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Digital Transformation Business Strategy in Post Covid-19

RISK MANAGEMENT AT RURAL BANK WITH ISO 31000 APPROACH

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Abstract: The ISO 31000 risk management process can be carried out through setting goals and strategies, resources planning, organizational structure, the ability level of employees, creating an efficient system, and identifying risk, an analysis, evaluation, monitoring and review of risks can be found in rural bank. A qualitative research method and a descriptive approach used in this study to find out more about the suitability of the application of banking risk management carried out by BPR X to ISO 31000 guidelines. Based on the interviews with three informants who became the Top Management at BPR X, this study concluded that the type of risk which requires more attention by BPR X management is credit and operational risk. Poor customer ability to repay loans is at the core of the credit risk problem, while the failure of the loan system and placement of Human Resources implemented at BPR X is the key to the high operational risk and human resource placement faced by BPR X management.

Keywords: Rural Bank, Risk Management, ISO 31000

1. Introduction

A bank is a financial institution collecting funds, redistributing the funds to the public in credit, and providing services in payment traffic and money circulation (Kuncoro, 2002:68). In running their business, banks must collect funds from the public to channel these funds back to the community in the form of credit. On the other hand, banks must make profits by lending to the public to earn income and pay their obligations in the form of interest to customers who deposit funds. In general, several types of banks exist in Indonesia. One of them is the Bank Perkreditan Rakyat (BPR) that serves micro, small, and medium entrepreneurs within closed

locations.

Such banks are intermediary institutions. This function is closely related to risk because the flow of funds from the community will face uncertainty. The bank may fail in managing these funds to affect debtors, creditors, and institutions since they have deposited their funds or invest their capital in the bank. Risk is generally defined as uncertainty that can occur, resulting in various gains and losses (Bessis, 2009). So it is necessary to manage risk by keeping failure in working funds or losses from occurring. According to Monahan (2008), the risk is a loss caused by an event or event that can hinder the institution's goals. So the risks need to be managed thoughtfully.

Referring to the provision of Bank Indonesia No. 11/25/PBI/2010 amendment to PBI No 5/8/PBI/2003 dated May 19, 2003, about the Implementation of Risk Management for banks, eight types of risks must be managed or considered by banks. They are credit risk, market risk,



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operational risk, liquidity risk, compliance risk, legal risk, reputation risk, and strategic risk. Meanwhile, the implementation of risk management at BPR refers to POJK No. 13/POJK.03/2015. In this endeavor, banks face risks in raising funds where exchange rates and interest rates influence markets. The second may pose a market risk. The risk in sending credit means the counterparty's failure to fulfill its obligations.

Associated with the business, banks need to manage credit risk, market risk, and operational risk integrated with other threats to achieve the desired target. Banking risk management generally adopts the rules provided by Basel. The term 'Basel I' refers to a series of central bank policies worldwide published by the Basel Committee in 1988 in Basel, Switzerland, as a set of minimum capital requirements for banks. This recommendation was confirmed in the rules by the Group of Ten (G10) countries in 1992. Basel I was abandoned and replaced by a more comprehensive set of Basel II guidelines in several countries (Bank Indonesia, 2003).

Basel II is the second legal recommendation and banking regulation, as a refinement of Basel I. The committee recommends creating an international standard of banking regulators to determine how much capital banks must set aside to safeguard against financial and operational risks that banks may face. Through the implementation of Basel II, Bank Indonesia improves risk management so that banks are more resistant to changes domestically, regionally, and internationally (Bank Indonesia, 2003).

In September 2010, Basel III introduced a new method of calculating RWA for market risk, including changes to capital and modifications to liquidity risk, both short-term (Liquidity Coverage Ratio, LCR) and long term (Net Stable Funding Ratio, NSFR). The two liquidity standards complement the existing monitoring tools to supervise bank liquidity and compare interbank liquidity conditions. The Basel III capital and liquidity framework started in January 2013 (Said, 2018).

