. However, positive

	behavior in managing risk remains limited.
4. Managed	**Risk management has been integrated with organizational governance and organizational management systematically and consistently practiced as per ISO 31000 Risk Management Guideline or Standard.** It becomes a culture that includes the strong support of competency, leadership, and commitment to risk management. Positive behavior in managing risk is prevalent throughout the organization and consistently supported with reviews, corrective actions, and improvements as needed.
5. Optimized	**Risk management is an integral part of organizational governance and organizational management, systematically and consistently practiced as per ISO 31000 Risk Management Guideline or Standard.** It has been internalized and rooted as an organizational culture with strong competency, leadership, and commitment to risk management. Positive behavior in managing risk has been manifested throughout and at all levels of the organization, supported consistently with reviews, corrective actions, and improvement as needed. It becomes the strong pillar of business resiliency and sustainability.

Source: ERMA ISO31000 RM3

In order to determine the level of a particular organization's risk management maturity, ERMA ISO31000 RM3 suggests an assessment of the following six attributes

(1) risk culture,
(2) risk management framework,
(3) risk management process,
(4) management process,
(5) performance management, and
(6) resilience and sustainability.

3.4.1 Attribute 1: Risk Culture

Measuring the extent to which corporate values have strengthened the risk management culture; the adequacy of competencies optimization to take advantage of risk management, and the positive behavior in dealing with risks.

3.4.2 Attribute 2: Risk Management Framework

Measuring the extent to which a strong leadership and commitment level have supported implementing an integrated risk management framework through the design, implementation, evaluation, and improvement of risk management effectiveness.

3.4.3 Attribute 3: Risk Management Process

Measuring the extent to which the risk management process has been used as a technical approach to implementing the integration of risk management into all organizational processes.

3.4.4 Attribute 4: Management Process

Measuring the extent to which the management process includes risk-based strategic planning and its execution following the principles of managing risk as suggested by ISO 31000 Risk Management Guidelines.

3.4.5 Attribute 5: Performance Management

Measuring the extent to which performance management has been planned, implemented, monitored, reviewed, improved, and improved on a risk-based basis.

3.4.6 Attribute 6: Resilience and Sustainability

Measure the extent to which the organization's resilience and sustainability have been planned, implemented, monitored, reviewed, improved, and enhanced on a risk basis.

Those six attributes are assessed through 22 indicators, 52 parameters, and 168 test-factors. The assessment ultimately produces the achievement value in terms of scoring. Based on such achievement value, the risk management maturity level is determined through the conversion matrix, as shown in Table 2 below:

Table 2: The Achievement Value and Maturity Level

	Initial	Repeatable	Defined	Managed	Optimized
Risk Management Framework					
Risk Management Process					
Management Process					
Performance Management					
Risk Culture					
Resilience and Sustainability					

	Completely Fulfilled
	Partially Fulfilled
	Not Fulfilled

Source: ERMA ISO31000 RM[3 1]

[1] *The details of the assessment criteria include three interrelated matters, i.e., taxonomy, weight and method are provided in the booklet of ERMA ISO31000 RM*[3]

