



A Supply Chain Risk Mitigation Based on Iso 31000: 2018- Balanced Scorecard (BSC) Integration to Improve Performance: A Case Study at "BTD" Hospital

Adhitya Nugraha A; Perminas Pangeran

E-mail: perminas@staff.ukdw.ac.id

Master of Management, Faculty of Business, Duta Wacana Christian University, Indonesia

<http://dx.doi.org/10.47814/ijssrr.v5i8.391>

Abstract

This study aimed to assess the supply chain risk through the integration of enterprise risk management (ISO 31000: 2018) and a balanced scorecard (BSC) to improve the performance of "BTD" hospital, Yogyakarta Special Region (DIY), Indonesia. This research was a case study at "BTD" hospital, DIY, Indonesia. The method of the data analysis was descriptive-qualitative. The result showed that mitigating 36 risks and integrating with four perspectives in BSC could improve the hospital's performance. The mitigations of these risks were improving the communication with the distributors, providing feedback to distributors, conducting assessments to distributors every year, evaluating the buffer stocks for life-saving drugs, e-prescription writing policies in hospitals, revising standard operating procedures (SOP) related to dispensing (making drug management, the person in charge of the drug shelves), mapping the manpower during the peak hours, making quality improvement of the socialization programs (Dispensing and LASA), making programs of characters' development and the facility improvement.

Keywords: *Supply Chain Risk; ISO 31000:2018; Balanced Scorecard*

Introduction

The "BTD" hospital has implemented a Balanced Scorecard (BSC) to evaluate the performance of the institution. The BSC perspectives are Financial, Customer, Internal Business Process, and Learning and Growth which have evolved into management instruments to develop strategic plans. Based on the results of the research done by Kopia, Kompala, Buchmuller and Heinemann (2017) found that the use of BSC as a strategic instrument has a positive impact compared to BSC which is used only as an assessment instrument. The implementation of BSC to evaluate the performance in hospital institutions has been widely carried out, such as the research on the performance of *Sleman Hospital* after the implementation of *BPJS Kesehatan* insurance done by Pradibta and Yaya (2018) and the research on the implementation of BSC in measuring the performance of *RSUD Wonosari Hospital* done by Bharata,

Setyorini and Isroah (2019). Likewise, the research on the performance analysis of the pharmacy department with the implementation of BSC has also been carried out such as research on the performance analysis of the pharmacy department of *Kanjuruhan Hospital, Malang* regency with the approach of BSC by Hidayati, Satibi and Fudholi (2013), the performance analysis and the mapping of the pharmacy department strategies using BSC in hospital by Marcelin, Satibi and Wardani (2015) and the analysis of the pharmacy department's performance of *Palembang Bari Hospital* using BSC approach by Rahayu (2018). However, with the positive impact of the implementation of BSC, hospitals are not spared from risks that can affect the organization's goals. Therefore, in addition to these 4 perspectives, the hospital must manage the risk perspectives.

Enterprise Risk Management (ERM) has been carried out by "BTD" hospital. However, it is not yet integrated into the BSC. Some studies showed that the integration of ERM and BSC improved organizational performance. The research entitled *Integration at high-level Management System Standard (MSS)/Integrating Management Standard (IMS) with BSC* had a strong correlation with organizational performance, where performance improvement became better and lasted longer than when MSS had been built (Kopia et al., 2017), the integration of ERM and BSC provided more comprehensive information for senior management on the relationship of performance and risk than with the implementation of both management not integrated by Purwanto (2016).

The integration of ERM with BSC was carried out in stages, firstly done by implementing BSC in the organization. Safitri and Pangeran (2020) present the implementation of BSC as a start to determine the strategy map of the organization is the first step to integrating ERM with BSC, followed by steps of risk identification, risk analysis, risk evaluation, and risk handling. The role of leaders is very important in the implementation of BSC in hospitals, as in research conducted by Rupita and Heru (2018). The result of studies showed the positive impact of the integration of ERM and BSC on performance in a study at Pharmacy (Nugroho & Pangeran, 2021; Monica & Pangeran, 2020). The integration of ERM based on ISO 31000: 2018 and BSC could lowers risk supply chain risk from an internal business process perspective.

Therefore, the integration of ERM (ISO 31000:2018) and BSC as a method that can be used by pharmacy departments to overcome a supply chain risk, to provide complete, safe, qualified, and affordable pharmacy services of medicines and medical devices to patients and financially responsible to hospitals.

Literature Review

Enterprise Risk Management

Organizations are faced with uncertain events that can affect the strategy and the goal achievement, where they can have a negative impact (risk) or a positive impact (opportunity), or a combination of risk and opportunity Walker and Shenkir (2018). ERM can be adapted according to the specifics of organizational culture and can be implemented in large or small-scale organizations, service or manufacturing companies, profit organizations, non-profit organizations, or private entities (Walker & Shenkir, 2018).

