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The Development of Industrial Fuel Sales Dashboard with Microsoft Power Business Intelligence in Corporate Sales Function PT Pertamina Patra Niaga Jatimbalinus

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Abstract— This research aims to develop daily reporting features in the sales dashboard using Microsoft Power BI, expanding upon the previous dashboard features, which consisted of monthly and annual reports. This study employed the action research method. Data collection was carried out by distributing questionnaires to measure the effectiveness of the daily reporting dashboard, using User Acceptance Testing (UAT) based on the ISO 9126 dimensions. The results of this research indicated that all UAT indicators (functionality, reliability, usability, and efficiency) were rated as very good. This suggests that the developed daily reports are highly effective in supporting management in making daily sales business decisions. It is expected that the daily reporting features, which consist of the daily MOPS report, daily sales volume, and daily forecasting per plant, can be utilized to monitor the company's real time daily industrial fuel sales data, improve the management team's key performance indicators, and enhance customer service excellence.
Keywords: *Data Monitoring, Sales Data, Sales Dashboard, Microsoft Power Business Intelligence.*

I. INTRODUCTION

A. Research Background

In a company, monitoring sales data plays a very important role, particularly for decision-making within various functions of the organization. Monitoring is the process of systematically collecting and presenting information related to the achievement of specific goals. In this context, the information presented pertains to sales data. [1] Through sales data monitoring activities, companies can track, monitor, and analyze the percentage, as well as the increase or decrease in sales, employee performance, and various influencing factors. In the era of digitalization and rapid technological development, the use of Business Intelligence (BI) technology serves as a highly relevant solution.

One of the popular and effective Business Intelligence (BI) tools is Microsoft Power BI. Developed by Microsoft, Power BI can be used for several purposes in business intelligence, including: (1) extracting, transforming and analyzing large volumes of data; (2) building relational models to combine data from various sources; (3) defining complex calculations using Data Analysis Expressions (DAX); and (4) creating interactive reports and dashboards for data visualization. In addition, Power BI offers other advantages, such as the Query Editor, a tool that enables users to collect and transform data efficiently. The data utilized can originate from various locations and sources, including text files, Excel files, databases, and even the internet. [2]

In the Microsoft Power BI application, various features are available to create a sales dashboard. This dashboard presents processed sales data in the form of various types of graphs, complemented by slicers that allow users to display specific data within a selected time period. Another advantage of the Microsoft Power BI dashboard is its ability to present real-time data with each update of the data source. Additionally, Microsoft Power BI utilizes DAX

Intelligence for calculations, enabling the production of more accurate data. [3] Therefore, the development of Microsoft Power BI applications serves as an effective solution to assist companies in monitoring sales data.

The purpose of Business Intelligence (BI) is to provide decision-makers with accurate information, enabling them to make informed decisions in managing the business. BI offers several key advantages, including eliminating assumption based tasks by delivering precise historical data. Additionally, BI aids in identifying business opportunities by revealing trends in market conditions. It also enhances understanding of consumer behavior, supports the setting of realistic goals, identifies opportunities for cross-selling and up-selling, and ultimately improves overall operational efficiency. [4]

The primary objective of Business Intelligence (BI) is to deliver high-quality information to support managerial decision-making. This is accomplished through a two-stage process: first, by identifying, collecting, storing, and maintaining data; and second, by retrieving, processing, and presenting the data in a form that is meaningful and useful for decision-makers. Decision-making is a fundamental aspect of leadership and is the responsibility of both managers and employees to ensure the company's continued operation and growth. Therefore, managers and employees at the managerial level must prioritize the importance of making high-quality decisions in the company's operations. [5]

Corporate Sales Jatimbalinus previously had a sales dashboard using Microsoft Power BI, which included several pages such as the Main Dashboard, Annual Reporting, and Monthly Reporting. Following organizational changes and requests from Top Management, there was a need to develop the Industrial Fuel sales dashboard by adding a Daily Reporting feature. The Daily Reporting feature will include tables and graphs of daily realizations, consisting of consumer names, purchase amounts, and price percentages. Through this feature, Corporate Sales Jatimbalinus can monitor which consumers made a realization on a given day and which did not. They can then directly follow up with consumers who have not made a realization to determine the reasons. This enables Corporate Sales Jatimbalinus to maintain and increase their Industrial Fuel sales. Based on the description above, the researcher decided to conduct a study titled "The Development of Industrial Fuel Sales Dashboard with Microsoft Power Business Intelligence in the Corporate Sales Function of PT Pertamina Patra Niaga Jatimbalinus."

Based on the research background described above, the problem formulation is: How can an effective Industrial Fuel Sales Dashboard be developed using the Microsoft Power Business Intelligence application in the Corporate Sales Function of PT Pertamina Patra Niaga Jatimbalinus?

