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# Root Cause Analysis Using Fishbone Diagram: Company Management Decision Making

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*Abstract: This study aims to analyze the causes of delays in decision-making within the company. Managers can identify several constraints in decision-making by using analytical tools. In this study, the device used to analyze the problem is root cause analysis. Root cause analysis is used to determine the initial cause of the issues. The method used in the root cause analysis is a fishbone diagram where the fishbone diagram that can identify some of the problems that underlie the constraints in decision making. This study uses a qualitative descriptive method by taking data from interviews and documentation. The results of this study can be seen in decision making four problems underlie the inhibition of decision making. The problem is the first decision-maker; namely, the company's management is not wholly a determinant in making decisions. The second problem is that the information presented as a guide for decision-making is inaccurate, not timely, and irrelevant. The third problem is the absence of software that processes data into information needed by company management. The last problem is the lack of integration between divisions, so the resulting information is out of sync. Root cause analysis and fishbone diagrams, that was possible to analyze in detail the causes of delays in decision making. In the end, management can find solutions to each of these problems. Management will search each problem for the root cause, and the answer that they will give will be right on target so that the hope to minimize the obstacles to decision making will be implemented*

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## Introduction

In business, a management information system is a tool used to support processes, operations, evaluation, technology, and information. The management information system becomes a tool that can be used to transfer data and manage the resulting information. Management has a role in organizing and managing something so that company goals can be achieved by utilizing existing resources. A management information system is a set of processes from processing, analyzing, and presenting data to be used in decision making.

Decision-making is a leadership activity found at all levels and in all management areas. Generally made because of a problem or decision to solve/resolve an issue. Most of the problem analysis activities and troubleshooting results were analyzed by quantitative methods. In general, the problem is the lack of balance/match between what needs to be done and the current situation. Decision-making by company management is very crucial. The decisions taken will have an impact on the company both in the long and short term. For this reason, management in making decisions must be correct so that the company's goals can be met.

In decision-making, various obstacles affect the company's management in making decisions. Management makes decisions to solve problems that occur, but in making decisions, it often encounters several blocks that drive decision-making not run smoothly. Some of the obstacles that often arise include the first doubt from managers in making decisions. Both managers misinterpret the information obtained so that they make the wrong decisions. The third is making hasty decisions. Fourth is whether the information obtained is too much or too little. With too much information, the manager's point of view is too broad and non-specific, whereas if there is too little information, the information obtained cannot show all the actual conditions.

Management is responsible for making decisions, and this decision is an essential key to the sustainability of the company and the company's strategic position. In making decisions, company management must collect all information from all divisions and ensure that the information obtained is reliable and accurate. The right decision will bring the company to the company's goals well, but if the decision is taken wrong, then the company will experience unwanted things.

Decision-making to solve a problem requires thinking in a structured and analytical way. This process starts with the most basic steps of identifying the root cause of the problem. Although not infrequently, the decisions taken cannot solve the problem because the identification of the problem is not correct. This is exacerbated by uncertainty, changing circumstances, and precise calculations, which enable both decision-makers representing the organizations affected by the decision to measure and share the findings that need to be made.

Several basic steps can be used as a reference in making decisions using both quantitative and qualitative approaches. This process is briefly described as a cycle that begins with problem framing. At this point, the problem phenomena that arise are formulated, identified, and restricted so as not to spread. Then proceed with looking for data related to

the problem (gathering information) and analyzing further to draw conclusions that support decision making (reach conclusions).

In decision-making science, decision-making methods are divided into three environmental conditions. In other words, it is a decision under certain conditions—decision-making under uncertainty and decision-making under risk. Specific decision-making is explained by knowing the outcome of each decision. This is in contrast to a situation where there is uncertainty and risk. In an uncertain case, a lack of knowledge about the event or the types of events occurring and their implications makes decision-making even more difficult. In a risk-based condition, it is necessary to know the possibility of the occurrence of these conditions and the impact of these risks.

Finding the cause of the problem is vital after the trial is defined. One way that can be used is to use Root Cause Analysis. This analysis analyzes the problem by examining some of the existing root causes to find the root cause of the problem. Several commonly used tools, such as fishbones or cause-and-effect diagrams (Ishikawa), can describe and combine organizational or business issues in terms of business processes, people, tools, customers, etc., and combine them with the 5 Whys analysis.

