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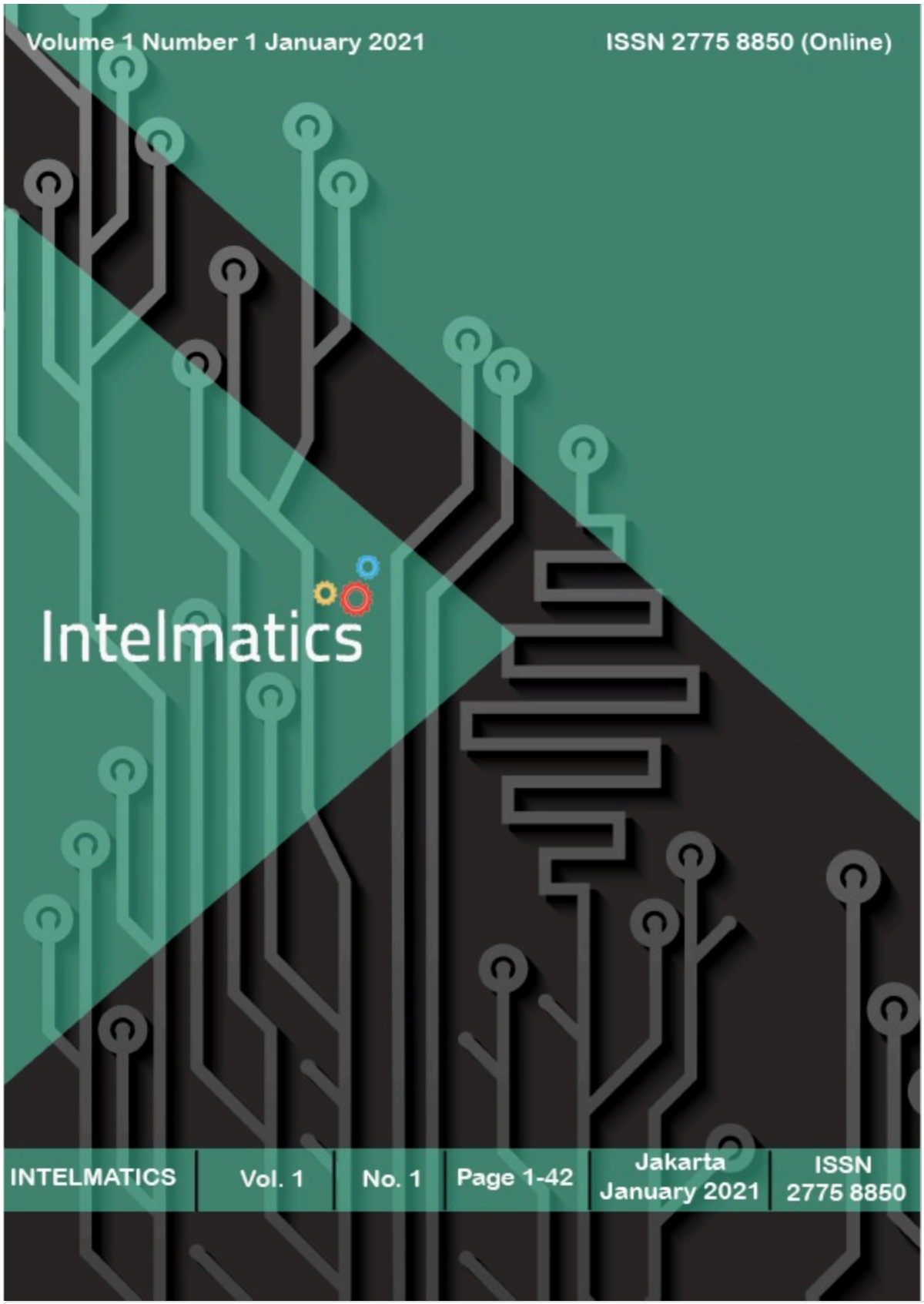
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The Design of a Revenue Dashboard for the Operational Division of PT XYZ Using the Kimball Four-Step Method

