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SUPPLY CHAIN PERFORMANCE MEASUREMENT MODEL AT PT. METITO INDONESIA BASED ON BUSINESS INTELLIGENCE POWER BI

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Abstract
Supply chain is one of the important aspects in a company. An effective supply chain can help companies to increase efficiency, effectiveness, and profitability. The purpose of this research is to develop a supply chain performance measurement model at PT Metito Indonesia based on Power BI Business Intelligence. This research is a type of qualitative research that uses a descriptive approach. The data collection technique in this research was carried out by observation and literature study. This research was conducted at PT Metito Indonesia which is located at Jl. Ampera Raya No. 18A, East Cilandak, Kemang, South Jakarta. Data validity tests in this study include tests, credibility, transferability, dependability, and confirmability. The research results show that measuring supply chain performance at PT Metito Indonesia can increase its competitiveness by adopting strategies that are more adaptive and responsive to market changes. Using BI Power BI helps companies to be more proactive in making strategic decisions that have a direct impact on increasing competitiveness in the market, increasing operational efficiency, and strengthening the company's position in a competitive industry.

Keywords: performance, supply chain, business intelligence, power BI

INTRODUCTION

The business intelligence *method* is an important component of a company's ability to achieve competitive advantage while increasing analytical efficiency for *supply chain management* (Sylvia & Angela, 2019). It is proven that through *business intelligence* in *the supply chain can create opportunities to reduce costs and stimulate revenue growth will be revealed, thus allowing companies to evaluate the supply chain as a whole from the customer's point of view* (Mathrani, 2014)

Business intelligence *systems* integrate and consolidate information to support companies seeking supply chain effectiveness through vendor and customer loyalty and retention (Mathrani, 2014). The success of *business intelligence* implementation can improve data consistency based on data integration, higher levels of interactivity, easier querying and analysis, and faster access to information (Mathrani, 2014). The essence of using *business intelligence* is the processing of large amounts of data to increase needs and make important decisions quickly (Li et al., 2023).

It was reporting from Binus University (2021) that the adoption of *business intelligence* in Indonesia is still low. This is evidenced by the small Indonesian market related to *business intelligence of 72.96 million dollars in 2016* Aini & Nasrudin, (2023) *while* the size of the global business intelligence market in the same year was US $ 19.40

billion NEWSWIRE, 2019), which means the size of the business intelligence market in Indonesia is only 0.37% of the global market.

Figure 1. *Business Intelligence Market Size* Top 3 Asia vs Indonesia
Source: Binus University (2023).

Based on the data above, the adoption of *business intelligence* in Indonesia is included in the low category. In 2016 Indonesia's *business intelligence* market was 72.96 million dollars while Japan had a market of 631.58 million dollars, India amounted to 645.09 million dollars, and China amounted to 810.81 million dollars (Indriasari et al., 2019). However, the use of *business intelligence* in Indonesia will experience growth in 2020, a significant growth of 44.44% in 4 years (Inkwood, 2018). The means that can be used to carry out *supply chain* management with *business intelligence* is Power BI (Bororing, 2022).

Power BI is a *business intelligence tool that can process data and display it in visualizations consisting of various forms of graphs to create dashboards, one method that can be used, namely* business intelligence (Mahebu & Samosir, 2023). According from the Dunlop, (2015), the advantage of using Power BI in conducting company data analytics, namely Power BI is equipped with *Artificial Intelligence*, provides ease of analysis in sharing data, getting real-time access to information, getting support from various data sources and does not require high costs.

Companies have made maximum efforts in increasing productivity, efficiency, speed of service, convenience, and making various innovations to remain superior and survive in the market (Rachbini, 2017). Business competitiveness in various industries results in increased company competition in the form of effectiveness and efficiency in terms of productivity is important, product and service quality is the most influential factor regarding customer satisfaction for the sustainability of the company (Rakhman et al., 2018).

Increasing efficiency can be done by integrating the company's supply chain activities, so as not to become an obstacle to the supply chain operational planning process. The concept of supply chain management (*Supply Chain Management* and SCM) can manage various management functions in a relationship with other organizations in forming an integrated and supportive system (Ikatrinasari et al., 2020). The key to effective *supply chain management* is to make suppliers on the company's strategy to meet changing markets (Ikatrinasari et al., 2020).

The need to increase company productivity and efficiency related to customer needs is one of the reasons for the importance of monitoring changes in consumer preferences and behavior so that companies can continue to adapt (Rachbini, 2017). Many companies have applied management theory and practice to the supply chain. Supply chain management that has been implemented does not provide efficiency and effectiveness

when managing and maintaining supply, in order to maintain loyalty to the company (Ikatrinasari et al., 2020).

