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# The Integration of Balanced Scorecard and ISO 31.000 Based Enterprise Risk Management Process to Mitigate Supply Chain Risk: Case Study at PT Anugerah Bintang Meditama

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## *Abstract*

This study aimed to mitigate supply chain risk through the integration of Balanced Scorecard (BSC) and Enterprise Risk Management (ERM) based ISO 31000 at PT Anugerah Bintang Meditama. The data was obtained through the questionnaires and the interviews with the company's operational managers. The identified supply chain risk consisted of five risk types, namely: supply risk, operational risk, financial risk, demand risk, and environmental risk. The analysis and evaluation results based on risk appetite showed that the priority risks were supply risk, operational risk, financial risks, and environmental risk. Thus, it was important to mitigate these risks to achieve strategic goals and improve company performance.

***Keywords:*** *Enterprise Risk Management; ISO 31000; Balanced Scorecard; Supply Chain Risk*

## *Introduction*

Every company will always face uncertainty in its business activities. The uncertainty that arises can come from the improvements in business processes, such as: resources use, complex production processes, promotional activities, and demand and supply uncertainty. This uncertainty or risk is something that cannot be avoided by every company (Sirait & Susanti, 2016). Risk is the events uncertainty that creates unfavorable results in an organization, such as: late delivery, financial expenses, business losses, and others (Mangla, Kumar & Barua, 2016). Risks also occur in the company's supply chain, such as: disruptions to product flow, information, raw materials availability to the final product delivery that threatens the entire supply chain (Handayani, 2016). Risks within the company must be managed, because losses arising from a risk can have a very detrimental impact on the company.

In doing its business activities, PT Anugerah Bintang Meditama faces various risks. This company is engaged in the medical equipment procurement industry and becomes a medical devices distributor to various hospitals, clinics, medical schools, and general public. The company collaborates with various suppliers in order to meet the customer needs in medical devices field. One of the various

risks faced by the companies is the changing business trends that tend to lead to the medical device products development along with the global products entry into the domestic market. The competitive global products entry cannot be avoided by business people in the medical device industry. This business trends changing has forced the companies in the medical equipment sector to rebuild their performance; so that they can compete globally. This change has increased the risks that the company has to face. In the end, it demands a system to control or manage risks faced by the company.

Although it is important to manage the risk within the company optimally, however, PT ABM does not yet have a standardized risk management framework and process. Risk in a company is important to be controlled through a risk management process application, such as: ISO 31000. Risk management is a systematic practical management effort to analyze the risk use and control to reduce losses due to the company goals inadequacy (Rilyani, et al., 2015; Mariana, 2017; Moktadir & Ali, 2018). Risk is the possibility of the company's failure in achieving its strategic goals. Meanwhile, the company's strategic goals and objectives can be mapped through the Balanced Scorecard. The Balanced Scorecard is a measurement tool used to ensure the proper implementation of the company goals.In its implementation, the company goals which are mapped in the BSC; cannot be achieved easily, sometimes. Therefore, the ERM application is needed to complement it by identifying and mitigating potential risks in order to help the company achieves its goals (Woods in Rasid & Golshan, 2017).

Extant studies have integrated Enterprise Risk Management and Balanced Scorecard (Beasley et al., 2006; Safitri & Pangeran, 2020). The Balanced scorecard is used to measure the company progress to achieve the company's strategic goals, while ERM can help to control the positive and negative factors that can affect the company goals achievement. Thus, this study aims to integrate ISO 31000-based risk management and BSC to increase the company's chances in achieving its strategic goals. Therefore, this study examined the integrated application of the risk management processes based on ISO 31000 standard and BSC to mitigate supply chain risks.

## *Literature Review*

### *Enterprise Risk Management*

Based on ISO 31000, risk is defined as the impact of goal achievement uncertainty. This uncertainty occurs due to insufficient information about things that the company will face. Something that is uncertain can be either profitable or detrimental. Uncertainty that has the potential to bring benefits is called the opportunity; while the uncertainty that has the potential for loss is called risk. Risks that arise can be a threat to the company because they have the potential to harm and disrupt the activities. Besides, it can hinder the company goals achievement. Therefore, risk management is needed since it can provide benefits to the company.