Risk according to ISO 31000: 2018 is defined as the impact of uncertainty on the achievement of organizational goals, these risks must be handled. Risk management is a critical activity in risk management that is the application of principles and frameworks. The implementation of risk management according to ISO 31000: 2018 starts with context determination, risk assessment (risk identification, risk analysis, and risk evaluation), risk handling, monitoring, and review of risk development by Susilo and Victor (2018). The ISO 31000:2018 provides principles and strategic

guidance for the implementation of risk management. This standard can be used for organizations, private companies, non-profit organizations, groups, or individuals. Here is an illustration of the principles, the working framework, and the risk management process of ISO 31000:2018:

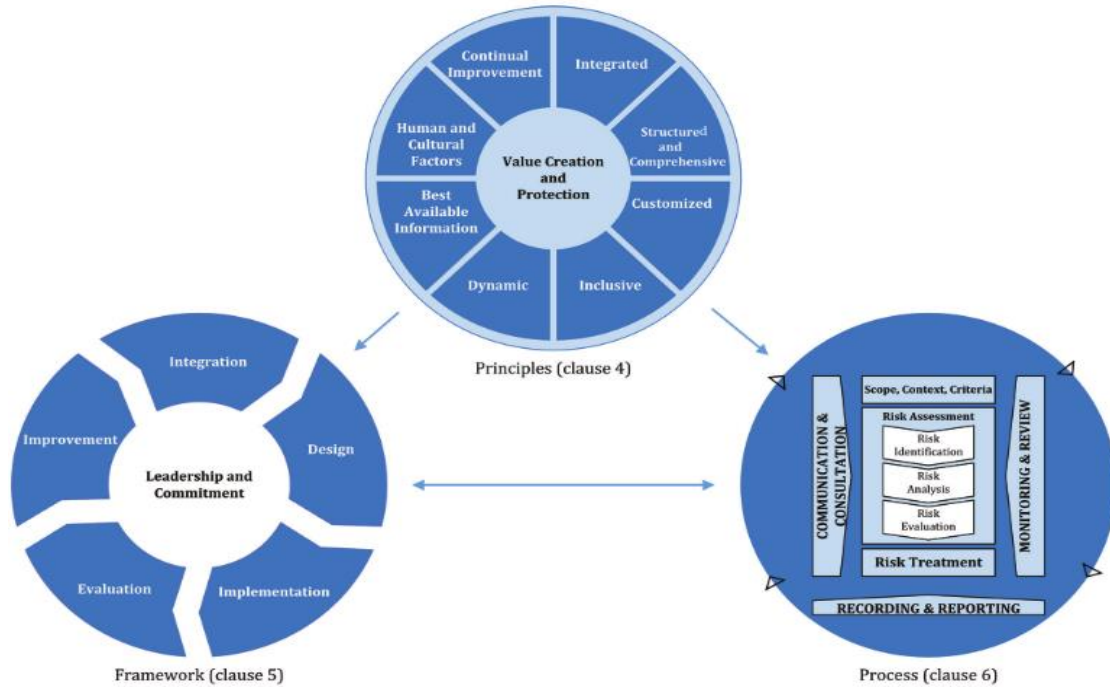


Figure 1. Relationship between principles, framework, and process of ISO 31000:2018

Source: ISO 31000-2018

Balanced Scorecard

A balanced scorecard (BSC) is a management tool developed in the 1990s by Kaplan and Norton (Kaplan & David, 1996). BSC is defined simply as a scorecard used to measure the performance of an organization, taking into account the financial and non-financial aspects, involving the internal and external factors in either long-term or short-term (Rangkuti, 2020). There are four perspectives according to Kaplan and Norton (Kaplan & David, 1996) in the BSC, namely financial perspective, customer perspective, internal business process perspective, and learning and growth perspective. Initially, BSC was used as a performance measurement tool for companies. The impact of the successful implementation of the BSC was further developed into organizational strategic planning and management systems.

Integration of ERM (ISO 31000: 2018) with BSC

The combination of BSC with ERM can improve performance management, where the BSC objectives are identified in each perspective followed by ERM in the framework of risk management. Alijoyo (2011) stated that BSC defines the strategy that needs to be executed while ERM provides proactive and adaptive capabilities in the execution process of the strategy that has been defined. The practical steps that can be taken for the integration are to use Control Self-Assessment (CSA) techniques for strategic objectives (objective setting) in each BSc perspective of an organization. The results of the CSA process generated a Key Risk Indicator (KRI), which is an indicator or benchmark of possible is that k will occur if there is no corrective action.

Walker and Shenkir (2018) stated that leaders/managers when monitoring KPIs in every perspective of financial, customer, internal business process and learning and growth then simultaneously assess the effectiveness of risk mitigation that has been done. The effect of such integration is that KPIs must be able to accept KRI, however, KRI is not established as the initial goal of the organization. As in the following table, each risk, namely supply, operational, financial, demand, and environment, has an impact on each perspective directly or indirectly.

Table 1. Integration of Risk Type and Balanced Score Card (BSC)

	Perspective Balanced Scorecard			
	<i>Financial</i>	<i>Customer</i>	<i>Internal Business Process</i>	<i>Learning and Growth</i>
<i>Supply risk</i>	√	√	√	
<i>Operational risk</i>	√	√	√	√
<i>Financial Risk</i>	√	√	√	
<i>Demand Risk</i>	√	√		
<i>Environment Risk</i>	√	√	√	

Source: results mapping researchers

Research Methods

This research was a qualitative study, and the research variable is risks related to the supply chain. Research variables were obtained through FMEA, by conducting some surveys, interviews, and observations. The observation was done in complete participation, where the researchers have been fully involved in what the data source does in making observations Sugiyono (2012). The object in this study was the pharmacy department in the hospital "BTD" located in DIY, Indonesia. The variables of this study were risk events in supply chain risk in RS "BTD" as follows:

Table 2. Risk Identification

Risk type	Code	Risk Event
Supply risk	S1	The selected supplier does not meet the legal aspect.
	S2	Suppliers are unable or fail to meet demand.
	S3	Suppliers do not deliver medicines and medical devices on time.
	S4	The quantity of products delivered is not by the request of the hospital
	S5	The specifics of pharmaceutical preparations (name, dosage, dosage form) do not correspond to hospital requests

Table 2. Cont.