This research was conducted to determine: (1) How to use ISO 31000 to manage risk for rural banks (BPR) in an integrated manner?; (2) What are the stages of ISO 31000 risk management?; and (3) How can ISO 31000 risk management create and add value to the company?. The standard guide, instructions, and demands for an organization can build a foundation and framework for a risk management program. The foundation includes the rules, objectives, and commitments to create a comprehensive risk management program. The ISO 31000 framework reflects the Plan, Do, Check, Act (PDCA) circles commonly recognized in all management system designs. The framework develops a management system. Still, an attempt assists organizations in integrating risk management into the overall risk management system.

The eleven principles in ISO 31000 state that risk management aims to create value because of its contribution to achieving its objectives and improvement. Examples are compliances with laws, regulations, and financial reputation. Risk management also integrates the process within the organization and the responsibility of management. Risk management is part of decision-making that helps decision-making with sufficient information. Then, it can help decide whether a risk is acceptable and whether a risk treatment is adequate and effective. Risk management explicitly deals with uncertainty in decision making, tension nature, and how to handle it. Risk management is systematic, timely, and structured to efficiency and consistent, comparable, and reliable results. Then, risk management should refer to the best available information for recommendations using information sources, experience, observations, and expert judgment. Risk management relates to needs that are relevant to the company's shape and needs. It considers human and cultural factors, capabilities, views, and company goals internally and externally.

Moreover, risk management is transparent and inclusive. All stakeholders are involved in the risk management process to remain relevant and up-to-date. Risk management is dynamic, iterative, and responsive to changes with internal and external events, changes in knowledge,



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and the implementation of monitoring and review. New risks emerge, existing risks can change or disappear, so the company must ensure that risk management continuously monitors and respond to change. Risk management implements strategies to improve the maturity of their risk management.

In this study, BPR X uses the 3T principles in disbursing credit to the public, namely Right Time, Right Amount, and Right Target. The credit process at BPR X is relatively fast, with more specific requirements and a very understanding of customer needs. The types of services provided by BPR X are collecting public funds in time deposits from savings or other equivalent forms and giving credit in working capital loans, investment loans, and consumption Loans.

The main activity of BPR X provides loans. There are many types of lending, such as microloans (KM), mini-term installment loans (KABM), car ownership loans (KPM), Honda motorcycle ownership loans (KPSMH), and flexible loans for small-medium enterprises. Its mission is to provide banking services through a quality management system, service quality, talented human resources, and appropriate infrastructure to create customer loyalty in the company's growth and development. BPR X follows company regulations and Bank Indonesia to control risk management by performing an internal audit. The internal audit task is an operational auditing body for BPR X and reporting the effectiveness and efficiency of each section to the president director of BPR X.

2. Literature Review

Risk Management on ISO 31000

Risk Management Principles and Guidelines, ISO 31000 (2009) explains that all organizations face uncertainty. The impact of tension affecting the achievement of organizational goals is a risk. A company should appropriately manage uncertainty changes to achieve its plans. In general, non-banking business types apply ISO 31000. However, this study observed the application of ISO 31000 to BPR X to know its risks more thoroughly with clear stages.

Context Consideration

The first step in the risk management process is to determine the goals the bank wants to achieve. Its business can run smoothly if the bank supports an operational system. The bank achieves particular goals following its perceived target as its appropriate strategy is needed. Strategy is a careful planning plan to achieve specific activities. A particular method is required so that the resulting policies will be optimal to achieve company goals. Strategic risk management includes all activities to identify risks, solve problems, adapt to changes, and implement the plans.

The following are components of strategic risk management: 1) Objectives and strategies. Does the company have realistic goals and the right strategy to achieve these goals? 2) Resources to identify assets, labor, and other resources to solve problems or see opportunities. 3) Organizational Structure. Does the company have good staff and line of units under their duties? 4) The ability of employees. Do employees have good abilities and understand their responsibilities in carrying out their duties to achieve company goals? 5) System. Do communication lines between entities, operating systems, and delivery networks are structured to support operating efficiency? 6) Risk Identification. Does the company have an effective way to identify the impact of changes in economic conditions, competition, technology, laws, regulations, and other changes? These can affect the achievement of company goals (Rachmania and Purwanggono, 2018).