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Abstract: ***The rapid development of information technology drives the need for effective and efficient decision-making systems, particularly in the business world. This study aims to design a dashboard integrated with the operational division system of PT XYZ to address issues of slow decision-making processes. The dashboard is designed using the Online Analytical Processing (OLAP) for Step Kimball method, enabling multidimensional data analysis.The design process includes several stages: identifying requirements, designing a data warehouse based on the Kimball method, processing data using OLAP, and visualizing data with Tableau. The data utilized comprises critical information from the operational division, such as company profiles, contracts, collections, revenue, and credit scores. The results demonstrate that the designed dashboard effectively provides relevant information to support fast and accurate decision-making needs. The implementation of this dashboard is expected to improve operational efficiency and provide better strategic insights for PT XYZ.***

Keywords: Dashboard; OLAP; Four Step Kimball; Data Visualization

I. INTRODUCTION

The telecommunications industry in Indonesia, including PT XYZ—which has been operating since 1995—continues to grow rapidly but faces challenges in improving operational efficiency. The operations division of PT XYZ, responsible for document verification, stock management, and handling customer requests, currently uses the MEA (My Enterprise Access) application. Although this application assists in managing documents and inventory, it still requires navigating through multiple tabs or windows to access information, which hinders decision-making processes, particularly in analyzing customer credit scores.

As a solution, PT XYZ plans to enhance operational efficiency by developing a Tableau-based dashboard. This dashboard will integrate essential information into a single, well-organized interface, reducing the time needed for data checks and accelerating decision-making processes related to customer contracts. By utilizing Tableau, the operational team is expected to access data more quickly, increase productivity, and support more efficient decision-making.

This research aims to design an OLAP database and develop a Tableau dashboard to support operational data analysis and facilitate contract decisions based on customer credit scores. The study is expected to make a significant contribution to PT XYZ's operational efficiency and the academic field by enhancing analytical skills and project management competencies.

II. LITERATURE REVIEW

Data visualization is a key approach to organizational Business Intelligence (BI) for conveying complex information in a clear and effective manner. Data visualization not only facilitates information delivery, but also enhances the understanding of relationships and patterns within large datasets as well. In modern business environments, visualization plays a critical role in accelerating data analysis and supporting timely decision-making for better organizational strategies. Data visualization is a key approach to organizational Business Intelligence (BI) for conveying complex information in a clear and effective manner [1]. Data visualization not only facilitates information delivery, but also enhances the understanding of relationships and patterns within large datasets as well [2]. In modern business environments, visualization plays a critical role in accelerating data analysis and supporting timely decision-making for better organizational strategies [3].

However, most of the above studies did not utilize the OLAP approach using the Four-Step Kimball method, which provides a structured methodology for building a data warehouse. According to Kimball [4], the four steps—selecting the business process, defining the level of granularity, identifying dimensions, and determining measurable facts—enhance efficiency and accuracy in operational data visualization. This structured, bottom-up dimensional modeling method (often manifested via star schemas) supports better OLAP

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performance and user-driven analysis [5]. A practical example applying these four design steps in an educational context shows how well-defined granularity and dimension/fact selection enable precise and consistent modeling for dashboards and analytics systems [6].

Furthermore, this study incorporates the FICO Score model for credit analysis, which is widely used to assess customer creditworthiness. By adapting the FICO scoring approach considering factors such as payment history, revenue, and collection duration, the credit score analysis becomes more structured and relevant for supporting contract-related decisions [7]. In addition, exploring formal modeling techniques such as the quadratic programming solution proposed by Hoadley can provide advanced, interpretable structures for the scoring model that align with FICO's design principles [8].

There are few interactive dashboard tools can be used by a dashboard designer, such as: Tableau, Power BI, Plotly, and Qlik Sense. Tableau has adequate features for data blending, real-time collaboration, and embedding options. It can also be used to represent a transformative force in better data analytics for strategic decision-making [9], [10]. By using Tableau as dashboard tools, a designer also gets some benefits: applying normal distribution using histogram, learning anomaly detection on normally distributed data, learning linear and polynomial regression, forecasting, and creating an external connection to R or Python [11], [12]. Several previous studies have demonstrated the effectiveness of Tableau-based dashboards in enhancing data monitoring and analysis. Sariasih (2022) applied Tableau Public to transform static flood data into interactive graphs and maps, improving both accessibility and visual appeal for public awareness and understanding [13]. Similarly, Tri Purwani et al. (2021) integrated Pentaho Data Integration (PDI) and Tableau to construct a sales dashboard for a retail store, emphasizing the importance of the ETL (Extract, Transform, Load) process before visualization [14]. In addition, Wibowo and Hidayat (2022) demonstrated how Tableau dashboards can be utilized for monitoring university academic performance in real time [15].