All parties have an important role including *distributors*, suppliers, retailers, manufacturers and customers to produce cheap, quality, and fast products. This underlies a new concept called SCM (Cuandra et al., 2022). SCM is to expand and develop concepts so that logistics management has a role to control the supply of goods between companies and develop related things needed by consumers (Rachbini, 2016). SCM (Supply Chain Management) is combining the activities of providing materials and services, converting into unfinished goods and final products, and delivery to consumers (Latuconsina & Sariwating, 2020; Lee & Ande, 2022).

The complexity often encountered by supply chain actors is that there is a conflict of interest from each actor for the supply chain. Each actor has different objectives, performance indicators, and optimization criteria (Aramyan et al., 2007). This does not necessarily contribute positively to the entire chain performance because the increased performance carried out by individuals can provide losses to other chain actors (Aramyan et al., 2007). Conflicts of interest from various actors in this chain complicate the availability of information. The relevance of information varies at each stage of the chain, although it is critical to overall supply chain performance (Mathrani, 2014).

Supply chain measurement is a hot topic to be discussed in efficient and effective supply chain management because supply chain measurement is considered to have a large role in maximizing value, process integration, increasing responsiveness, and reducing production time (Aramyan et al., 2007). In evaluating the success of a strategy there are many different types of performance measures, both quantitatively and qualitatively both have been used and many types of performance measures cause difficulties for a company in choosing performance measures specifically (Aramyan et al., 2007).

Research from Sitorus et al., (2020) discusses supply chain analysis using the *Supply chain operations reference* (SCOR) model. Subhan et al., (2022) research discusses KPIs (Key Performance Indicators). Research by Susanto et al., (1928) on Supply Chain Management Performance Measurement with *Supply chain operations reference* Model 9.0. Research by Putra et al., (2019) examines the supply chain performance of UD Coffee company "Matt Coffee" in Bondowoso Regency using SCOR Method version 11.0.

Kinding et al., (2019) provided an analysis related to the performance of a series of Al-Ittifaq vegetable supplies to each member in order to meet common goals using the SCOR (Supply Chain Operational Reference) model, analysis of internal attributes of food Supply Chain Operational Reference card and external analysis of food Supply Chain Operational Reference card. Sangari & Razmi, (2015) research discusses the role of business intelligence (BI) to fulfill agility related to the supply chain context by examining the relationship between BI competence, agile capabilities, and agile supply chain performance.

PT Metito Indonesia is a subsidiary of Metito Group, a global company specializing in water and wastewater treatment solutions and services (Gunawan et al., 2021). PT Metito Indonesia focuses on providing water treatment solutions and services in Indonesia. PT Metito Indonesia provides safe water treatment solutions for various purposes, including drinking water treatment, industrial process water treatment, and more. In addition, PT Metito is also engaged in Wastewater treatment, desalination, Water Recycling and Environmental Services (Gunawan et al., 2021).

Based on initial observations, it was found that currently PT Metito has not implemented business intelligence with power BI which is why PT Metito does not have a *live high level management report* which is a summary of *supply chain activities and* traceability progress *for both* delivery *and* open orders that can be accessed easily. In addition, PT Metito still uses *a paper base* and has not digitized data. Because PT Metito does not have the right system to process large company data, currently PT Metito does not have *forecast* calculations and *Days on Hand* which are used as a reference for companies in predicting products that experience *slow moving* or *fast moving.* Based on the presentation presented, researchers have an interest in conducting research on the topic "Supply Chain Performance Measurement Model at PT Metito Indonesia Company Based on Business Intelligence Power BI".

RESEARCH METHODS

This research is a type of qualitative research that uses a descriptive approach. One of them is data examination (editing), classification (classifying), verification (verification), analysis (analysing), and conclusion making (Sugiyono, 2013). Primary and secondary data were used in this study. Interviews and direct observations with company managers are primary sources of data. Secondary data sources come from documentation, articles, and journals related to the research topic. Data collection techniques in this study include literature studies by exploring articles, jhurnal and other information relevant to research and direct observation. According to Sugiyono, (2013). data validity tests in qualitative research include tests, credibility, transferability, dependability, and confirmability. This study appointed PT Metito employees as research subjects while the object of this study was a supply chain performance measurement model through business intelligence using Power BI. This research was conducted at PT Metito Indonesia located on Jl. Ampera Raya No. 18A, East Cilandak, Kemang, South Jakarta.

Measurement of the entire performance of the supply chain is important because measurement influences decision making through evaluation of past behavior and through benchmarking opportunities. Inadequate value on performance measures can lead to continuity problems in the short or long term, as decision makers need information about operations to guide their decisions. To ensure sustainability, it is critical to work efficiently and minimize costs throughout the supply chain. In addition, organizations in the supply chain are interdependent on each other. Therefore, in addition to individual organizational performance indicators, it is imperative to have a set of performance indicators at the supply chain level (Triantafillou et al., 2001). The selection of measurement methods in this study is arranged as follows:

1. Ontime Delivery which is one of the key performance indicators in the supply chain that measures how often orders or delivery of goods are delivered on time according to the schedule promised to customers. The choice of this method is important because it can demonstrate the operational efficiency, reliability and quality of service of the company.