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Monahan (2008) defines that risk as the potential loss caused by events that can hinder company goals. The company can achieve its goals when it can manage risk. BPR X issued exceptional SOPs regarding Risk Management (SOP-S1.7 document revision 02, dated January 25, 2010) and Internal Audit SOP-I2.1 document revision 06, dated June 08, 2012) at the stage of determining this context. The purpose of SOP Risk Management is to ensure that the company can thrive without significant risks. There are only two supporting documents for this Risk Management SOP: market trends and liquidity data. Market trends and liquidity data are to determine deposit interest rates and determine lending limits.

Risk Assessment

As the law of Bank Indonesia PBI No. 5/8/PBI/2003 and the amendment No. 11/25/PBI/2009 about the implementation of risk management for commercial banks, there are eight risks that banks must manage. The eight types of risk are credit risk, market risk, operational risk, liquidity risk, compliance risk, legal risk, reputation risk, and strategic risk.

The risks related to market risk affecting the collection of third party funds, credit risk arising from customer failure to fulfill their obligations, and risk operations due to inadequate or malfunctioning internal processes, the human errors, system failures, and external events that affect bank operations (Basel II) and liquidity. There are several techniques to identify risk. In this case study, the risk is determined using a cause and effect analysis technique. Drawing on risk management and risk assessment methods (ISO 31010, 2009), the method is a structured method to identify possible causes of unexpected events or problems that occur. Cause and effect analysis by a team of experts understands the issues at hand.

The stages in the cause and effect analysis involve six ways (Meilania, 2014). Firstly, finding the effects of the events to be analyzed, the consequences can be positive (objective) or negative (problematic) depending on the circumstances. Secondly, categorizing causes shows in a fishbone diagram. The issue at hand considers the cause category. Thirdly, writing the possible causes of each primary type in branches to describe the relationship between them. Fourthly, asking why or what causes it to connect reasons. Fifthly, reviewing all results for verification purposes consistently and for analysis completeness for causes and effects. Last, identification can be obtained from the opinion of an experienced team and based on the available evidence. However, each technique has benefits and limitations, including the cause and effect technique. The first includes experts' support, structured analysis, reasonable hypotheses, and readable diagrams results to identify desirable or undesirable factors (Muniroh et al., 2020). While the limitations of the cause and effect include the possibility of the team having no sufficient ability to identify problem grounds, and the process in this method is incomplete. So the cause analysis is needed to create recommendations for brain-storming. There is a separation between the causal factors with the primary category before the investigation. The interaction between the causal classes is inadequate (Muniroh et al., 2020).

Risk Assessment

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3. Method

This study applied the qualitative method, and the researcher collected data through observation and interviews (Fitrah, 2017). The data collected with the qualitative approach to



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gain insight into the research objects. The observation and document analysis obtain an overview of the company's performance processes. The interviews were conducted with the leadership of BPR X to identify and assess a particular problem or situation as it is. The stages of research include (1) literature study from books and journals to understand the topic of discussion, (2) observation on the object under study, (3) interviews to get sources about the object under study, (4) data processing to proceed overall data from observations, (5) interviews under ISO 31000 Standard guidelines, and (5) Reports of findings on risk

4. Result and Discussion

As interview results in BPR X, several obstacles in achieving the company's goals are collecting funds, distributing credit, and operating BPR X to obtain profit. Each of these divisions has targets to achieve the company's overall targets. In the process of risk analysis, assessment occurs to find the impact risks.