Based on the problem formulation, the objective of this research is to develop an effective Industrial Fuel Sales Dashboard using the Microsoft Power Business Intelligence application within the Corporate Sales Function of PT Pertamina Patra Niaga Jatimbalinus. To achieve the research objective of developing an effective Industrial Fuel Sales Dashboard, it is essential to focus on data visualization, which serves a fundamental role in data analytics.

Thus, to gain a clearer understanding of the data, visualization becomes essential. In the era of big data, data visualization stands as one of the fundamental aspects of data analytics. The concept of "data visualization" encompasses all efforts to enhance human comprehension of data by presenting it within a visual context. It aids data scientists and engineers in tracking data sources and conducting basic exploratory data analysis. By representing data graphically, data visualization becomes an indispensable tool, enabling decision-makers to quickly and accurately identify distributions, patterns, and trends.

II. METHOD

The scope of this research includes the 2024 Industrial Fuel sales data, agent list data, and the industrial Fuel sales team. The research employs an Action Research method and focuses on analyzing the sales dashboard users, marketing specialists, and IT specialists. Primary data is obtained directly from the Jatimbalinus Corporate Sales Function, while secondary data is sourced from books and journals related to sales dashboards, business intelligence, data monitoring, and decision-making. Observations are conducted on organizational changes related to Industrial Fuel sales data, which influence the development of the sales dashboard. Interviews are carried out through direct questions and answer sessions, tailored to gather the necessary information for creating the sales dashboard.

The questionnaire, based on the User Acceptance Testing (UAT) method and guided by the ISO 9126 dimensions, is designed for users, marketing specialists, and IT specialists. The ISO 9126 dimensions used as measurement indicators include functionality (suitability, accuracy, security, interoperability, and compliance), reliability (maturity, fault tolerance, and recoverability), usability (understandability, learnability, operability, and attractiveness), and efficiency (time behavior and resource behavior).

The UAT process begins with documenting the business requirements, followed by outlining the business process (workflows) or scenarios, and concludes with testing using data. Effective testing is crucial in the

development of applications or information system to ensure that the final product is delivered to users on time and aligns with their needs. [6]

In this research, the analysis of effectiveness measurement was conducted using ISO 9126 formula and the Likert scale. The score data that obtained from distributed questionnaires will be calculated using the ISO 9126-dimension measurement formula, as outlined below [7]:

$$\%\text{Actual Score} = \frac{Actual\ Score}{Ideal\ Score} x100\%$$

The actual score represents the total of all responses given by the respondents on the questionnaire, while the ideal score assumes that all respondents select the highest possible score of all answers.

The questionnaire assessment uses a Likert Scale to evaluate respondents' levels of agreement with various statements. The scale is as follows: Strongly Agree = 5, Agree = 4, Neutral = 3, Disagree = 2, and Strongly Disagree = 1. Additionally, the Likert Scale is used to calculate the effectiveness test scores based on the ISO 9126 dimensions. The total percentage score is then categorized into different effectiveness levels: 20.00% to 36.00%: "Not Good," 36.01% to 52.00%: "Not Good," 52.01% to 68.00%: "Fair," 68.01% to 84.00%: "Good," and 84.01% to 100%: "Very Good."

III. Result and Discussion

On June 13, 2020, PT Pertamina Patra Niaga was appointed as the Sub Holding Commercial & Trading of PT Pertamina (Persero) virtually, with the official legal end-state occurring on September 1, 2021. In addition to managing PT Pertamina Patra Niaga's existing business operations, including trading, fuel handling, and fleet and depot management, the Sub Holding Commercial & Trading is responsible for overseeing PT Pertamina (Persero)'s downstream business chain activities. Corporate Sales Jatimbalinus a division of PT Pertamina Patra Niaga responsible for the sales of Industrial Fuel and Petrochemical products through B2B transactions in the Jatimbalinus region. The division has developed sales dashboards to monitor and report sales data using Business Intelligence.

The implementation of action research in this study began with preliminary observation. In this stage, it was identified that, due to organizational changes and requests from Top Management, it was necessary to enhance the existing sales dashboard by adding daily reporting features, including the daily MOPS report, daily sales volume, daily forecasting per plant, and sales Pareto analysis. Previously, the Industrial Fuel sales dashboard only featured the Main Dashboard, MoM vs Last Year, MoM Analysis, Top 10 Consumer, Real vs Target, and MOPS & HPP, which were used for monthly, quarterly, and annual reporting. However, due to organizational changes in the Industrial Fuel business, it has become necessary to develop the dashboard further so that it can be used more effectively as a tool for data monitoring and decision-making.