2. Total Order Quantity, this measurement method is useful for knowing the number of orders processed by the company within a certain period of time. It is important to understand how large the volume of orders that the company manages, and can be used to analyze demand trends and possible future production needs.
3. Average Lead Time which refers to the average time it takes a company to process an order from the time it comes in to it is delivered to the customer. This measurement is important because it can provide an idea of operational efficiency, response capabilities, and can also help in the identification of areas that need improvement in the supply chain.

The choice of this measurement method is based on the importance of these aspects in supply chain management. By measuring performance using these indicators and integrating them into Business Intelligence platforms such as Power BI, companies can generate more measurable and better interpreted data to make more effective decisions in optimizing their supply chain performance. The flow of this research is divided into several stages which will be presented in the description below:

1. Selection of Research Objects
2. Identify the Problem
3. Problem Formulation
4. Literature Study
5. Data Collection
6. Data Processing
7. Data Validity Testing
8. Discussion and Proposal for Performance Improvement
9. Conclusion and Advice.

RESULT AND DISCUSSION

Supply chain performance in a company must be measured because it is a key factor in determining operational success and business sustainability. Supply chain performance measurement allows companies to identify strengths and weaknesses in their supply chain management. This provides important insights in terms of efficiency, effectiveness, and adaptability of a supply chain. By measuring supply chain performance, companies can monitor operational performance, identify critical points that may affect production and delivery, and improve coordination between parts of the supply chain. In addition, supply chain performance measurement allows companies to evaluate supplier performance, manage risks associated with the supply chain, and adjust strategies to meet changing market needs. By having a deeper understanding of supply chain performance, companies can make better decisions, improve customer satisfaction, optimize costs, and maintain competitiveness in a competitive market. Therefore, supply chain performance measurement is not only important for internal monitoring, but also to ensure that companies can face challenges and opportunities in a dynamic and rapidly changing business environment.

Supply chain performance measurement can be done by various methods, one of which is based on business intelligence power BI. Business Intelligence Power BI is one of the data analysis tools developed by Microsoft. The tool allows users to integrate data from multiple sources, including inventory and supply chain data, and analyze that data using a variety of analytics techniques such as data visualization and predictive analytics. Business Intelligence Power BI can help companies make better decisions by providing deeper insights into the performance of companies, customers, and supply chains. The tool also allows users to create customizable dashboards and reports according to company needs. The advantages of Business Intelligence Power BI are that it is easy to use, has an intuitive interface, and can be integrated with various data sources such as Excel, SQL Server, and SharePoint. In addition, this tool also has the ability to perform data analysis in real-time and can be accessed from various devices such as desktops, laptops, and smart phones.

The supply chain performance measurement model is implemented in PT Metito Indonesia based on business intelligence power BI with the following results:

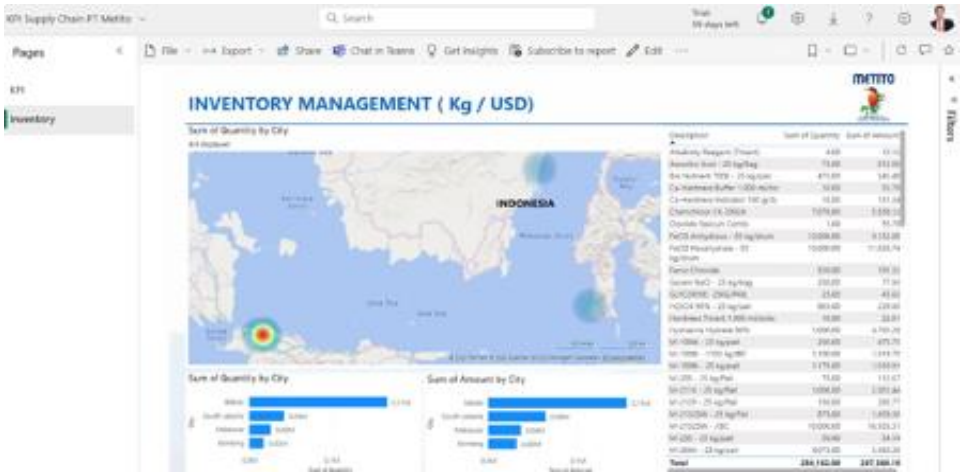

Figure 1 Inventory Management

Figure 2 shows inventory management data with sum of quantity by city, consisting of Bekasi of 0.17M, South Jakarta of 0.04M, Makassar of 0.03M, and Bontang of 0.02M. The total quantity is 0.1M. In addition, figure 1 also shows the sum of amount by city, consisting of Bekasi of 0.15M, South Jakarta of 0.06M, Makassar of 0.04M, and Bontang of 0.03M. The sum of the total values is 1M.