III. Research Methodology

a. Business Process Identification

The Operational Division of PT XYZ consists of five teams, each responsible for different tasks in managing data through the MEA (My Enterprise Access) system. The core data includes five primary sources: Document, Corporate, Credit Score, Collection, and Revenue. Based on discussions with the operational team, a need was identified to develop an integrated dashboard to streamline monitoring activities and support faster decision-making.

b. Grain Definition

The grain of the data warehouse is defined based on the need to display project names categorized by risk level—Potential, Medium, and High Risk—to assist management in making strategic decisions.

c. Dimension Table Identification

The following dimension tables were defined:

- Account Dimension: Includes Account ID, Account Manager Name (AM Name), Corporate Size, PID ID, Person in Charge Name (PIC Name), and Status.
- Project Dimension: Includes Project ID and Project Name.
- Document Dimension: Includes Document ID, Document Type, Document Number, and End Date.
- Time Dimension: Manages temporal data based on event dates and time periods.

A Galaxy Schema is utilized to accommodate fact tables with different time dimensions, providing analytical flexibility.

d. Fact Table Identification

Three fact tables were developed:

- Fact Revenue: Contains fields such as Revenue Amount, Project ID, Account ID, Document ID, and Time ID.
- Fact Credit Score: Includes Credit Score, Score Indicator, Project ID, Account ID, Document ID, Time ID, and Collection Rate.
- Fact Collection: Stores Overdue Date (Os_due_date), Billing Due Date, Collection Due Date, along with Project ID, Account ID, Document ID, and Time ID.

e. Data Pre-Processing

Raw data, provided in .csv and .txt formats, undergoes several pre-processing steps:

- Data Merging: Combining Account, Revenue, Collection, and Credit Score files using Account ID as the primary key.
- Data Cleansing: Removing irrelevant columns and saving cleaned data in .csv format.
- Dimension Table Generation: Utilizing Microsoft Excel and Pentaho to create unique dimension tables (Account, Project, and Document).
- Time Dimension Construction: Using Pentaho to generate a time table based on event dates.

f. Database and OLAP Design

A relational database named Davinci was built using phpMyAdmin, containing both dimension and fact tables. Relationships between tables are established using primary and foreign keys. The OLAP system was modeled using a Star Schema to enable efficient multidimensional analysis.

g. Dashboard Visualization

The dashboard was developed using Tableau and consists of five primary menus:

- Profile
- Contract
- Revenue (Performance)
- Credit Score

- Collection

As result, this dashboard is designed to accelerate customer data verification processes and to support the operational division in making data-driven decisions more efficiently.

IV. RESULT AND DISCUSSION

a. Data Processing

The data processing consists of two main stages: Pre-processing and OLAP, both conducted using Pentaho. The data used in this process came in the form of Excel files.

1. Pre-processing

   In this stage, data cleansing was applied both manually and through Pentaho. The cleansing process in Pentaho was aimed at extracting the unique data.

   This step was essential to define the primary keys and KPI filters that would later be used in the Tableau dashboard.

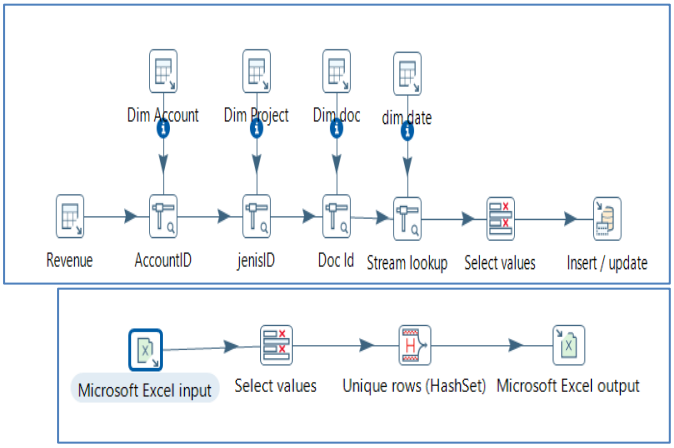

Fig 1. *Unique Processing*

b. OLAP

In the OLAP stage, XAMPP was used for database management, and Pentaho was used for the ETL (Extract, Transform, Load) processes. Data was manually inserted into the database, while Pentaho was used to perform insert/update operations and to build relationships between tables.