Risk management is a coordinated activity to direct and control an organization in dealing with risks. According to William in Aprianto (2015) risk management is also general management application that tries to identify, measure and handle the causes and effects of uncertainty in the organization. The purpose of risk management is to identify risks and develop strategies to reduce or even avoid them, in addition, by carrying out risk management, the company can maximize existing opportunities (Labombang, 2011). One part of risk management is to implement Enterprise Risk Management (ERM). ERM is a method and process that organizations use to manage risks and seize opportunities in achieving the company goals (Rasid & Golshan, 2017).

*Supply Chain Risk*

Supply chain is a series of relationship activities within a company that carry out the distribution of goods or services supply from their original place to the buyer's or customer's hands (Indrajit & Djokopranoto, 2005). The supply chain involves an ongoing relationship regarding goods/products, money and information. Therefore, it can be concluded that supply chain risk is a risk that occurs in the flow of products, information, materials until the final product delivery which reaches the buyer or customer (Handayani, 2016).

Risk in the supply chain is an event caused by an imbalance between demand and supply. The company must anticipate risky events that can save short-term and long-term safety in the supply chain. It is because a risk impact can disrupt, monitor materials, information and cash flow, which in turn can damage sales, increase costs, and disrupt the company's sustainability (Chopra & Sodhi, 2004).

Risk is the event possibility that can harm the company. A risk assessment is required so that these risks can be handled and given appropriate treatment. To carry out a risk assessment, the first step that must be taken is to categorize or classify risks based on their type (Blackhurst, et al., 2008). Punniyamoorthy et al. (2013) classifies the risk types in supply chain risk into five, namely: supply risk, operational risk, financial risk, and demand risk.

Supplier risk is an adverse event that occurs to the supplier and affects the company's ability to meet customer demands (quality and quantity) in anticipated cost and time or causes a threat to the business continuity or customer needs. Operational risk is the risk that occurs due to the process, system and human failures. Risks that arise due to the malfunctioning of the applicable internal system (process), human error, and system failure. Financial risk is the risk that arises due to uncertainty in financial activities or targets. In addition, financial risk is a risk that has an impact on the company's financial performance. Risks that cause low financial profitability and even loss. In which in extreme circumstances can lead to business destruction. The risk in demand is the risk that occurs due to disruption of the downstream supply chain operation (Juttner, 2005). The disruption occurs due to a mismatch between the company's projected demand forecast and actual demand in the market.

*The Risk Management Implementation Process Based on the ISO 31000*

Within the ISO 31000 framework, the risk management process is a critical activity in risk management that becomes the implementation of the principles and the framework which will be built. This standard describes a risk management implementation framework starting from conceptualization through direct communication and consultation with risk owners, risk assessment through three stages (risk identification, risk analysis and risk evaluation), treatment or management of existing risks, and monitoring, and reviewing on future risk developments. ISO 31000-based risk management process are presented in Figure 1.

Context establishment aims to identify and to express organizational goals, the environment in which the goals are to be achieved, interested stakeholders, and the risk criteria diversity, all of which will help revealing and assessing the nature and risk complexity. There are four contexts that need to be determined in establishing the context. They are internal context, external context, risk management context, and risk criteria.

Risk assessment consists of: 1) Risk identification is carried out to find and ensure what risks which can affect the organizational goals achievement. 2) Risk analysis means analyzing the risks' likelihood and impact that have been identified and classified into high, medium, low risks. 3) Risk

evaluation is carried out to compare the risk analysis and risk criteria results to determine how risk treatment will be applied in the company.