This data provides information about the quantity and value of inventory in each city, which can be used to optimize inventory management in the company's supply chain. By understanding this data, companies can determine more efficient and effective inventory procurement and delivery strategies to meet customer demand and minimize inventory costs.

Figure 2. KPI SC Dashboard

Figure 3 shows KPI (Key Performance Indicator) data on SC Dashboard based on customer name. Customers with the largest number of orders are Samsung at 277K, followed by Smelting at 175K, Cogindo at 85K, Jawa Power at 69K, Indonesia Power at 63K, Rochtec at 40K, Thalassa Tirta at 32K, Sumber Indah at 29K, Energi Hero at 27K, and Bexal Hubb at 0.0M. The total order quantity is 0.2M (200,000 kilograms).

This data provides information about supply chain performance for each customer, which can be used to evaluate the company's performance in meeting customer demand and optimizing inventory management. By understanding this data, companies can determine strategies to improve supply chain performance for each customer, such as improving production efficiency or improving timely inventory delivery to meet customer demand.

Measurement of supply chain performance at PT. Metito Indonesia's Business Intelligence Power BI has several benefits that can help companies improve their operational efficiency and effectiveness. Here are some of the possible benefits:

1. Performance Monitoring

   Supply chain performance measurement using Business Intelligence Power BI allows companies to monitor their operational performance in real-time. Using dashboards and reports provided by Power BI, companies can view key performance indicators (KPIs) such as inventory levels, delivery times, and shipping costs. This helps the company in identifying areas that require improvement and taking appropriate actions to improve overall performance.

2. In-depth Data Analysis

   Business Intelligence Power BI provides the ability to analyze data deeply and thoroughly. Companies can combine data from various sources such as inventory management systems, warehousing management systems, and production management systems. By analyzing this data, companies can identify trends, patterns, and relationships between various factors in their supply chains. This helps companies in making better and strategic decisions.

3. Compelling Data Visualization

One of the main advantages of Business Intelligence Power BI is its ability to present data in the form of attractive and easy-to-understand visualizations. Companies can create interactive dashboards with graphs, charts, and maps that facilitate understanding of supply chain performance data. With effective data visualization, companies can quickly identify patterns or anomalies in their supply chain performance.

4. Faster Decision Making

   Implementing Business Intelligence Power BI, companies can access data in real-time and perform analysis quickly. This allows companies to make decisions that are faster and responsive to changes in their supply chains. For example, if there is an increase in demand from customers, companies can quickly see the available inventory and take steps to meet that demand.

5. Improved Operational Efficiency

   Companies can identify areas that require improvement and improve their operational efficiency. For example, by looking at long delivery times or high shipping costs, companies can look for solutions to optimize shipping processes and reduce logistics costs.

Implementation of Business Intelligence (BI) Power BI based supply chain performance model at PT. Metito Indonesia makes a major contribution to the company's strategic decision making. The data analyzed and presented through BI Power BI provides deep insights into supply chain performance, enabling management to take more informed and targeted strategic decisions. Information generated from BI Power BI can be used to formulate strategic decisions in the following ways:

1. Data on operational efficiency, such as processing time, lead time, or inventory levels, can be used to identify areas that require improvement or optimization, enabling companies to make more efficient process improvements, reduce operational costs, and improve service quality to customers.
2. Information about supplier performance and supply chain reliability can help in decision-making related to risk management and better supplier selection.
3. Analysis of market trends and consumer responses to products can provide important insights for developing more effective marketing strategies and products that better suit market needs.

Utilizing this information, PT. Metito Indonesia can improve its competitiveness by adopting a strategy that is more adaptive and responsive to market changes. The use of BI Power BI helps companies to be more proactive in making strategic decisions that have a direct impact on increasing competitiveness in the market, improving operational efficiency, and strengthening the company's position in a competitive industry.

CONCLUSSION

Measurement of supply chain performance at PT Metito Indonesia can be the key to increasing the company's competitiveness in a competitive market. By adopting strategies that are more adaptive and responsive to market changes, companies can

strengthen their position and improve their operational efficiency. The use of BI Power BI assists companies in achieving this goal by providing the information needed to take the right strategic decisions. By using BI Power BI, companies can become more proactive in making strategic decisions. Information obtained from Power BI allows companies to view their operational performance data in real-time. This allows companies to take quick and appropriate actions to improve their operational efficiency and respond more adaptively to market changes. In addition, the use of BI Power BI also helps companies improve their operational efficiency. By analyzing operational performance data, companies can identify areas that require improvement and take necessary actions to improve their operational efficiency. This can help companies in reducing their operational costs and increasing competitiveness in the market.

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