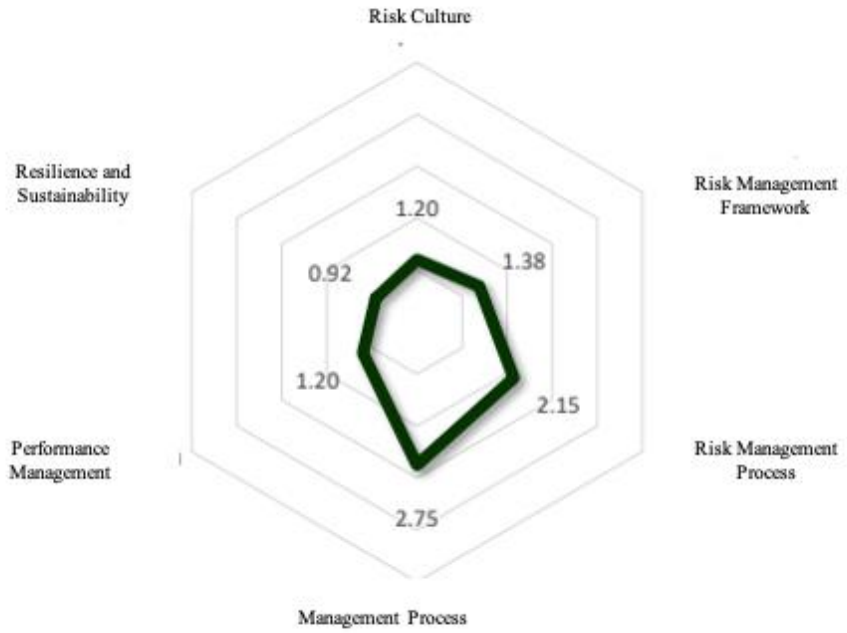
4. Results and Findings

The field research consists of two phases. The first phase is to conduct the risk management maturity assessment of their current existing risk management practices. The second is to the road map for the organization to achieve a higher maturity level.

4.1 Risk Management Maturity Assessment - The Current RM Practice

The first phase covers document reviews, including questionnaires, focused group discussion, interview with board members, and interview with the risk management team. The result suggests that the overall current company's risk management maturity is at the repeatable level at the scoring value of 1.62. That level reflects incapability and out-of capacity to embrace the ERM approach to protect and create its value. It further suggests that the current state of risk management maturity lacks resiliency and sustainability that results in the organization's need amid covid-19 and toward the new normal post-COVID-19. Below is the assessment result describing the overall level of scoring value at 1.62 and the detailed scoring value of each respective attribute. The overall scoring value is 1.62 coming from the average of the total of respective scoring value ((1.38 + 2.15 + 2.75 + 1.20 + 0.92 + 1.20) / 6)).

Figure 2. Result of Risk Management Maturity Assessment PT XYZ



4.1.1. Risk Management Framework at scoring value 1.38

Some positive evidence was found particularly: (a) a written statement regarding the commitment to integrating risk management into all organizational processes which Top Management had signed; (b) a well-documented paper which describes the distribution of accountabilities, responsibilities, and risk management authority at every organization level.

However, there was no evidence that top management has an explicit vision, mission, and strategy of risk management integration shared at all organization levels. Furthermore, such evidence was also not found in the followings:

- Risk management policies and procedures which were supposed to guide the integration were carried out through the PDCA (plan- do-check-action) cycle.
- The integration of risk management into all organizational processes was supposed to be at least well-designed.
- The integrated implementation approach was supposed to be available for BOD, including its evaluation measures and improvement initiatives.
- The integration between risk management initiatives with the organizational culture was supposed to be well-articulated, measurable, relevant, and in line with its transformation program.

4.1.2. Risk Management Process at scoring value 2.15

The result shows that risk management's core processes have been carried out in a measured and controlled manner. However, several factors need improving, especially in the communication and consultation, recording, and reporting process.

Furthermore, the entire risk management process cycle has not been integrated into all organizational processes whereby each function at the Head Office does not yet have any plan for integrating risk management processes into their respective core responsibility. In the absence of such integration, the risk management practices are siloed per function per branch and region.

4.1.3. Management Process at scoring value 2.75

The result shows that the organization has set its long-term strategic goals and translated them into their long-term strategy upon which their annual targets for BOD are determined. Moreover, management contract between BOD and one line below BOD are formalized. The management contract contains the respective Key Performance Indicators (KPIs) and Work Budget Plan (WBP), which was detailed following the SMART (Specific, Measurable, Achievable, Realistic, and Timely) principles.

However, the strategic planning process is not supported with a comprehensive risk assessment, hence unable to figure out the anticipation to deal with the risks that could fail the organization to accomplish its strategic goals and objectives.

Furthermore, there is no risk assessment process of the WBP. Therefore, the senior management does not have any ground of anticipation to deal with risk at strategic and/or

operational level in addressing down-side risk and upside risk or taking advantage of opportunities in achieving their strategic and/or operational objectives.

4.1.4. Performance Management at scoring value 1.20

The result shows that the parameters of the organization's goals, performance units, and work plans have been clearly articulated before the Department / Division prepares their performance plan. However, there is still an aspect that has not been met yet related to a critical indicator known as Key Risk Indicators (KRIs).

KRI is a critical aspect of enabling the organization to integrate its risk-based planning process through a design that pairs the KRI into each respective Key Performance Indicators (KPIs) agreed in the management contract. As such, it does not have an early warning system in place due to the lack of KRIs; hence, there is not any ground available to mitigate downside risks and/or address or exploit upside risk at its earliest. In other words, the organization's performance management system tends to be reactive rather than pro-active.