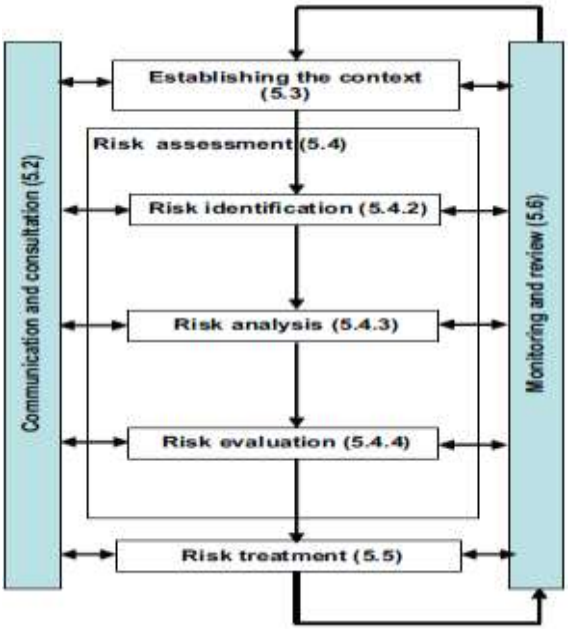


**Figure 1. ISO 31000-Based Risk Management Process**
Source: ISO 31000:2009

Risk Treatment. According to (International Standard Organization) ISO 31000 in Susilo & Kaho (2018), there are four treatments that can be carried out by organizations. They are: 1) Risk avoidance is a strategy to eliminate risks by not carrying out activities completely that are thought to have risks that exceed the organization's risk appetite. 2) Risk Mitigation is a strategy used to reduce organizational risk. Reducing risk can be done by reducing the possible risk level and / or the impact of risk loss. 3) Risk Transfer is a strategy used to transfer parts of the risk to another individual, business entity or organization. Making a risk transfer means reducing the risk gravity; by transferring it to the other party. By transferring risks, the impact of existing risks must be borne by the main risk stakeholders. 4) Risk Acceptance is a strategy to accept the risks that occur due to the unavailability of other alternatives to avoid risk, mitigate risks and transfer risks. Risk acceptance is often called risk absorption, risk tolerance, or risk retention.

*Balanced Scorecard*

Balanced Scorecard (BSC) is a set of management tools to ensure the company's strategy can be implemented properly; intact and in balance. Balance between financial dimensions with non-financial dimensions and between future dimensions and past / present dimensions (Alijoyo, 2011). The balanced scorecard can be used as a performance measurement system, strategic management system and as a communication tool in Kurniawati (2011).

There are four perspectives that can be measured in the balanced scorecard. They are: (1) Financial Perspective, this perspective explains the tangible results of the strategy using financial measurements. The financial perspective is defined as the way an organization manages its finances so that it can carry out its activities continuously. (2) Customer Perspective, this perspective measures customer satisfaction, retention, and customer growth which is the company's goal. (3) Internal

Perspective, this perspective refers to internal business processes in which the management must know how well the company's business is running and ensure whether products and services are in accordance with customer requirements based on the company's mission. (4) Learning and Growth Perspective, this perspective refers to employees' learning and innovation in the company in accordance with their vision. The process perspective as well as the learning and growth perspective explains how the organization implements its strategy.

*The Integration of ERM and BSC*

The integration of ERM and BSC is dealing with the integration of two things that can be united and are needed in the company's business scope because they can increase the organization's strategic goals achievement (Beasley et al., 2006). BSC defines the strategy needed by the company and how to carry out the strategy, while ERM provides proactive and adaptive processes in the strategy execution process (Alijoyo, 2011). BSC requires input and feedback from various parties both internal and external to the organization. BSC does not rely solely on the shareholders' perspective, which emphasizes not only the financial returns from the company, but also the point of view of customers, employees, and other internal company stakeholders.

**Table 1. Risk Types and Balanced Scorecard**

| | | Customer Perspective | Internal Perspective | Learning & Growth Perspective | Financial Perspective |
|---|---|---|---|---|---|
| **Risk Types** | Supply Risk | | √ | | √ |
| | Operational Risk | | √ | √ | √ |
| | Financial Risk | | | | √ |
| | Demand Risk | √ | | | √ |
| | Environmental Risk | √ | √ | √ | √ |

**Source:** survey data

The customer perspective in the balanced scorecard focuses on customer's satisfaction so that it has an impact on improving the company's financial performance. In this perspective; there are inherent risks, such as: risk on demand and risk to the environment in the form of company's reputation which has an impact on decreasing customer's satisfaction. Risk management is needed to mitigate risks related to the customer's perspective. With the risk management application, the company can get greater opportunities in ensuring customer's loyalty and acquiring new customers who can encourage a better financial performance for the company.

