The Application of Power Business Intelligence in Analyzing the Availability of Rental Units

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Abstract. The availability of rental units in the field of vehicle rental services is the most important thing that must be given special attention by company management in order to provide good service to customers related to unit information. Sometimes unit information available in the field is different from what is recorded in the system, resulting in misinformation. For example, a unit that is supposed to be ready for rental, but in the system status the unit has not changed from its last status which causes the unit cannot be ordered by the customer. Errors are still found in the recording of repair units so that it needs to be adjusted to the status of the unit so that the unit can be rented immediately. Besides the lack of supervision of employees who record or update the status of the unit in the system makes the data pull system is not the same as the existing manual data. To reduce these errors, management requests that information on the availability of units be displayed in the form of a dashboard so that they can display the status of units from various categories simultaneously. This study uses literature study and experimental methods which consist of four stages, namely collecting data, pre-processing data, visualizing, and analyzing data. The purpose of this research is to build a dashboard using Power Business Intelligence (BI) that can display rental unit availability information from various categories based on certain parameters.

1. Introduction

Information is the end result of data processing that is obtained from various sources. According to [1] information is data that has been processed into a form that is more meaningful and beneficial to humans. While the data is raw facts that represent events that occur in the organization or environment before being processed into a form that can be understood and used by humans.

According to the Minister of Communication and Information of the Republic of Indonesia, Mr. Rudiantara in [2] the existence of data today is touted as "a new type of oil", this is inseparable from how important data is in the world economy today. Massive data growth, both in terms of greater volume, increasingly diverse variations, as well as faster data velocity makes data a very valuable commodity in an organization. [2] suggested that 90% of the world’s data was collected only in the last 2 years, the majority consisting of unstructured data originating from the internet, including IoT. So with traditional monolytics server technology it is not possible to follow and accommodate data developments so quickly that only data related to relevant transactions can be entered into, that is structured data. Traditional systems may not be able to accommodate unstructured data such as video data, voice, and others for analysis needs.
So with regard to data with its current development, organizations must have qualified human
and technological resources to be able to process data for the interests and objectives of the
organization.

PT Mitra Pinasthika Mustika Rent or better known as MPM Rent is a company engaged
in the field of vehicle rental services, especially four-wheeled vehicles. Not only that, to be
able to win business competition and answer the needs of MPM Rent customers also provide
driver rental services, vehicle auctions, and purchase of used units. Current customers consist
of companies and individuals. Quoted from the official website page, the number of rental units
owned reached 15,000 units spread across several regions in Indonesia.

In carrying out its business processes MPM Rent uses the Microsoft Dynamics AX
2012 application which is one of the ERP (Enterprise Resource Planning) applications from
Microsoft. AX 2012 is able to provide a platform for developers to be able to provide
special functionalities to the industry, in addition to presenting new capabilities in warehouse
management, transportation, demand planning, and retail [3]. All departments related to the
company’s business processes will be integrated through ERP, so that it will easily access the
data and information needed by each department.

To be able to meet the business demands of every department and management, all existing
data must be able to be presented quickly, precisely, and accurately. The speed of processing
data and information in the decision making process [4] is able to cope with and avoid events
or events that can result in losses to the company [5].

At present the fulfillment of these business requests is presented using the SQL Server
Reporting Services (SSRS) application. SSRS is a special reporting platform that provides real
business intelligence to workers who use information and business decision makers [6]. SSRS
has the ability to create reports in many formats and is also able to execute reports on demand,
cache, archive, or automatically submit them to users.

In line with company needs and to bring about a competitive advantage [7], management
wants information on the availability of rental units to be displayed in the form of a dashboard
making it easier for interested parties to process them [8] for later use as a decision-making tool.
In addition, it is also expected to provide accurate availability of rental units simultaneously,
real-time, and can describe the forecast in the future and to study the past about business
opportunities and challenges [4].

The best choice in meeting the company’s needs is to apply Business Intelligence. Business
Intelligence (BI) is a series of activities that support the extract-transform-load (ETL) process
[9] to analyze the data owned by the organization and external data from third parties [5] so
as to produce appropriate information in the decision making process, also analyze and prepare
the strategic planning for the future [10].

[5] states that there are four basic components of business intelligence that work together,
namely:

- **Data Warehouse.** Data warehouse acts as a source of data from business intelligence. A
data warehouse is a collection of data that is subject-oriented, does not change, and has a
wide enough time span that functions in management decision making.