4.1.5. Risk Culture at scoring value 1.20

Some positive evidence is noted, such as a written statement made by top management to applying risk management in making benefits and protecting value; the use of three lines of defense (TLD) model regarding the distribution of risk management accountability; and the use of risk management expertise model for their leaders' development program.

Unfortunately, there is not any evidence that a written commitment to applying risk management is applied and practiced. Instead, neither risk appetite nor risk tolerance is ever mentioned or used as a reference in any decision making or action. Hence none is recorded in the minutes of the meeting. Consequently, the implementation of TLD is not effective due to the absence of risk criteria (risk appetite, risk tolerance)as pivotal points among and within the respective role and between one line of defense with another, e.g., between the first line and second line, or first line and third line, or second-line with the third line.

As for the risk management expertise model for their leaders' development program, despite some identified issues regarding the leaders that had not been anticipatory, efficient, and consistent in making a decision, there are not any follow-up actions to address those issues either in their leadership development program or in their other training programs.

4.1.6. Resilience and Sustainability at scoring value 0.92

No evidence shows this attribute has been well addressed. No document is available about how the organization deals with the issues of resilience and sustainability of an organization nor observable evidence of relevant practices. Observably, this situation becomes a deep concern of BOD as they express the urgency and the importance of having such resilience and sustainability in place, whereas the scoring value of this particular attribute is the lowest than others.

Furthermore, the pressures and the urgency of having the organization's resiliency and sustainability are rising dramatically due to the impact of the Covid-19 pandemic since March 2019 and prolonged until early 2021. Besides, the company is also urged to accomplish their

business transformation program, which indeed requires a certain level of organization's resilience and sustainability to embrace the dynamic of VUCA (Volatility, Uncertainty, Complexity, and Ambiguity) in their industry.

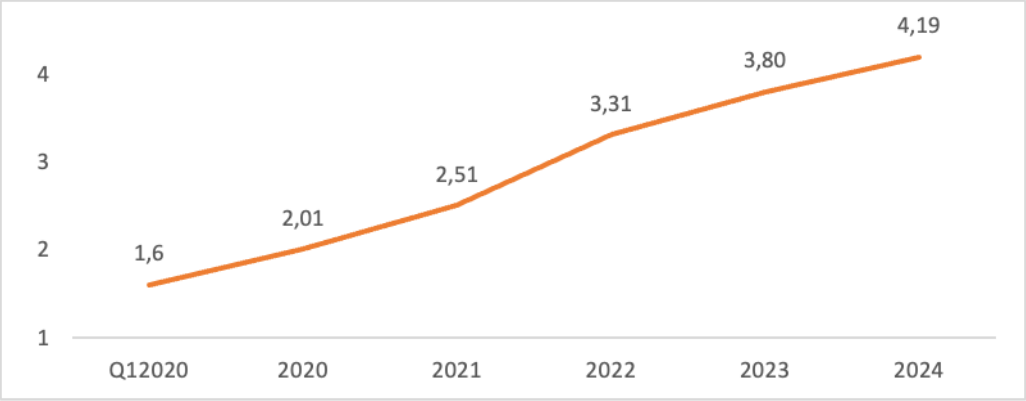
4.2 Risk Management Maturity Assessment - Developing The Road Map

Using the result of the current risk management practices assessment as the baseline and having considered the company's business transformation program, BOD sets a target to have the company reach a higher maturity level in which the attribute of the organization's resilience and sustainability should be much stronger. Furthermore, BOD determines the time frame and the milestone that such risk management maturity should be at an average scoring value of 4.00 or 'managed' level by the end of 2024.

To reach such a goal, the detailed five-year road map with respective yearly milestones is co-developed by the company's risk management team and the business transformation team. As such, the road map is constructed to assure that the company's risk management becomes an enabler to accomplish the company's strategic goals through a strongly internalized risk culture, a higher risk resiliency, and much stronger sustainability. In this case, four major programs are recommended to the company as guidance in implementing such a road map.

Below is the illustration of the company's risk management maturity level roadmap with its targeted milestone year on year.