From the internal business processes perspective; there are risks involved, such as: risks that affect the company's logistics and distribution processes, risks in adding customers, risks in developing new products, and regulatory risks related to standards and social norms in society. Risks that arise must be handled through a risk management process. Risk management requires each individual in the company to identify, assess, and monitor risks in each aspect of the company's business processes in order to achieve the company goals.

From the learning and growth perspective; there are inherent risks, such as: risks in recruiting new employees and in giving proper training and supervision for the employees. Risk management is needed in this perspective in order to make the company able to mitigate both the likelihood and the impacts of these risks. Specific objectives that are built to handle the risks can communicate the ERM

importance for professionals who work in organizational development and human capital within the company.

From the financial perspective, there are risks that may arise related to costs and benefits. Each risk management process must consider the costs in responding the relative risks to the benefits. All existing risks related to costs and benefits can hinder the target achievement in the financial perspective. Hence, cost / benefit analysis in risk management is very important to support success in implementing the company's goals which are mapped in the balanced scorecard. Therefore, the BSC and ERM can effectively align company efforts in dealing with the corporate risk. The balanced scorecard focus is on achieving future goals and strategic priorities as well as describing the effectiveness and efficiency of past systems (Kalendar & Vayvay, 2016). On the other hand, risk management is the managers' tool in detecting positive and negative events that can affect organizational goals. So, the BSC and risk management integration will increase the company's likelihood in achieving its goals and objectives.

## *Research Method*

This research was a supply chain risk assessment based on ISO 31000 in the case study of PT. Anugerah Bintang Meditama (PT.ABM). PT ABM is engaged in the medical equipment procurement industry and becomes a medical devices distributor to various hospitals, clinics, medical schools, and the general public. The data was obtained through the interviews using questionnaires which were conducted with the company's operational manager. In the study, there were two processes carried out, namely the strategic goals establishment by giving questionnaires questions as a tool to form the company's Balanced Scorecard and questionnaires statements for the Enterprise Risk Management implementation based on ISO 31000. The data collection was carried out from March 2019 to September 2019.

## *Results and Discussion*

The first stage in this research implementation was to see the PT ABM objectives through the company strategy map. The strategy map illustrates how the company can create value by linking strategic objectives explicitly through causal relationships which are grouped into four Balanced Scorecard perspectives (Kaplan & Norton, 2004).

In the strategy map with a financial perspective, a customer perspective, an internal business process perspective, and a growth and learning perspective; three strategic objectives were obtained. This process was obtained through the interviews and filling out the questionnaires by the company managers. This activity aimed to see the company's goals and identify risks that could hinder the company's strategic goals achievement.

The next stage was the enterprise risk management implementation through risk management assessment based on ISO 31000. The stages in risk management assessment based on ISO 31000 as follows.