Risk type	Code	Risk Event
	S6	The quality of the delivered products does not meet the standards or is defective.
	S7	Medicines and medical devices have expired period < 6 months
	S8	Suppliers are not willing to accept product returns
	S9	Suppliers are not willing to fulfill urgent orders
	S10	Principals choose new suppliers and replace old suppliers to distribute their products
	S11	The principal does not meet the legal aspects and quality standards set by the government
	S12	Principal recall for medicine and medical devices after-sales
Operational risk	O1	Employees are unable to meet delayed or unaddressed job targets on time
	O2	Errors in the setup in HIS of medicines and medical devices to
	O3	Errors at the transaction stage
	O4	Errors at the stage of preparing and compounding
	O5	A mismatch between the amount of inventory with card stock
	O6	Medicine and medical devices are improper or damage
	O7	Medicine and medical devices are expired
	O8	Stock inventor of some items in satellite pharmacy is not available
	O9	Stock inventor of some items in the central warehouse is not available
	O10	New methods/ systems/ ways cannot be adopted by employees
Financial Risk	F1	Decreased hospital income
	F2	Increase in hospital receivables
	F3	Periods of increased or erratic hospital receivables
	F4	Increased hospital operating costs
	F5	Payment to suppliers is not current
Demand risk	D1	The demand for medicine and medical devices is not able to be met by the pharmacy department
	D2	Demand for medicine and medical devices decreased
	D3	The dem ford of medicine is outside the hospital formulary
	D4	Request for some items that cannot be substituted
	D5	Complaints from patients or users related to medicines and medical devices.
Environmental Risk	E1	Uncertainty of macroeconomic conditions affecting hospital conditions
	E2	The disaster occurred either natural or non-natural
	E3	Issues related to licensing aspects, legal aspects, for safety
	E4	Issues of medicines and medical devices from the government

Source: data processing results.

After obtaining the research variables, then the researchers conducted BSC mapping in the pharmacy department through the interviews and examination of the documents. The next stage was the

determination of the context, namely the risk probability level criteria, the risk impact level criteria, the risk criteria, and the risk appetite. The researchers consulted with the leaders to determine the level, the criteria, and the risk appetite.

The researchers created a table of probability level criteria that shows how often these risk events occurred. There are 5 criteria, namely rare, small probability, medium probability, high probability, and almost certain. Researchers establish quantitative and qualitative criticism to facilitate the categorization. Here is a table of established probability levels:

Table 3. Probability Level Criteria

Level	Probability Level	Probability	Frequency/ year
1	Rarely	≤ 5%	1-2 events
2	Small Probability	≤ 5% up to ≤ 10%	3-5 events
3	Medium Probability	>10% up to ≤ 25%	6-10 events
4	High Probability	>25% up to ≤ 45%	10-15 events
5	Almost Certain	>45%	> 15 events

Source: data processing results

The researchers created a table of risk impact level criteria that shows the severity of these risks. There are 4 areas of impact that were defined, namely finance, performance, operation, and reputation. In each of these categories, the leveling was insignificant, low, intermediate, high, and catastrophic. The researchers set the qualitative and quantitative criteria to facilitate the categorization. Here is a table of established probability levels:

Table 4. Risk Impact Level Criteria

Impact Area	Insignificant	Low	Intermediate	High	Catastrophic
	1	2	3	4	5
Finance	Loss ≤ Rp 2 M	Loss ≤ Rp 2-15 M	Loss ≤ Rp. 15 – 45 M	Loss ≤ Rp. 45 – 100 M	Loss > 100 M
Performance	Remain 90%	Remain 89% -75%	Remain 74% - 60%	Remain 59% - 40%	Remain < 39%
Operation	interrupted but not significantly	Interrupted 10% - 15% and one function is disrupted	Interrupted 15% - 35% and two functions are disrupted	Interrupted 15% - 35% and three functions are disrupted	fail and all functions are disrupted
Reputation	negative perception in the pharmacy department	negative perception in the hospital	negative perception inpatient	negative perception in the local area	negative perception in the national

Source: data processing results.

The researchers made a table of risk level criteria that shows the relationship between probability and severity of the risk. The relationship was calculated by multiplying the score obtained. There were 5 risk levels set including very high, high, medium, low, and very low. The researchers set the score criteria to facilitate the categorization. Next, the researchers created a matrix to describe the levels at each risk event, with color markers, and include risk appetite in the matrix. Here is a table of risk level criteria set:

Table 5. Risk Level Criteria

Score	Risk Level	Performance	Risk Response	Priority
20-25	Very High	Immediate handling required	Mitigate, Share, Avoid	I
16-19	High Risk	Handling required		II
12-15	Medium Risk	Recommended for handling	Mitigate	III
4-11	Low Risk	No handling is required, if possible can be done action	Accept	IV
1-3	Very Low Risk	No handling required	Accept	V

Source: data processing results.