This study analyzes the causes of decision-making by management that cannot be carried out optimally. Research that is often done mostly explores strategies and techniques in the decision-making process by management. Sometimes the company's management even though they have used decision-making techniques such as the first Delphi technique, namely the technique of submitting to experts and specialists to predict a condition in the future; both nominal techniques where several people gather to provide opinions (surveys) without going through communication; and lastly, electronic methods that mix nominal techniques using specific electronics/applications, but still the results of the decisions taken are less than optimal or not on target. In the decision-making process, management often pays attention to the company's techniques, methods, and strategies in making decisions. When the decisions are taken are less than optimal, it will have an impact on the company. In making inappropriate decisions so that they do not repeatedly occur in a company, the causes of decision-making errors are analyzed. The novelty of this research is that there is little that discusses how to study from making decisions that are not right by drawing the problem to the root of the problem to determine the solution of each generated situation.

In a manufacturing company where the company's management experiences complex problems, the decision-making process must be precise and accurate. This research takes the object of one of the local cigarette companies in Bondowoso. The company's management in this cigarette company often has difficulty making decisions. Several times the decisions taken were not correct and did not go well. This study aims to identify the root causes of problems in decision-making by company management using root cause analysis.

## Research Method

This study used qualitative research methods. Qualitative research can be understood as a research method that uses descriptive data in the form of written or spoken language

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from observable people and actors. Qualitative research is conducted to explain and analyze individual or group phenomena, events, social dynamics, attitudes, beliefs, and perceptions. Therefore, qualitative research begins with the development of fundamental assumptions and principles of thought used in the study. The data collected in the survey is then interpreted. Data analysis in qualitative research is defined as the researcher's attempt to systematically find and organize records from observations, interviews, etc., to better understand the investigated case and present it as a result. Qualitative data analysis is integrated into data collection activities, data reduction, data presentation, and concluding research results. They are collecting data in the study using interviews and data documentation. The research was conducted at the Gagak Hitam cigarette factory in Bondowoso, East Java.

**Result and Discussion**

PR. Gagak Hitam is a local privately owned cigarette factory with a marketing area in Bondowoso. PR. Gagak Hitam has complete divisions starting from the production division, marketing division, finance division, HR division, and general. Each division has various issues and requires attention from management. The company's management is led by a director who the company's commissioner appoints. In running the company, the manager of each division will provide reports and discuss with the company's core management to resolve problems. Decision-making by management is an essential requirement for every division. Decision-making by management must be carried out appropriately, quickly, and accurately to overcome any problems that occur in each division.

In one of the most critical functions of management, decision-making, leaders spend most of their time reviewing the decision-making process. The higher the individual's position in the organization's leadership, the more decisions that need to be made. The behaviour and attitudes of decision-makers in the decision pattern significantly influence the behaviour and attitudes of employees. Decision-making results from solving problems, answering questions as the law of the situation, choosing from available options, and stopping the process of thinking about the issue or problem at hand. The factors that influence decision-making in the context of decision-making, in this case, are decision-makers. These, namely management positions, can be seen from the strategic, policy, regulatory, organizational, or technical point of view. The second factor is a deviation from the problem that hinders achieving goals, hopes, plans, desires, and needs to be solved. The third factor is that all the general condition factors are interrelated and affect each. The fourth factor is conditions such as resources. The last element is the goal. The goals to be achieved are fixed or defined for an individual, unit, organizational, and general company purposes. Based on the results of interviews and several reports obtained when conducting research using the fishbone diagram method in Root Cause Analysis, it can be described the problems in decision-making by management within the company.

Root Cause Analysis (RCA) is a process used to understand, solve, and find out when problems occur from the start. RCA is useful for avoiding future failures by pinpointing the

cause of the problem. RCA identifies the origin of the problem using specific processes with related tools to find the leading cause of the problem (Gozali et al., 2020).

RCA is a solution to problem technique that seeks to identify the factors that cause problems or unexpected events. Root cause analysis is a way to answer the questions "what happened", "how did it happen", and "why did it happen". The primary purpose of this method is to identify factors that are represented in the form of type, size, location, and time as a result of certain habits, behaviours, and conditions that need to be changed to avoid unnecessary errors. Accurate and systematic results can be obtained by identifying the root causes of residues using the root cause method (Wibowo et al., 2018). The RCA process consists of five separate steps: defining problems, collecting data, analyzing data, identifying root causes, and identifying corrective actions (Groot, 2021).

Identify which problems require handling and provide solutions to resolve the problem. RCA provides a detailed description of the root cause of a problem. The problem-solving model developed by Andersen and Fagerhaug consists of seven stages, namely (a) problem understanding; (b) problem cause brainstorming; (c) problem causes data collection; (d) problem cause data analysis; (e) root cause identification; (f) elimination problems; and (f) solution implementation (Mega Astuti DR et al., 2019).