This process followed a star schema model and was directly connected to the XAMPP database.

Fig 2. *Star Schema*

c. Visualization

For the visualization stage, the database was connected to Tableau as the data source. The dashboard was developed using Tableau and designed to function like an application. It was built to be interactive and consisted of four main dashboards.

One example of the resulting dashboard is shown in this study, which focuses on supporting decision-making processes regarding the continuity of partnerships between PT XYZ and its customers.

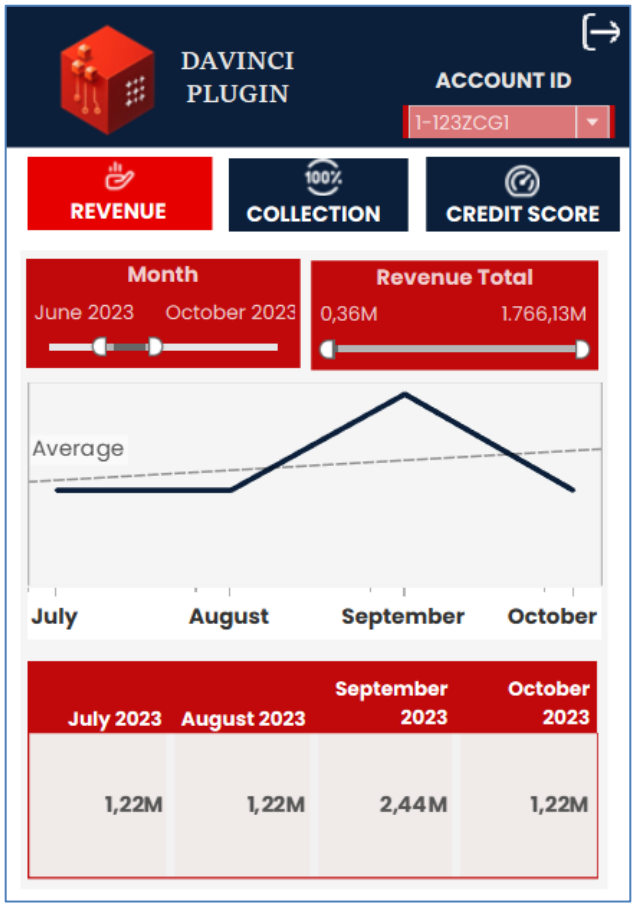

Fig 3. *Dashboard DAVINCI*

d. FICO Score

While PT XYZ made decisions about contract partnerships, it evaluates three revenue aspects: revenue, collection, and credit score — with the credit score being the final decided factors.

The credit scores were calculated using the FICO score weightings. After the weights were assigned, a normalization process was applied to convert the scores into the scale of 1 to 5.

Finally, a linear regression analysis was performed to assess the level of correlation between the score and actual decision outcomes.

$$\text{Total Skor} = (\text{Skor Collection Rate}) + (\text{Skor Payment Indicator}) + (\text{Skor Revenue})$$

Fig 4. *Fico score*

V. CONCLUSION

This study successfully designed a revenue dashboard for the

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Operational Division of PT XYZ using the Four-Step Kimball methodology as an approach to the OLAP database design. This method proved the effectiveness in identifying business processes, determining data granularity, and developing dimension structures and fact tables. The dashboard which was developed using Tableau, enables users to compare revenue based on accounts, projects, and contracts within a specific time frame. It is also equipped with filter features that facilitate more efficient analysis. The visualizations provide clear insights into revenue trends from various sources and support more informed decision-making to enhance the company's operational performance.

For future development, it is recommended that the data retrieval process be more organized and structured. Additionally, further collaboration with the company is advised to gain more optimal access to data connections.

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