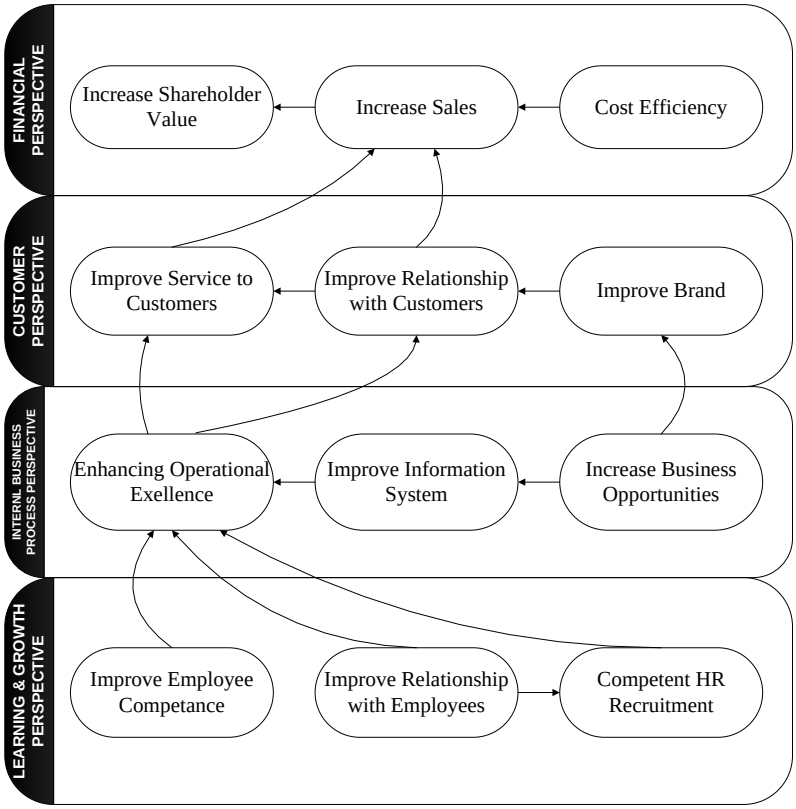


**Figure 2. Strategy Map**
**Source:** survey data

*Risk Identification*

The risk identification process at PT ABM was carried out to identify and to find risky events in business activities related to the company's failure in achieving its goals. The risk identification process included the events and risk causes. In this study, the risk focus was the risk that occurred in the company's supply chain. Risk identification in this study used the fishbone diagrams method. The risk identification which was carried out created 29 risk events that triggered risks in the company's supply chain. The identified risk events consist of 7 risks which came from the suppliers, 11 risks came from the company's operations, 4 financial risks, 3 demand risks, and 4 risks came from the company's external environment.

**Tabel 2. Risk Identification**

| Risk Types | Code | Risk Events |
|---|---|---|
| Supply Risk | S1 | Error in *supplier* selection |
| | S2 | Suppliers' sudden failure |
| | S3 | The supplier's disability in fulfilling orders on time |
| | S4 | The amount of goods mismatch with the supplier's orders |
| | S5 | Excess goods reception from the suppliers |
| | S6 | Reliance on a single supplier |
| | S7 | Imported medical equipment products fluctuations |

**Source:** survey data

**Tabel 2. Continued**

| Risk Types | Code | Risk Events |
|---|---|---|
| Operational Risk | O1 | Work postponement by the employees |
| | O2 | Employees Rotation Excalation |
| | O3 | Inadequate development of employee potential |
| | O4 | Employee productivity is not optimal |
| | O5 | Loss for goods damage |
| | O6 | Work implementation is not accordance with the SOP |
| | O7 | Failure in achieving division target |
| | O8 | Error in recording stock of goods |
| | O9 | Error in delivering goods to the customers |
| | O10 | System failure due to unreliable software & hardware |
| | O11 | Company data lost |
| Financial Risk | K1 | Decrease in company's margin |
| | K2 | Increase in bad debts |
| | K3 | Operating costs exceed budget |
| | K4 | Disability to pay debt interest |
| Demand Risk | P1 | Error in estimating market needs |
| | P2 | Customers' negative complaints |
| | P3 | Customers number is reduced |
| Environmental Risk | L1 | Macroeconomic uncertainty which affects the company |
| | L2 | Licensing problems in medical device products |
| | L3 | Out of control natural disaster and phenomena |
| | L4 | Digital disruption |

**Source:** survey data

*Risk Analysis*

Risk analysis was carried out after the risk identification process. Based on the field study, it was agreed that there were 29 risk events that might hinder the company's goals. Risk analysis was carried out by analyzing two criteria, namely the likelihood criteria and the impact criteria. The determination of likelihood and impact criteria in the risk analysis process had been determined at the early stage of conceptualization together with operational management. Below are the risk level criteria that had been determined together.