After identifying the risks and setting these criteria, the next stages were as follows:

- a. Risk analysis was done based on the probability and the impact by using interview and observation methods.
- b. Risk evaluation was done based on red, yellow, green, and dark green risk criteria through interviews, questionnaires, and observations which were then continued by mapping the inherent risk.
- c. Handling risks related to the supply chain risk was done by providing the improvement plans, the plans, and the implementation processes and proposing a person in charge of conducting risk treatment. Next, the researchers conducted a residual risk mapping.
- d. Monitoring and reviewing the risk management to achieve the organizational goals.

Results and Discussion

Based on the results of the research, the roadmap of BSC in the pharmacy department of medicine and medical device supply chain process in “BTD” hospital is presented in figure 2, as follows.

KPI balanced scorecard in the pharmacy department of the “BTD” hospital has been prepared, so this study related to supply chain can be shown as follows. The financial perspective is the inventory turnover of the pharmaceutical goods and it is 25 days at the maximum. The customer perspective is customer satisfaction with the pharmacy services in the hospitals and improving the speed of the pharmacy service at the hospital. The internal business process perspective is the quality indicator that is achieved according to the target and the increase in compliance with the use of the electronic prescribing is achieved 100%. The internal growth perspective refers to human resource needs that are met at least 80% of the results of the needs analysis, related to facilities, all health equipment is calibrated and minimum facility standards are met, and the regulatory compliance with the government regulations is 100%. The business process of the supply chain of medicines and medical devices can be illustrated through the following chart, as at figure 3.