Credit Risk Analysis

To find out the credit risk in BPR X, an interview with the Leader of BPR X, namely Mr. Muhammad Budi Malik (on April 20, 2020), was summarized into three results. The credit risk often occurs because over time. The debtor's financial condition worsens. The cash flow is unsuitable because of irregular funds in large amounts without receipts and no reserve fund for urgent needs. Second, many loans ultimately cannot be paid by the debtor because of the customers' evil character. They know their responsibilities to pay the bank, but they do not fulfill their duty. The customers mostly use the money for their business expenses. Last, unpredictable disasters can occur at any time. The debtor dies, the debtor's business getting fires, the theft occurs so that the customer cannot pay his debt to the bank. These are rare but can happen. Suppose a disaster strikes a customer. Therefore, those incidents will affect the customer's financial situation where credit failure can occur. The customers cannot fulfill their obligations at all.

As a result of the interviews, the most significant factor cause credit risk is managing risks to fulfilling customer credit obligations. It is influential in raising funds by offering competition for interest on savings or deposits between banks that affect market risk (See Table 1).

Market Risk Analysis

Findings of market risk refer to an interview result with the Deposit Supervisor of BPR X, namely Mr. Baihaqi Abdillah, on April 20, 2020. He convinces that BPR does have different interest rate provisions from banks other than BPR. Sometimes the interest rate in BPR is higher than the interest rate of private banks. However, nowadays, the interest rate provided by BPR is not much different from the interest rate of commercial banks. Many commercial banks give higher interest rates. This dramatically affects the public fundraising process. However, a few customers will move to commercial banks or other BPRs because of the difference in interest rates, even though it is only 0.5% (See Table 1).

Operational Risk Analysis

The other result goes on operational risk analysis as the interview result with a leader of BPR X, Mr. Muhammad Budi Malik (April 20, 2020). Four significant findings can hinder the operational activities of BPR X.



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Table 1. Risks of Credit, Liquidity, and Operational of BPR X

No	Activities	Risks
1	Credit	Debtor's worst financial conditions
2	Credit	Bad characters of customers
3	Credit	Customers' credit disasters
4	Market (funding)	Interest rate competition among banks
5	Operational	Unclear and firmed SOP
6	Operational	Employee's fraud
7	Operational	Unstructured recruitment
8	Operational	Operational System failure, offline system

Source: Processed Interview, 2020

The operational department firmly adheres to the bank's Operational Standards. Sometimes the SOPs are not clear for employees. Hence, they make mistakes in carrying out their work to disrupt operational activities. The SOP is also less strict, so the employees are less aware of the company's principles. Secondly, there have been violations, and fraud of employees in BPR X. Such employees are given severe penalties and fired since fraud can affect bank performance. Thirdly, operational activities should be dislocated because employees with certain positions and tasks cannot do their jobs properly. For example, tellers should be cautious since they work directly with physical money. Fourthly, a computer system or IT is an essential tool in operational activities. If the computer system does not work correctly, so the operational activities will be hampered. The offline system can make it difficult for both customers and employees. When there is trouble in the system, the banking activities can stop that cause customer disappointed with BPR X's services (See Table 1).

The interview results regarding credit risk, market risk, and operational risk are summarized below:

Risk Analysis and Risk Assessment

Risk analysis aims to identify the possibility and impact of risk. The probability of an event includes three approaches, such as (1) using situational knowledge to calculate probabilities; (2) applying historical data to identify past and current events to estimate future ones; and (3) reviewing the risks of the owner, expert or employees to view the possibility of events(Water, 2007).

In addition, the technique to carry out a risk analysis is a consequence or probability matrix. Referring to ISO 31010 (2009), it combines qualitative or semi-qualitative ratings of impact and probability to produce a risk rating. The process for generating a risk rating is by finding an appropriate impact on the situation and determining the possibility of that impact (Ramadhan, Febriansah, and Dewi., 2020).