**Table 3. Likelihood (Probability) Criteria Level**

| Level | Probability Level | Quantitative Criteria (Probability) | Quantitative Criteria (Frequency / Year) |
|---|---|---|---|
| 1 | Rarely | ≤ 5% | 1-2 events |
| 2 | Small Possibility | > 5% s.d ≤ 10% | 3-5 events |
| 3 | Medium Possibility | > 10% s.d ≤ 25% | 6-10 events |
| 4 | High Possibility | > 25% s.d ≤ 45% | 10-15 events |
| 5 | Almost Certain | > 45% | More than 15 events |

**Source:** survey data

**Table 4. Impact Criteria Level**

| Impact Area | Insignificant (1) | Low (2) | Intermediate (3) | Highh (4) | Catastropic (5) |
|---|---|---|---|---|---|
| Financial | Loss ≤ 2 million | Loss > 2 million- 15 million | Loss > 15 million- 45 million | Loss > 45 million- 100 million | Loss ≥ 100 million |
| Performance | Performance achievement up to 90% | Performance achievement 89% up to 75% | Performance achievement 74% up to 60% | Performance achievement 59% up to 40% | Performance achievement less than 39% |
| Operational | Operational processes disruption but insignificant | Operational processes disruption between10-15% and disrupts one function | Operational processes disruption between 15-35% and disrupts two functions | Operational processes disruption between 35-50% and disrupts three functions | Failure >50% and affects most of the functions |
| Reputation | The arise of bad publicity in the internal environment | The arise of bad publicity in the internal environment and the shareholders | The arise of bad publicity by the customers | Negative publicity in local mass media | Negative coverage in national mass media |

**Source:** survey data

*Risk Evaluation*

Risk evaluation was carried out with the aim to help the risk management decision making process. The risk evaluation process was carried out to determine what risks which required risk treatment and how to prioritize the risk treatment implementation. The risk treatment had been agreed together with the company's leader which created steps in risk management efforts as listed in Table 5 Risk Criteria.

**Tabel 5. Risk Criteria**

| Score | Risk Level | Performance | Risk Response | Priority |
|---|---|---|---|---|
| 20-25 | **Very High Risk** | Immediate action are necessary to manage risk | *Mitigate, Share, Avoid* | I |
| 16-19 | High Risk | Action is necessary to manage risk | | II |
| 12-15 | Medium Risk | Action recommended | *Mitigate* | III |
| 4-11 | Low Risk | No action required, if the resources are available then action can be taken | *Accept* | IV |
| 1-3 | Very Low Risk | No action required | *Accept* | V |

**Source:** survey data

The risk evaluation results were described in a risk matrix. After a risk analysis was carried out by multiplying the likelihood and impact criteria, the risk level was obtained for each risk event. The risk level obtained was evaluated for later treatment based on Table 5. Risk Criteria. Risks handled were the risks which were above the risk appetite line; a risk that was considered high and had a negative impact on the company's failure in achieving its goals. Risks that required to treatment were S5F (supply risk 5, financial impact), O1O (operational risk 1, operational impact), O5F (operational risk 5, financial impact), K1K (financial risk 2, performance impact), K2F (financial risk 2 , financial impact), S3F (supply risk 3, financial impact), S5K (supply risk 5, financial impact), S5O (supply risk 5, operational impact), P1F (demand risk 1, financial impact, L4F (environmental risk 4, financial impact), S1F (supply risk 1, financial impact), S4F (supply risk 4, financial impact), S4O (supply risk 4, operational impact), O4K (operational risk 4, financial impact), O5K (operational risk 5, financial impact), O5O (operational risk 5, operational impact), O7K (operational risk 7, financial impact), O9O (operational risk 9, operational impact), O9F (operational risk 9, financial impact), O11O (operational risk 11, operational impact), K1F (financial risk 1, financial impact), K1O (financial risk 1, operational impact), L1F (environmental risk 1, financial impact), and L1O (environmental risk 1, operational impact).