Figure 1. RCA Problem Solving Model

RCA methods often used include Fishbone Diagram, Pareto Analysis, 5Whys, Brainstorming, Failure Mode Effect Analysis (FMEA), and Six Sigma (Susendi et al., 2021). The first method is Fishbone Diagram. Fishbone Diagram in its stages of identifying causes using 4M and 1E categories, namely Man associated with the user, method relating to the procedure or system used, Machine is the equipment used; Materials is the material used, abused and Environment circumstances or conditions that occur (Liliana, 2016). The advantage of the Fishbone method is that it provides a theoretical framework that can represent analyzing the root causes of problems (Mario Coccia, 2017). Fishbone Diagram has a drawback, namely that the data display used is qualitative and cannot facilitate the analysis

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of the potential root cause correlation between each 4M and 1E category (Yuniarto et al., 2013).

The second is Pareto Analysis, where Pareto identifies problems and classifies problems according to their significance. The result is a histogram sorted from highest to lowest (Magar & Shinde, 2014). The advantage of this method is that it can determine the main problem so that it can be solved first. Like the Fishbone Diagram, Pareto Analysis only uses qualitative data (Sarkar, 2018).

The third method is 5Whys. 5Whys identifies the relationship of the root causes of different problems by asking why these problems occur (Ding et al., 2013). This method is straightforward and is often used in solving problems (Sondalini, 2011). The disadvantage of this method is that it can only be used for simple issues (Card, 2017).

The following method is Brainstorming, where this method collects every idea from each individual in the group to solve the problem. The advantage of this method is that it gets a lot of input for solutions to each issue, but the time needed for discussion and problem solving is also a lot (Kumbhar, 2018).

The fifth is the Failure Mode Effect Analysis (FMEA) method which uses probability, estimates, and the level of risk criteria to develop a Risk Priority Number (RPN) which is used in determining rankings in problem-solving (Rana & Belokar, 2017). This method's advantage is that it identifies and assesses problems and assists decision-making based on the RPN. The disadvantage of this method is that it uses different parameter calculations, making it difficult to determine the risk value (Dahooie et al., 2020).

The last method is Six Sigma. This method uses a model known as DMAIC (Define, Measure, Analyze, Improve, and Control) (De Mast & Lokkerbol, 2012). The advantage of this method is that it uses statistical data to focus on preventing problems rather than solving them. This requires a long-term and sustainable commitment within the company and a complex analysis system for statistical data (Antony, 2012).

In this study, the RCA method used is a fishbone diagram. Fishbone diagrams are also called Ishikawa diagrams which show cause-and-effect relationships. This diagram relates to productivity and management, so it can be used to establish causal factors. Prof. Kaoru Ishikawa introduced this diagram at Tokyo University in 1953 (Handayani & Susilowati, 2021). Fishbone diagrams help show the main factors that affect the quality and impact the problems that occur and can see more detailed aspects that influence and have a relationship with the main factors in the issue. The main causal factors in this causal diagram are material (raw materials), machine (machinery), man (labour), method (method), and environment (environment). These primary factors can be detailed to determine the cause of the problem (Saori et al., 2020).

The stages in making a fishbone diagram are as follows: first, determine the problems. The second step is determining the main categories or factors that cause the pain. The next step is to identify the cause of the problem. Finally, analyze the problem with a diagram (Hisprastin & Musfiroh, 2020). The benefits of fishbone diagrams include being able to use actual conditions to improve product or service quality, being more efficient in the use of

resources, and being able to reduce costs; can reduce and eliminate conditions that cause non-conformance of products or services and customer complaints; can make a standardization of existing and planned operations and can provide education and training for employees in decision-making activities and take corrective actions (Pebrianti et al., 2021). Fishbone diagrams are used to identify and organize the possible causes of a specific effect and then separate the root causes. The advantages of using the fishbone diagram method are (Eviyanti, 2021) are the first allows thoughtful analysis to manage the root causes of a problem; both fishbone techniques are easy to apply and create easy-to-understand visual representations of reasons, cause categories, and needs; thirdly by using a fishbone diagram, we can focus more on identifying risks on the "big picture". This is useful in analyzing the possible causes of the problem or the factors that influence the issue. Finally, from the root causes that have been found, further analysis of the reasons can be carried out. Then a solution can be found to solve the existing problem by solving the root of the problem.

Fishbone diagrams are handy for organizations that implement knowledge management. Collecting group ideas systematically can help management understand and diagnose the organization's problems. Fishbone diagrams are handy for organizations that implement knowledge management. Collecting group ideas systematically can help management understand and analyze the organization's problems.