Figure 3. Risk Management Maturity Level Roadmap PT XYZ



The implementation strategy to accomplish the ultimate target of scoring value at 4.00 or higher by the year 2024 is organized into four major programs:

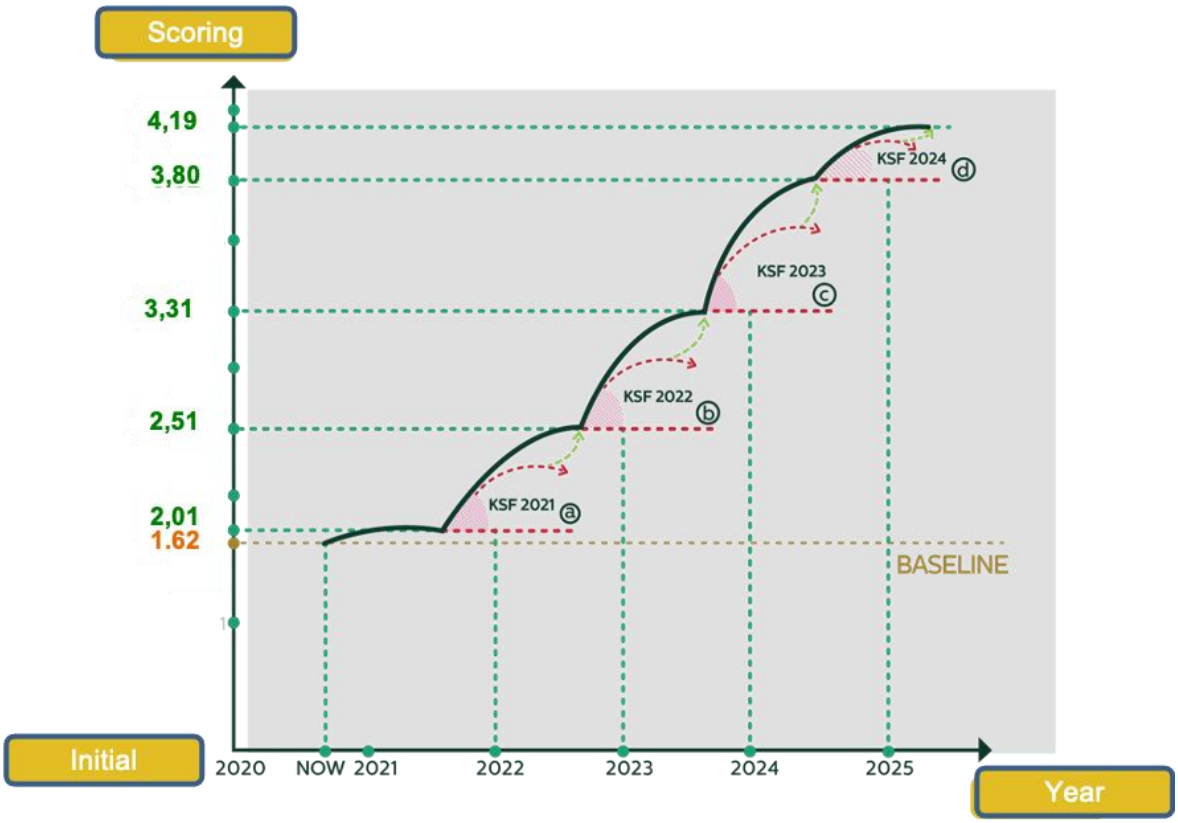
- Development of the appropriate policies and procedures as the legitimate basis of the risk management implementation and practices.
- Training and socialization to integrate policies and/or procedures into behavioral measures and company culture.
- Development of the Risk Management Information System to embed the implementation of policies and procedures into the business process and workflow.

- Evaluation and review of the effectiveness of the initial policies and procedures developed and made any improvements and/or adjustments if needed.

Along with the four programs above, the company's risk management team raises some concerns on how to keep the momentum of the implementation so that the respective yearly target could be secured accordingly, i.e., scoring value at 2.01 by the end of 2020, scoring value at 2.51 by end 2021, scoring value at 3.31 by end 2022, scoring value at 3.80 by end 2023, and finally scoring value by end 2024.

To address such concerns, some KSF (Key Success Factors) are identified and explicitly put as the critical factors in assuring the inflection point is kept well yearly. While the details are kept as confidential matters, the expected generic result of this KSF is illustrated in Figure 4.