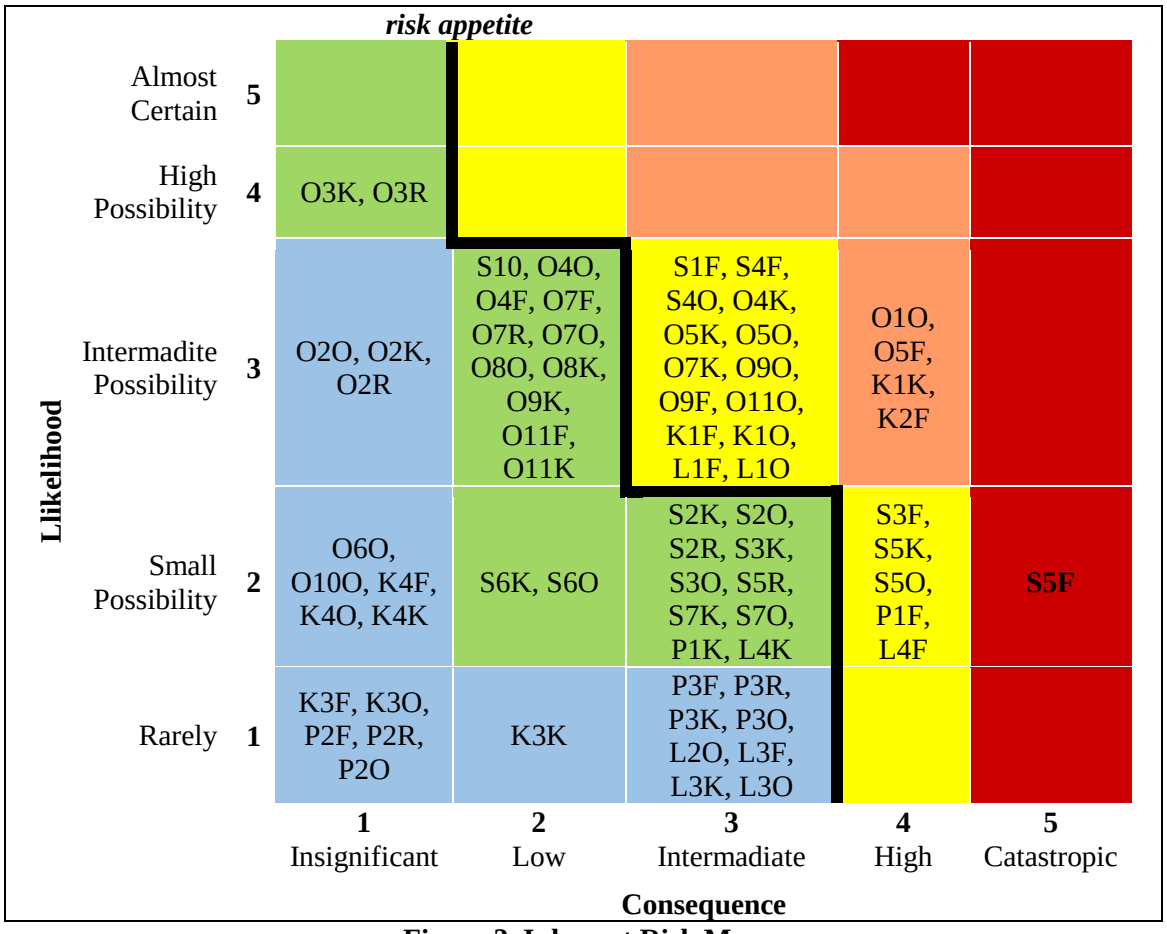


**Figure 3. Inherent Risk Map**

*Risk Treatment*

After the risk evaluation was carried out with the treatment decision results of each risk; the next step was to make further control planning, namely risk treatment. Risk treatment was an effort to

minimize risky events that could hinder the company's goals achievement. The risk treatment process was used to overcome the risk causes which became the trigger for potential risks that created bad effect to the company's activities.

Steps in the risk treatment were included identifying options to deal with risk. The options used to handle risk are risk avoidance, risk transfer, risk mitigation, and risk acceptance. The second step, namely preparing a risk management action plan; was an activity or strategy that would be carried out to reduce risk events. The third step was to plan or project the expected results (outputs) if the action plans were going to be implemented. The fourth step determined the person in charge for the action plan in handling risks and the fifth step was monitoring the residual risk expectations. Residual risk was the risk that remained after handling risks and became the company's hope if the risk management results in less residual risk than before handling it. This means that the management of risks carried out by the company was successful and could reduce risky events that hinder the company's goals achievement. The residual risk map was presented in Figure 4.