- **Business Analytics.** In short business analytics are a collection of tools used to
manipulate, mine, and analyze data contained in a data warehouse.

- **Report and Queries.** This includes all forms of reporting either statically (unchanged)
or dynamically in accordance with data changes and any kinds of existing queries such as
drill down, multidimensional, view, grouping, and others.

- **Data.** Text and web mining as well as top-level mathematical and statistical tools.

One of business intelligence application used is Power BI. With Power BI, information can
be displayed in visuals and filtering. With the help of visuals and filters, the user or person gets
convenient and easier to understand the data [11].

2. Method
The scope of the research is only limited to the dashboard development process using data that has passed the ETL process.

The method used in the study is as follows:

- **Literature study.** Gather references that can support research through scientific journals, books, articles, and other sources that support research.

- **Experiments, consisting of:**
  1. Data collection.
     At this stage, data collection is carried out both from the results of inputting the system and manually recapitulated daily data in the form of an Excel file such as daily pool report and stock report.
  2. Pre-processing data.
     At this stage the ETL (extract - transform - load) process is carried out, which extracts data from the data that has been collected and then changes (transform) such as correcting errors in the data, eliminating unneeded and duplicated data. Then the data will be sent to the data warehouse.
  3. Data visualization.
     At this stage visualization of data that has been processed into a dashboard using Microsoft Power BI tools.
  4. Data analysis.
     At this stage an analysis of the data presented in graphical form is carried out to obtain the information needed.

To facilitate understanding of the process that needs to be done, a research experiment sequence scheme is created as shown in Figure 1 below:

![Figure 1. Stages of research experiments.](image)

3. Result and Discussion
This section explains the results of the research carried out, starting from the process of collecting data to obtaining the desired data to then be displayed in graphical form using Power BI tools. The results of the study can be described by the system architecture as follows:

3.1. Data Collection
There are two sources of data used, namely data derived from the results of ERP system input and manual data held by the operational department. Among them are the daily pool report and stock report. The daily pool report informs rental units in and out of the pool, while the
stock report informs the availability of rental units both ready to lease, have been ordered by customers (booked), as well as units that are under repair (out of service). The two data are then compared, if there is a discrepancy between system data and manual data, it is necessary to make adjustments to the data contained in the system first.

3.2. Pre-processing Data
Rental unit data that has been collected and then extracted in accordance with the needs of the analysis, then performed cleaning the data to eliminate data that is not needed, if an error is found in the data both data value errors and data type formats, it is necessary to make improvements to the data. Then the data is entered into the data warehouse, at this stage the data is already in good condition and ready to be used in the next process. This ETL (Extract Transform Load) process is performed using SQL Server Integration Services (SSIS). With Integration Services, we can extract and change data from various data sources such as XML, text data, CSV, Excel, and so on and then send to many destinations.

3.3. Visualization
From the rental unit data that has been processed, information is obtained such as how many units with the status "Ready" and "Out of Service", then how many rental units have been ordered by customers and how many units have not been ordered. How many units replace Temporary with the status ready, and how many units Change Temporary with the status of Out of Service. And how many units are included in the category of ready to sell. The information is presented in the form of a dashboard which can be seen in Figure 3. There are five parameters namely the date period used to display information based on the selected date period. Site, to display information based on site. Type to display information based on unit type. The model year to display information based on the unit model year, and the model to display information based on the unit model.

There are four major categories in the dashboard, namely Unbooked, Booked, Replacement Car, and In Disposal Process.

One of them is unbooked which consists of units ready to rent and OOS units (out of service) for units that are under repair. Through this information, users can find out how many units are ready to rent and units that are under repair (OOS) in a site. There is a breakdown of unit status availability data, namely by right clicking on the unit status pie chart then selecting Drill through - Details. Then the data details will be presented in tabular form.
4. Conclusion

Information on the availability of rental units in a company engaged in the field of vehicle rental services would be very important, especially if the business units are scattered in several regions in Indonesia.

With the dashboard, conclusions can be drawn as follows:

- Management can find out the availability of rental units it has by searching for information based on the date, site, type, year, and model of the unit. And can find out in detail about
the availability of these units.

- Management can quickly find out how many idle units are in a site without having to count them first, because the information has been presented in the dashboard.
- The ability of BI Power in processing and visualizing data into graphical form provides benefits for the company, company management can quickly and easily read the information presented so as to accelerate the decision making process.

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