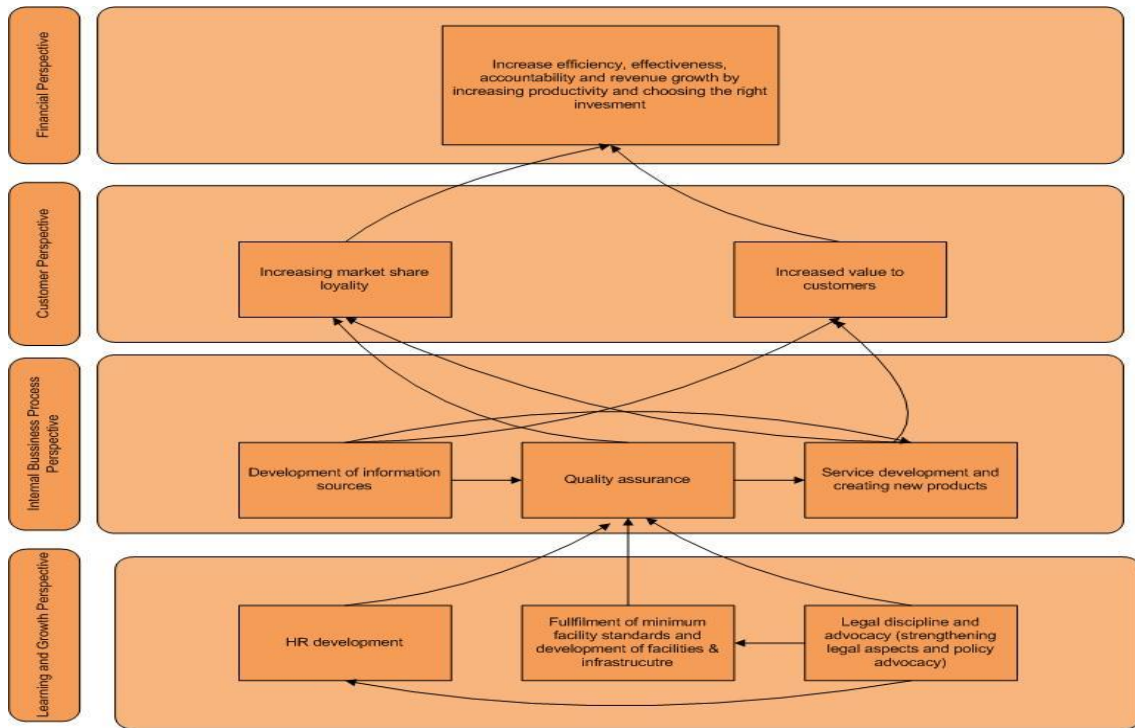


Figure 2. Roadmap BSC of Pharmacist Department

Source: data mapping results

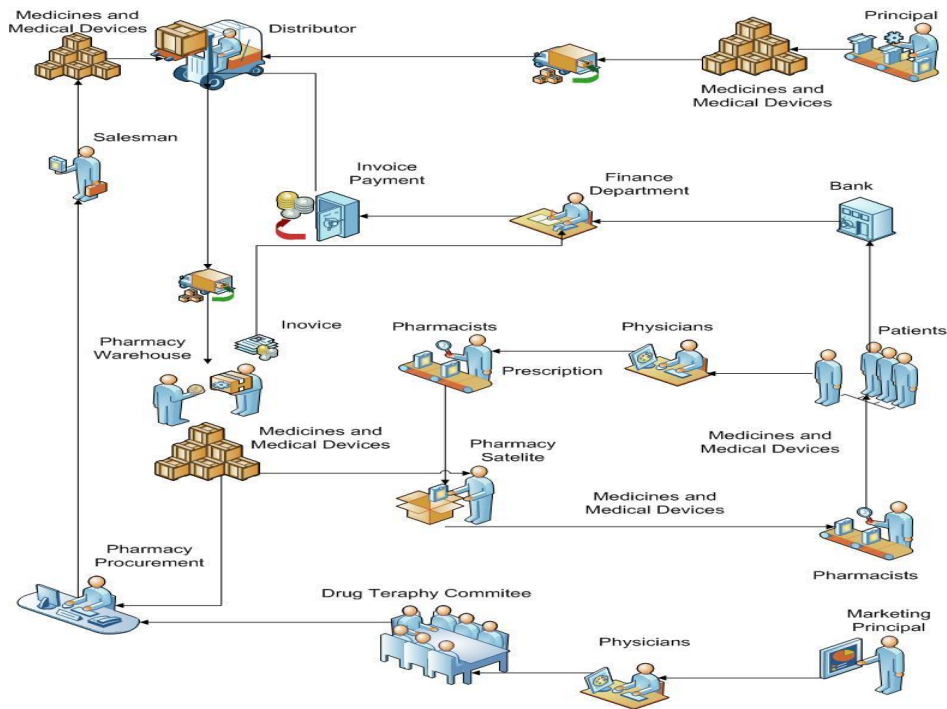


Figure 3. Business process of medicines and medical devices supply chain

Source: data mapping results

The next step was analysis, i.e. each of these risks was calculated on the scale of impact and probability, which was depicted in the following graph:

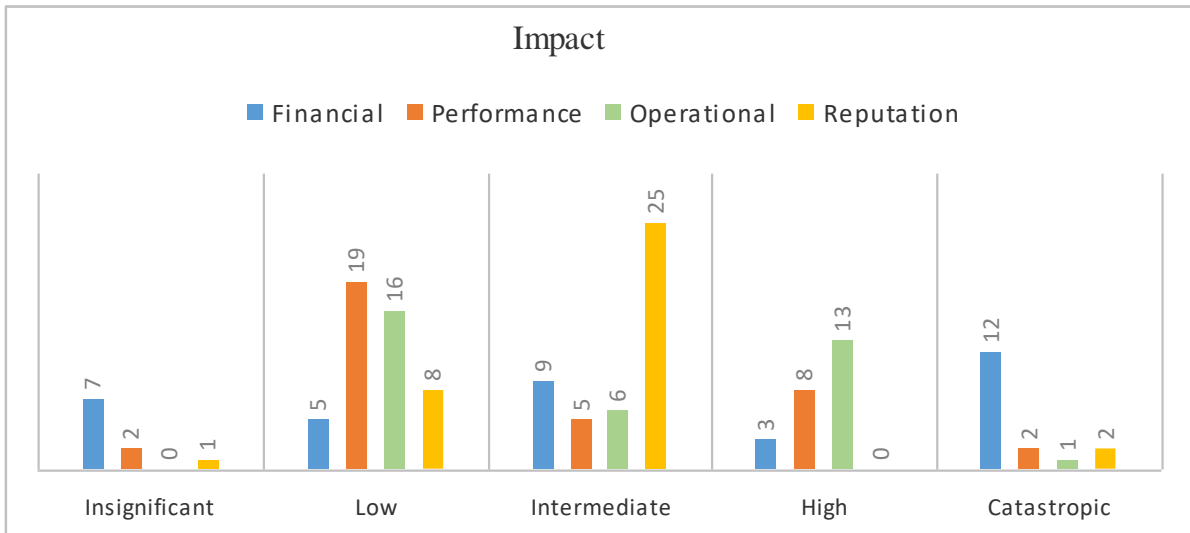


Figure 4. Risk Impact Chart

Source: data processing results.

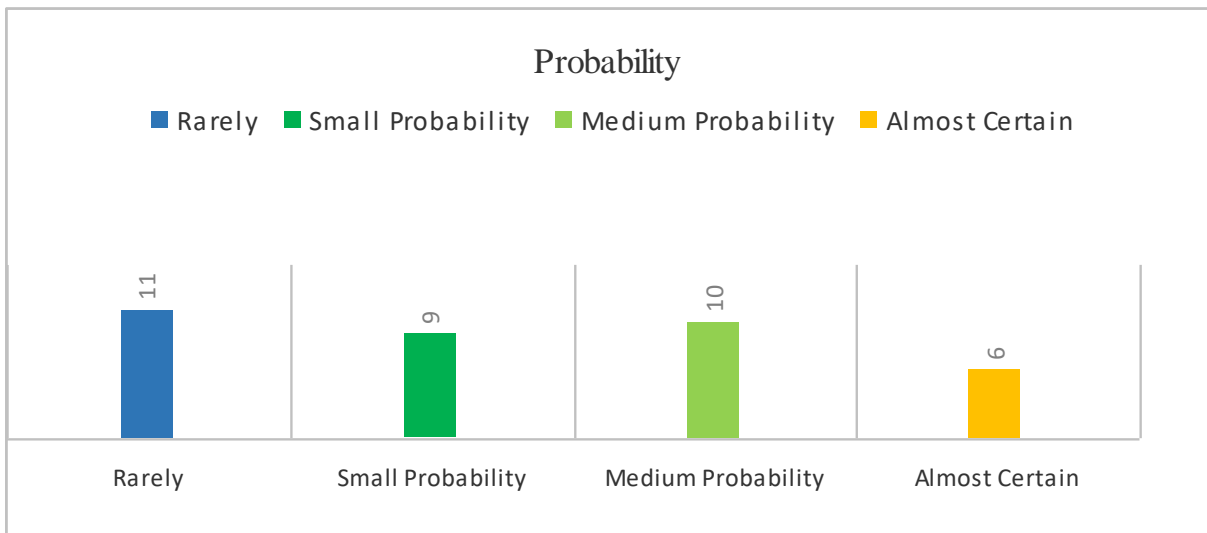


Figure 5. Probability Risk Chart

Source: data processing results.