Figure 4. Key Success Factors Roadmap PT XYZ[2]



4.3 Recommendations on the organization's resiliency and sustainability

Given the result of the current maturity level is the lowest; the attribute of the organization's resiliency and sustainability requires additional attention to ensure its acceleration is fast enough. Hence, the targeted overall scoring value could be achieved timely both the year-on-year's target and its ultimate target in 2024.

As such, the following recommendations have been proposed to the BOD of the company who already accept the idea:

1. Assuring the mapping of all key business processes is available, particularly those related to the provision of key services and/or products to the markets.
2. Conducting BIA (Business Impact Analysis) at its earliest overall Key Business Processes and formulate its business process recovery strategy and objectives.
3. Using the Bow-Tie Analysis to understand the overall picture of critical risk events that might lead to disaster if the barrier of likelihood and the impact of such a risk event could not be reduced and/or mitigated.
4. Using the business process recovery strategy and objectives above, building sufficient capacity across the organization to be able to carry out the recovery strategy as planned if a certain critical risk really occurs and becomes a major problem or crisis.

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[2] *A gap between the solid line curve and the dotted curve is identified as a potential slowing down zone (or weakening zone, or potential losing of the inflection point) if there is not any KSF action or initiatives taken by the company.*

5. Expanding the radar to assure that the risk management process is dealing both down-side risk, which might create disaster imminently and upside risk, which might create disaster in the future as we cannot optimize the opportunity today. As such, the company needs to sense potential risks not related to the economic value creation but also social value creation and environmental value creation.
6. Conducting regular review and evaluation of the effectiveness of the crisis response procedures through periodical testing.

As the last point regarding the organization's resiliency and sustainability, it is highly recommended if the organization adopts ISO 22301 Business Continuity Management (BCM) as soon as possible in 2021, which would fit in pair to the existing ISO 31000 risk management maturity road map. Those two standards have many interrelated elements that enforce one another. The ISO 22301 will help organizations assure that their risk management practice has a systematic and regularly tested business recovery strategy and procedures, including business continuity and disaster recovery procedure. Likewise, the ISO 31000 will help the organization ensure the BCM approach is integrated with the organization's overall management system from the strategic down to the operational level.

5. Conclusion, limitations, and further research.

The study confirms that SOE can use the risk management maturity assessment to define the baseline of their current practice of ISO 31000 Risk Management and help them develop a road map in building a higher level of organization's resilience and sustainability. The board of directors (BOD) of the SOE, who are in the pursuit of their business transformation program (BTP), has accepted the road map built upon the current maturity level. Furthermore, the BOD urges its risk management team and business transformation team to collaborate effectively as the two sides of a coin. In this regard, BOD says that it is impossible to accomplish the organization's BTP without having solid organization's resiliency and sustainability attributes well in place. Hence, the risk management maturity level should be at least of scoring value 4.00 as a pre-requisite pairing to their BTP by 2024. To achieve such a target of scoring a value of 4.00 or more in 2024, some key success factors (KSF) are identified and recommended to the BOD to help them define the inflection point to keep the momentum to a progressing increase of their year-on-year maturity level from 2020 to 2024.

The study also confirms that the Risk Management Maturity Model using ISO 31000, i.e., ERMA ISO31000 RM3, is applicable and suitable for the ISO 31000 adopters. It is found that it gives a much rigorous result to the SOE as opposed to their previous assessment result, which had applied a generic model.

Although many staff and officers of the SOE get initially surprised with the result of the assessment using ERMA ISO31000 RM3, which produces a scoring value lower than their expectation, i.e.1.62 versus at least 2.00, their BOD affirms and accepts the scoring 1.62. The acceptance of BOD is based on their judgment that the assessment using ERMA ISO31000 RM3 reflects the reality rather than just an expectation, and more specifically, it is fully designed for ISO 31000 adopters as opposed to other risk management maturity models, which are very generic.

Despite some useful deep understandings and insights about conducting risk management maturity in a large SOE, this paper has limitations in the sense of generality and comparability with other SOEs who have also adopted ISO 31000 Risk Management Standard. Therefore, it is strongly recommended to conduct further research through a similar case study approach in other SOEs that have adopted ISO 31000 and/or conduct a survey of some SOEs who have adopted ISO 31000 either separately or simultaneously.

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