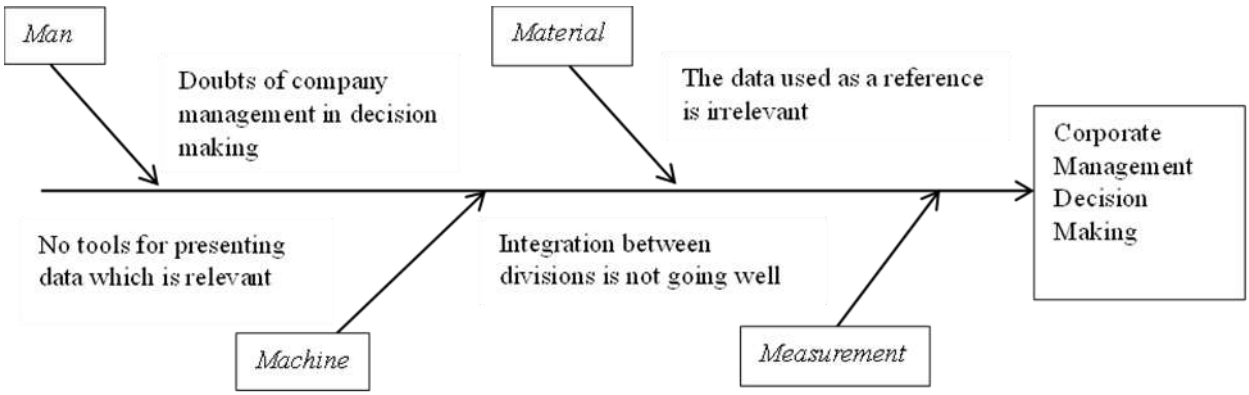


Figure 2. Fishbone Diagram

Explanation of FishBone diagram for enterprise management decision-making problems is the first problem Man or users of data visualization in decision-making. In this company, where the company owner is still an individual in making decisions, the company management is filled with doubts about acting decisively. Often the company's management in making decisions takes a long time for only short-term choices. Management in decision-making is not the final determinant but is a bridge that connects the company and the owner. The owner of the company is the final decision-maker. The owner's lack of understanding of the data reported by management is a problem that often causes long decision-making, even for urgent company problems.

The second problem is materials related to materials or information needed by company management in making decisions. Often the data presented is too much and not appropriately grouped. This makes the company management confused in reading and

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understanding the data presented. So that the decisions taken are often inappropriate because the data or information offered is irrelevant. The problems experienced by this company regarding information do not meet good quality information, which includes inaccurate, outside, and not timely data.

Information that should be reported has three qualities of good news. The first is accurate; the data must be free from errors and not biased or misleading. Proper also means that information must reflect the intent. The information must be correct because, from the source of information to the recipient, many disturbances may change or damage the data. The second is on time; the knowledge that arrives at the recipient should not be late. Outdated information will have no value anymore because the information is the basis for decision-making. The third quality is relevant, which means that the information has benefits for the user. The relevance of the information for one person to another is different—the value of information related to decisions. If there is no decision, then the data becomes unnecessary. Findings can range from simple repetitive decisions to long-term strategic decisions. The primary function of information is to increase knowledge or reduce the uncertainty of information users. So that information is crucial in decision-making.

The next problem is the Machine or tool used in presenting the data needed by company management. The information presented cannot describe the real-time condition of the company. This is due to the absence of tools or software that helps in giving data that is attractive and easy to understand by company management. This problem is related to the second problem, namely relevant information. Most of the data obtained by this company are still manual. Data is recorded manually and entered into reports using Microsoft excel. The information generated from data processed using excel cannot describe in detail as expected by management in the decision-making process.

The last problem is a measurement, where the divisions within the company are not yet integrated, causing differences in information data for the same thing. This may result in invalid information due to data discrepancies. To solve these problems, the company must have a dashboard that displays relevant data from each division to make decisions easier for company management.

The importance of an integrated system within the company not only affects each division but is very important in presenting information to management. In making decisions for a division, company management must consider the effect that decision has on other divisions. This is where the role of integration between divisions is. If the integration of information, for example, goes well, when making decisions, management can make decisions quickly and accurately just by looking at the data from each division's report. However, if the information for each division is not integrated and has different information, it will add new problems in making decisions for other issues.

The condition in the company today is that the data obtained and presented to the company's management to become a guide in making decisions are not well integrated, not shown in an attractive and not easy to understand, and invalid data. This raises the risk of errors in decision-making, resulting in problems in the company's operational activities.

## Conclusion

In making decisions, company management must have qualifications, including firstly, and the decision-maker is the right and qualified person. Second, the information obtained is data that has been appropriately processed and becomes information that has a quality that is accurate, timely, and relevant. Third, the news reported must be integrated with all divisions within a company. When the qualifications of the decision-making process have been met, the decision-making in problem-solving carried out by the company's management will be right on target.

From the analysis results using RCA and fishbone diagrams, the problems that occur in decision-making can be seen in detail. The solution to each problem found in the fishbone diagram can be determined so that the decisions taken will be right on target and can solve the main issues in the company. The resulting solution is expected to be able to minimize the obstacles that occur in decision-making in the future.

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