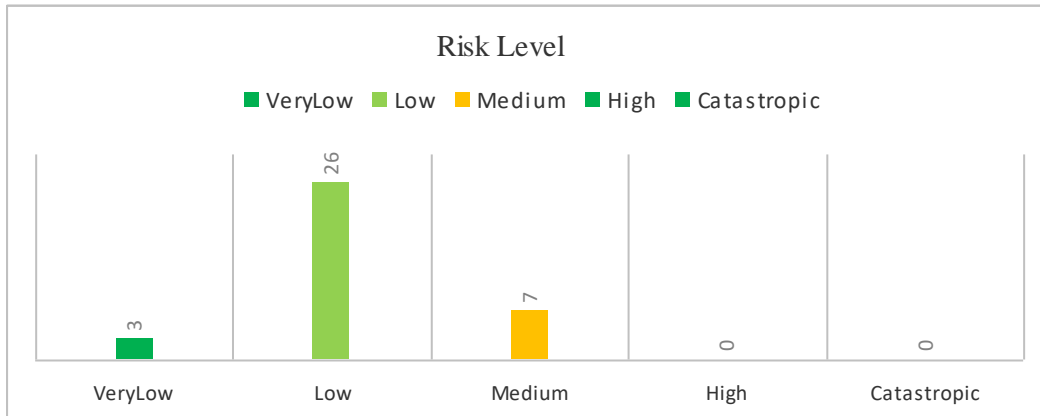


Figure 6. Risk Level Chart

Source: data processing results.

This study then conducted a risk evaluation by calculating the impact and probability of each of the 36 risks so that the risk level was obtained. Here are the levels of the risk, as presented in figure 6. The researcher mapped the risks before handling the risk, here was the matrix of the inherent risk, as presented in Figure 3.

Risk appetite

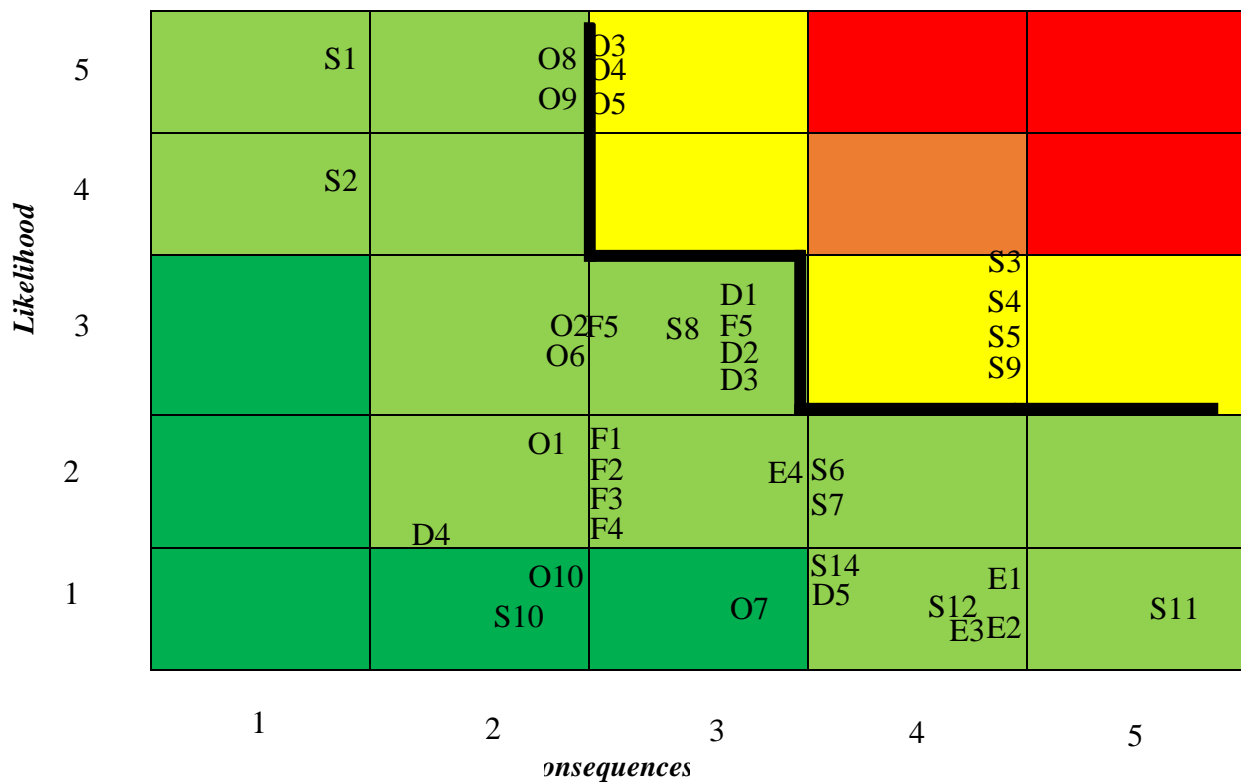


Figure 7. Matrix of Inherent Risk

Source: data processing results.