Therefore, at the planning stage of developing the Industrial Fuel sales dashboard, data extraction will be carried out, transferring the data originally stored in Microsoft Excel into Microsoft Power BI. Once the data is extracted into Microsoft Power BI, it will be processed and visualized using graphs, tables, and slicers across several pages, according to the needs of the Jatimbalinus Corporate Sales function for monitoring industrial fuel sales data. The pages to be created include daily MOPS report page, Daily Sales Volume page, Plant Forecast page, and Sales Pareto page.

After the planning stage is completed, the next stage is action. At this stage, the execution of the dashboards design is carried out using the Microsoft Power BI application. At the observation stage, an offline questionnaire will be distributed in hard copy form to several predetermined respondents, including 10 dashboard users, 2 computer experts, and 2 marketing experts. They will assess the dashboard based on effectiveness criteria using the UAT method and ISO 9126 dimensions, focusing on its function as a monitoring and decision making tool through the designed dashboard display.

Based on the analysis results at the observation stage, it was concluded that the respondents, namely the dashboard users, assessed that the dashboard functioned effectively and met user requirements. This is evidenced by the majority of users providing "Agree" and "Strongly Agree" responses to the effectiveness indicators presented across various aspects. Therefore, it can be concluded that no further testing is necessary.

The Industrial Fuel Sales Dashboard for the Corporate Sales Jatimbalinus function was developed to provide an effective tool for monitoring sales data and supporting decision making based on existing facilities. In the development of this sales dashboard, additional daily reporting features were introduced, divided into two pages: the Daily MOPS Report and the Daily Sales Volume. A plant forecasts page was also added. Furthermore, the Industrial Fuel Sales Dashboard is now equipped with a homepage feature, allowing users to navigate directly to the desired page.

The research results show that the sales dashboard performs exceptionally well across all evaluated ISO 9126 dimensions. Functionality received a score of 88.28%, categorized as "Very Good." Reliability was also rated "Very Good," with a score of 87.14%. Usability achieved the highest score of 94.29%, reflecting "Very Good" performance in making the dashboard easy to understand and operate. Lastly, Efficiency scored 87.86%, also placing it in the "Very Good" category. Overall, these results demonstrate that the sales dashboard is highly effective in meeting user needs.

In this research, the effectiveness of the dashboard was tested by distributing questionnaires to several respondents, the majority of whom were users of the sales dashboard. The questionnaire was developed based on system effectiveness theory using UAT method and the ISO 9126 dimensions. Through this approach, it could be determined whether the developed sales dashboard was effective as a tool for monitoring and decision making. In the ISO 9126 dimensions, several indicators are used to assess design effectiveness, including functionality, reliability, usability, and efficiency. Then respondents involved in the questionnaire assessment included 10 dashboard users, 2 marketing specialists, and 2 IT specialists. Based on the results of the action research conducted, it was found that the developed dashboard can be effectively used as a tool for monitoring and decision making for the Industrial Fuel team of the Jatimbalinus Corporate Sales function. This is evidenced by the questionnaire results, where each indicator achieved a percentage score above 81% which falls into the "Very Good" category.

The research has significant implications for improving sales monitoring and decision-making processes. The sales dashboard plays a crucial role by providing leaders with easy access to sales data, enabling them to track performance across various time frames—daily, weekly, monthly, and yearly. This real-time access facilitates swift evaluation and allows for timely adjustments in sales strategies for future periods, ultimately enhancing overall operational efficiency. Specifically, the Industrial Fuel sales dashboard within the Jatimbalinus Corporate Sales function offers real-time visualization of sales data through various graphs, tables, and other visual tools, making it an effective tool for data monitoring and decision-making. For future research, it is recommended to enhance the dashboard by enabling access via other devices, such as smartphones and tablets. This would allow leaders to monitor sales data anytime and anywhere, further improving flexibility and responsiveness in managing sales operations.

This research was conducted using the action research method, which included the stages of planning, action, observation, and reflection. To assess the effectiveness of the dashboard, questionnaires were distributed to dashboard users, marketing experts, and IT specialists. The results of the effectiveness test showed that each indicator scored over 80% indicating that the dashboard is highly effective. This demonstrates its strong capability as a tool for data monitoring and decision making within the Jatimbalinus Corporate Sales function.

Based on the research conducted, users provided valuable feedback and suggestions to further enhance the dashboard's effectiveness. They recommended conducting regular trials and feedback sessions to ensure that the dashboard's features continue to meet the evolving needs for data monitoring. Additionally, periodic system audits by the company's IT team were suggested to maintain the system's performance and integrity over time. Users also emphasized the importance of making the dashboard accessible online via a website, enabling more efficient access and use from any location. Additionally, they advised providing training on business intelligence developments to empower users with the skills needed to further enhance and diversify the dashboard's content using the features available in Microsoft Power BI.

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