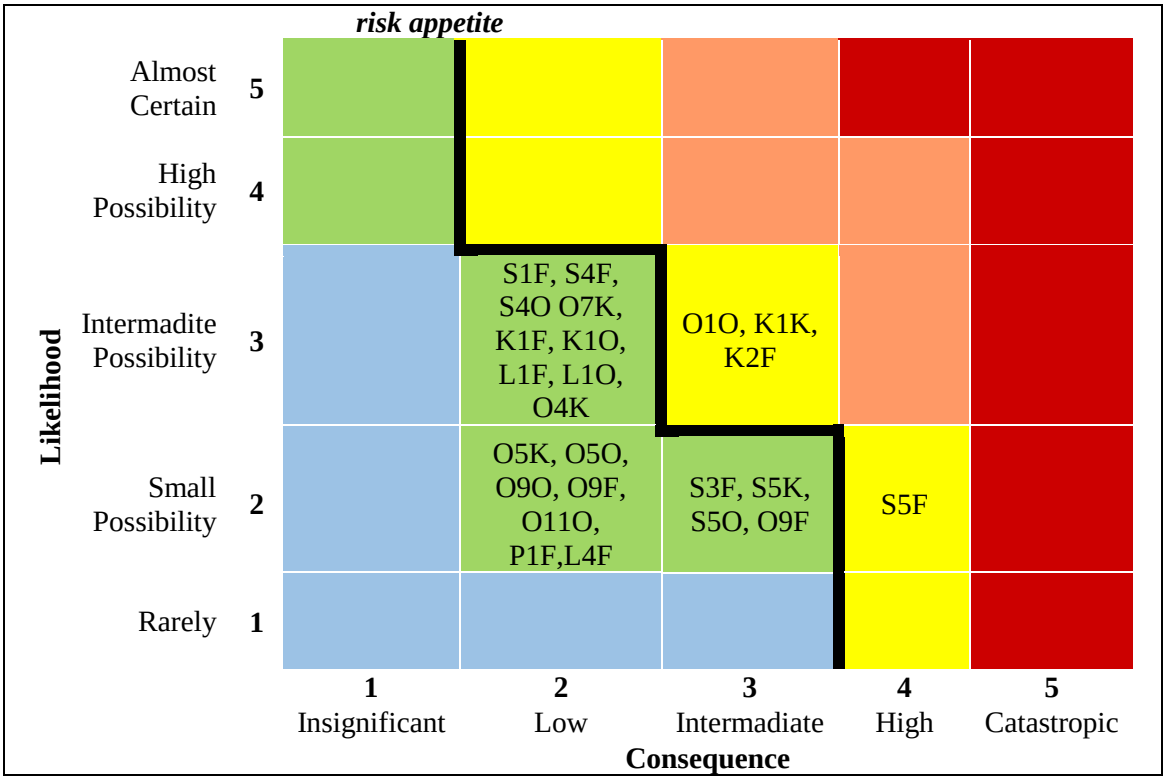


**Figure 4. Residual Risk Map**

## *Conclusion*

Based on the research results which were conducted at PT Anugerah Bintang Meditama, several important conclusions had been obtained. Based on the risk identification results through interviews with a questionnaire to the company's operational manager, 29 risk events that occurred in the company had been identified and these risks could disrupt the failure in achieving the company's goals.

Based on the analysis and evaluation results, there were 16 risk events at the upper level of risk appetite and 13 risk events at the lower level of risk tolerance so that they did not require treatment or risk

mitigation. Risks that were at the upper limit of risk were supply risk, operational risk, financial risk and environmental risk. This risk was not accepted and the company had to take action to mitigate the losses impact due to the company's failure in achieving its goals.

Treatment or mitigation on the priority risks, namely the supply risk of excess goods which had been received by the suppliers. Risk mitigation had been carried out by selecting mitigation treatment options and avoiding risks. This treatment option had been expected to produce an appropriate action plan to reduce the risk events causes. The risk mitigation that had been carried out was expected to be able to reduce each risk event so that the company could achieve strategic suggestions in the Balanced Scorecard. The strategic objectives achievement reflected the performance escalation for the company.

It is recommended for the company to implement ISO 31000-based Enterprise Risk Management because this standard describes the existing risk management processes systematically and in detailed. By implementing ERM, it can help the company to assess and manage risks that have occurred or may occur, including the big and the small risks; so that, it can help the company to achieve its goals and increase its value.

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