In this matrix, the risk management was carried out on S3, S4, S5, S9, O3, O4, and O5 risks because they were above the risk appetite. Before the mitigation, the mitigation researcher conducted a root cause analysis using the 7 why method and also a fishbone diagram. Mitigation that was carried out for O3 risk events is the dissemination of the policies for writing e-prescriptions and medical e-records by the leaders, revising the policy on the adjustment of stock-taking results, making SPOs in charge of drug shelves, making SOPs related to drug setup, and proposing additional computer facilities. Mitigation of S3 risk events included the communication and the feedback to the distributor, prioritizing the payments along with the financial department, and conducting regular distributor assessments every year. Mitigation S4 and S5 risks were giving feedback to the distributor and the regular assessments of the distributors every year. While risk mitigation S9 was giving feedback to the

The mitigation of O4 risk events is evaluating job descriptions for the employees, mapping the personnel during the peak hours, and creating the socialization programs related to LASA and Dispensing. In the O5 risk event, the mitigation carried out is making SOPs for tracking the stock-taking, making SOPs for checking drug shelves regularly, setting minimum and maximum values for embalage, and making socialization programs related to dispensing, general cleaning routine scheduling, procurement of drug storage facilities, improvement of access facilities. control of entrances, propose a redesign of outpatient and inpatient pharmacy satellites, and plan employee character development programs. After the risk mitigation was carried out, researchers compiled the matrix of residual risk as in figure 8, follows:

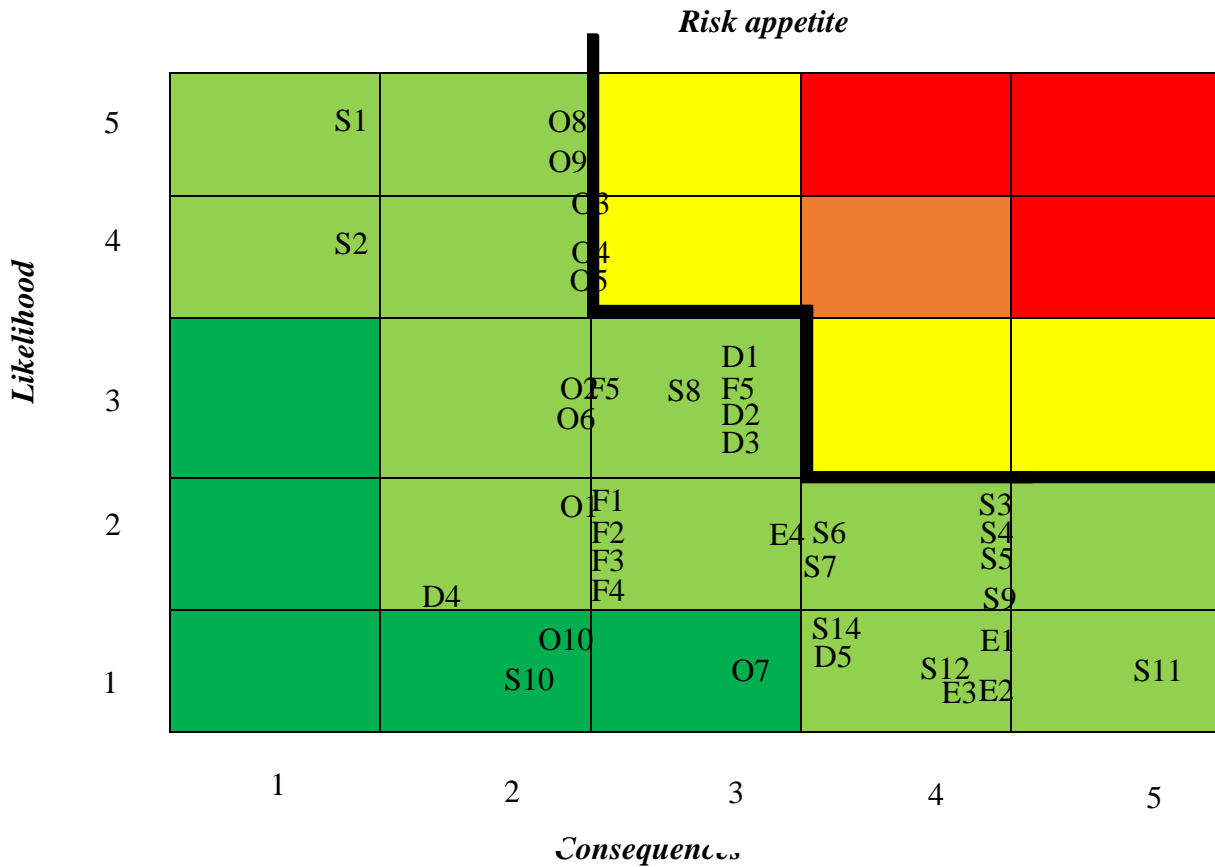


Figure 8. M
Matrix of Residual Risk

Source: data processing results.