Table 2. Risk Impact

Rating	Impact	
Low	Profit loss is approximate Rp. 100 million in a month	
Moderate	Profit loss is approximate Rp. 500 million in a month	
High	Profit loss is approximate Rp. 1 billion in a month	

Source: Processed Interview, 2020



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Tabel 3. Likelihood Risks

Rating	Impact	
Low	Occur up to once a month	
Moderate	Occur 2 to 3 times a month	
High	Occur more than three times a month	

Source: Processed Interview, 2020

Risk Treatment

Credit risk treatment related to incompetent debtor's business is to mitigate risk from BPR X.

a. Credit risk (Debtor's financial condition worsens). Credit risk occurs due to the debtor's failure to fulfill its obligations. One of the reasons for the debtor's loss to fulfill his commitments is that the debtor's business has decreased, thus affecting the cash flow of the debtor's company. In the end, the debtor cannot pay the monthly installments.

Table 4. Risk Assessment

No	Aktivitas	Risiko	Nilai Risiko
1	Credit	Debtor's worse financial condition	Moderare
2	Credit	Bad customer character	High
3	Credit	Debtor's disasters	Moderate
4	Market (funding)	Interest rate competion	Low
5	Operational	Unclear and firmed SOP	Low
6	Operational	Employee's fraud	Moderate
7	Operational	Unstructured recruitment	Moderate
8	Operational	System failure, offline system	High

Source: Processed Interview, 2020

BPR X has taken action to anticipate debtor failures by examining financial statements at the beginning of credit applications. The credit marketing team will be more effective by reviewing the debtor's financial condition every three months, not once a year.

- b. Credit risk (bad customer character). The customer is crucial in assessing the debtor, whether the customer is eligible for credit or not. Customer character assessment is at the beginning of doing credit analysis by looking at the customer's credit record at BI checking. If the customer has more than one credit, the customer is not eligible to become a debtor. Moreover, customers with bad character are not eligible to be given credit because it will be complicated for the bank to fulfill its obligations. Therefore, credit risk treatment of bad customer character is to avoid the risk.
- c. Credit risk on disaster to customers. Risk treatment for disasters that happen to customers takes mitigation actions. Therefore, BPR X has provided insurance to customers. Suppose a disaster occurs at the place of business used as collateral for the debtor. In that case, the bank does not bear the risk one hundred percent.
- d. Market risk (interest rate competition). In collecting funds from the public, the value of interest rates changes for customers to place their funds. Therefore, BPR X must adjust interest rates with competitors and see the bank's ability and elevate facilities and services. The risk treatment of market risk refers to interest rate competition.
- e. Operational risk (SOP) is not clear and firm. The operational risk is low and acceptable. However, this risk is by mitigating and controlling. If this risk is allowed to continue, it



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can harm the bank. New SOPs are about operational activities. BPR X needs to do socialization so that no operational errors can hamper banking activities.

- Operational risk on employee fraud. The fraud committed by employees harms the customer's finances that cannot be tolerated. The basis of a bank's business is customer trust. If the employee has committed fraud and harmed the customer, the customer's confidence has been violated and disappointed. Hence, the impact will be severe regarding the reputation of BPR X. If the importance of BPR X is horrible, it will affect the business in raising funds and lending. Customers will no longer entrust their funds to BPR X, and thus BPR X will not be able to extend credit to the public. BPR X's efforts will be paralyzed.
- Operational risk on unstructured recruitment. Recruitment is essential, so it is necessary to mitigate this risk. The mitigation process is to provide more detailed requirements when recruiting employees. HR must have good abilities in assessing prospective employees by giving strict assessment standards, for example, in the psycho test assessment of prospective employees. Moreover, the bank provides a clear list of job desks to employees to work more optimally.
- Operational risk on system failure. System failure occurs quite often, but the operational risk due to system failure is still acceptable to the bank. The mitigation process that BPR X must use a backup system when the central system cannot work. System failure, often known as the offline system, is closely related to customer satisfaction if BPR X often experiences an offline method. Then customer service will be hampered, and customer satisfaction will be affected—the destructive impact on BPR X. The worst possibility is that customers will not perceive to use BPR X banking services again.