Conclusion

Based on the results of the risk analysis and the risk evaluation, 36 risks were obtained consisting of the supply risk (12), the operational risk (9), the financial risk (5), the demand risk (5), and the environmental risk (4). The acceptable risks were 29 risks spreading out into the low-level risk (26) and the very low-level risk (3). Furthermore, the seven risks that were carried out in risk mitigations were the supply risk (4) and the operational risk (3). In this research, the supply chain risk mitigation conducted internally at the hospital included the preparation and socialization of policies, the preparation of new SOP, the socialization programs related to quality in service, character-development programs, and the addition of supporting facilities. Risk mitigation carried out with external parties, namely distributors, was communication and evaluation of the distributor performance. The program that was still in the proposal was a satellite redesign plan for outpatient and inpatient pharmacies. The risk mitigation in this study was expected to help hospitals to improve their performance.

References

- Alijoyo, A. (2011). *Memadukan Balance Scorecard (BSC) dan Enterprise Risk Manajemen (ERM)*. Retrieved from <http://www.crmsindonesia.org>.
- Bharata, R.W., Setyorini, D., & Isroah. (2019). Penerapan Balance Scorecard dalam Mengukur Kinerja Rumah Sakit Umum Daerah Wonosari. *Jurnal Riset Ekonomi Pembangunan (REP)*, 4(2), 174-189. Retrieved from website: <http://www.jurnal.untidar.ac.id/index.php/REP>.
- Hidayati, I.R., Satibi & Fudholi, A. (2013). Analisis Kinerja Instalasi Farmasi RSUD Kanjuruhan Kabupaten Malang dengan Pendekatan Balance Scorecard. *Jurnal Manajemen dan Pelayanan Farmasi*, 3(3), 191-196, September 2013. Retrived from <http://www.jurnal.ugm.ac.id>.
- ISO 31000: 2018 Risk Management Guidelines second edition. (2018). The International Organization for Standardization. Retrived from <https://www.iso.org/obp/ui/#iso:std:iso:31000:ed-2:v1:en>.
- Kaplan, R.S., & David P. N. (1996). *The Balanced Scorecard Translating Strategy Into Action*. USA: Harvard Business School Press Boston Massachusetts.
- Kopia, J., Kompala, A., Buchmuller, M., & Heinemann, B. (2017). Performance Measurement of Management System Standards Using the Balance Scorecard. *Amfiteatru Economics Journal*, 19(11), 981-1002. Retrived from <http://www.search.proquest.com>.
- Marselin, A., Satibi., & Wardani, P.E. (2015). Analisis Kinerja dan Pemetaan Strategi Instalasi Farmasi Menggunakan Balance Scorecard. *Jurnal Manajemen dan Pelayanan Farmasi*, 5(3), 171-178. Retrived from <http://www.jurnal.ugm.ac.id>.
- Monika, E.G., & Pangeran, P. (2020). 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. *International Journal of Multicultural and Multireligious Understanding*, 7(10), 616-628.
- Nugroho, R.L., & Pangeran, P. (2021). Improving The Performance of the Balanced Scorecard Thorough Implementing ISO 31000 Risk Assessment at Shofa Pharmacy. *Eureka: Social and Humanities*, 1, 23-36.
- Pradibta, A.A., & Yaya, R. (2018). Analisis Kinerja Rumah Sakit Umum Daerah Sleman Berdasarkan Balance Scorecard Setelah Penerapan Asuransi Badan Penyelenggara Jaminan Sosial Kesehatan.

Reviu Akuntansi dan Bisnis Indonesia, 2(1), 11-25. Retrieved from website: <http://www.journal.umy.ac.id/index.php/rab>.

Purwanto, H. (2016). Integrasi Manajemen Risiko dan manajemen Kinerja di Bank BJB. *Tesis*. Program Magister Manajemen Program Pascasarjana Universitas Katolik Parahyangan. Bandung.

Rahayu, R. (2018). Analisis Kinerja Instalasi Farmasi RSUD Palembang Bari dengan Pendekatan Balanced Scorecard Tahun 2017. *Skripsi, Prodi Ilmu Kesehatan Masyarakat (S1), Fakultas Kesehatan Masyarakat, Universitas Sriwijaya*,

Rangkuti, F. (2020). *SWOT Balanced Scorecard: Teknik Menyusun Strategi Korporat yang Efektif plus Cara Mengelola Kinerja dan Risiko*. Jakarta: Gramedia Pustaka Utama.

Rupita, A.J., & Heru K.T. (2018). Intention of Hospital Managers in Implementing the Balanced Scorecard. *Journal Medicoeticolegal dan Manajemen Rumah Sakit*, 7(3), 212-220. Retrieved from <http://www.journal.umy.ac.id/index.php/mrs>.

Safitri, R., & Pangeran, P. (2020). Balanced Scorecard and ISO 31000, Risk Management Integration to Improve Performance: Case Study at Indonesian Credit Union.

International Journal of Multicultural and Multireligious Understanding, 7(6), 527-538.

Susilo, L. J., & Victor R.K. (2018). *Manajemen Risiko, Panduan untuk risk leader dan risk practitioners, berbasis ISO 31000:2018*. Jakarta: PT Grasindo

Sugiyono. (2012). *Metode Penelitian Kuantitatif, Kualitatif dan R&D*. Bandung: Alfabeta.

Walker, P.L., & Shenkir, W.G. (2018). Enterprise Risk Management: Frameworks, Elements, and Integration. *Institute of Management Accountants*, Retrieved from http://www.imanet.org/thought_leadership.

Copyrights

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).