5. Conclusions

The application of ISO 31000 in managing risk at BPR X begins with determining the context to achieve the target. The strategy in achieving the target is related to BPR X's efforts, collecting funds from the public, and distributing credit. So far, BPR X has carried out independent risk management in each of its business divisions. With the implementation of ISO 31000, BPR X can realize the overall risk and support the achievement of company targets. With risk management based on ISO 31000, BPR X can know what risks it faces and what appropriate actions to deal with emerging threats. By carrying out the risk management of ISO 31000, risks can be managed in an integrated manner. With the risk map, BPR X knows what poor problems have an impact on the bank. The credit risk refers to lousy customer character, and the operational risk affects system failure. Therefore, BPR X should take particular actions in managing credit risk due to lousy customer character. BPR X should not accept the risk because customer character is essential to assess credit approval. Due to system failure, BPR X must mitigate the operational risk by providing a backup system as a support and replacement system when the primary system fails.

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References

Bessis. 2002. Risk Management in Banking (2nd). England: John Wiley & Sons.



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e-ISSN 2746-5667

- Fitrah, M., 2017. Research Methodology: Qualitative Research, Action Research, and Case Study. Jawa Barat: Cv. Jejak.
- Gustini, D. W. dan Afriani, S. 2014. *Analysis of Risk Management at PT Bank Bengkulu Head Office. Ekombis Review.* 1(1): 105-121.
- ISO 31000. 2009. Risk Management Principles and Guidelines.
- ISO 31010. 2009. Risk Management Risk Assessment Techniques.
- John, J. 2009. Fundamentals of Enterprise Risk Management. American Management Association.
- Kuncoro, M. 2002. Banking Management: Theory and Application. Yogyakarta, BPPE.
- Mahardika, K. B., A. F. Wijaya, dan A. D. Cahyono. 2019. *Risk Management on Information Technilogy with ISO 31000. Sebatik.* 1(1): 277-284.
- Meilania, T. 2014. The Application of ISO 31000 in Risk Management in the Bank. *Jurnal Administrasi Bisnis*. 10(1): 17-32.
- Monahan, G. 2008. Enterprise Risk Management: a methodology for achieving strategic objectives. Hoboken: John Wiley & Sons.
- Muniroh, L., Y. Rahayu, A. Sirojun, M. N. Rabbani, E. Yusril, I. S. Roza. *Analisys of Risk Level at Garuda Jaya Garment with ISO 31000. Manajerial.* 19(1): 17-32.
- Peraturan Bank Indonesia No 5/8/PBI 2003 Tanggal 19 Mei 2003 about *Application of Risk Management on Bank*.
- Peraturan Bank Indonesia No.11/25/PBI/2009 Tentang Perubahan atas PBI No.5/8/PBI/2003 tentang Penerapan Manajemen Risiko bagi Bank Umum
- Peraturan Bank Indonesia Nomor 13/1/PBI/2011 Tanggal 5 Januari 2011 Tentang Penilaian Tingkat Kesehatan Bank Umum
- Rachmania, B. A. dan B. Purwanggono. 2018. Rekomendasi Penerapan Manajemen Risiko Berdasarkan ISO 31000. *Jurnal Administrasi Bisnis*. 21(1): 1-7.
- Ramadhan, D. L., R. Febriansah, dan R. S. Dewi. *Risk Management on Information Technilogy with ISO 31000* at Smart Canteen SMA XYZ. *JURIKOM (Jurnal Riset Komputer)*. 7(1): 91-96.
- Setiawan, A. B. 2015. Kajian Strategi Pengamanan Infrastruktur Sumber Daya Informasi Kritis. *Buletin Pos dan Telekomunikasi*. 13(1): 44-62.
- Undang Undang Republik Indonesia No 10 Tahun 1998 tentang perubahan atas Undang Undang No 7 tahun 1992 Tentang Perbakan
- Water, D. 2007. Supply Chain Risk Management: Vulnerability and Resilience in Logistic. Kogan Page Limited: London. UK.