Gas Store Data Analysis Using ERD Method and Constitutional Data Warehouse Model

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Article Information:	ABSTRACT
	A data warehouse is a data storage system that plays a crucial role in business analysis. It collects, integrates, and stores data from multiple sources in a structured format, providing holistic insight into organizational performance. Entity-Relationship Model (ERD) is a visual tool for designing database structures. It uses entities to represent real-world objects and the relationships between them. ERD helps plan an efficient and coherent database design. A conceptual model is an abstract visual representation of information structures and relationships within a domain. It covers key concepts and business rules, assisting in building a solid foundation of understanding before technical designing begins. All three are interrelated in the development of successful information systems. Data warehouses use conceptual models to direct effective data storage design, while ERD helps describe the entities and relationships to be stored in the data warehouse. The combination of all three enables organizations to design, develop, and maintain adequate information systems, based on a deep understanding of data and its relationships. This results in better decision making, more efficient innovation, and optimal utilization of resources. The purpose of this study is to produce optimal data using the ERD method. The main objective is to explain how much data in an information system in the Company and how data management is crucial for effective decision making. **Keywords**: *Data Warehouse, ERD, Konseptual Model*

INTRODUCTION

Collection, retrieval, processing, storage and distribution of real information. The more information, the easier it will be for a company to make decisions (Roy dkk.,

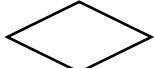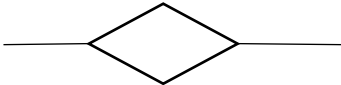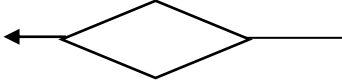2019). A very clear definition of information system is a system that will facilitate a company in decision making so that it will help the company in planning a business strategy that they will use (Lei dkk., 2020). Thus, data management will become a primary need of a Company because with this the Company will be more advanced because of good data management.

But please note that if you want to manage data that is much more with certainly good results, a good and balanced analysis is needed (Khawaja dkk., 2019). Data analysis is a very important component, data analysis is a method that has a purpose in how to describe a data, data relationships, and any limitations in a data or information (Boje dkk., 2020). There are many methods in analyzing a data but in this journal will be used the Entity Relationship Diagram (ERD) method combined with conceptual data methods.

RESEARCH METHODOLOGY

In this research using two methods, namely Entity Relationship Diagram (ERD) combined with conceptual data methods (Balia dkk., 2021). ERD itself has a purpose to describe each entity and a relationship between entities with graphic notation will become a data diagram that will enter the data process transacatonal with this process will be clearly drawn (Bao dkk., 2019). Then with this data conspetual model has the aim of assisting in management decisions that will be oriented to an integrated project, time variant and will be difficult to change (Doro Edi et al. 2009).

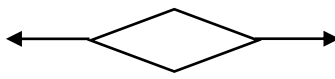| Notation	Components	Information
▭	Entity	Symbolizes that the individual represents an object and can be distinguished from others
⬭	Attribute	Symbolizes the ownership of the entity's property
◇	Relationship	Symbolizes the relationship between entities
—◇—	Relation N : N	Symbolizing an entity to the first entity can relate to many entities
◄—◇—	Relation 1 : N	The relationship indicates that between the first entity and the second entity there is a relationship in a ratio of one to many or vice versa. Each entity has the ability to connect with many entities in another entity group

	Relation 1 : 1	A relation that describes that each entity in the first group corresponds to no more than one entity in the second group

Table 1: ERD components

The conceptual model itself has the meaning of a logical design which presents a data in a standard form display and supports a quick access to a data (Zhang dkk., 2020). In this model itself has several terms, namely fact table, dimension table and hierarchy.

RESULT AND DISCUSSION

System analysis has an important purpose where system analysis will have a function to describe a system that runs in order to see more clearly how the system works and then will release a result of the disadvantages and advantages of the system (Lu dkk., 2020). Analysis of the running system will have the following stages:

Business process analysis
1. Business process analysis refers to a set of interconnected actions or work performed to solve a specific problem or produce products and services
2. System Actor Analysis
   Perpetrator analysis is an analysis of people who are interested and also have their respective duties
3. Rule analysis
   Business rule analysis is an explanation of business rules that are currently in effect in the current system

Problem analysis and problem solutions can be interpreted as an analysis of problems designed to find a solution in the field. In solving the prelu problem (Zamora-Izquierdo dkk., 2019), a flowmap is prepared as follows:

1. User analysis
   This analysis has a function that will describe the users who will use this system
2. Procedure Analysis
   This analysis will provide an overview of the planned system (Qi dkk., 2019). These system procedures are intended to gain a more detailed understanding of the operation of such systems, so that benefits and benefits can be identified.

house can be interpreted as a fairly new paradigm in a decision-making environment. Data warehouse itself means a collection of logic data that is separate from the operational database (Subuh &; Yasman, 2019).

A conceptual data warehouse model or dimensional model is a logical plan that describes data in a standard format and facilitates quick access to the data (Messina

dkk., 2021). There are several terms associated with this model, including fact tables, dimension tables, and hierarchical structures.

Hierarchy refers to determining the order of mapping from a more specific concept or lower level to a more general concept or higher level (Roy dkk., 2019). Common dimensional models involve star schemas, snowflake schemas, and fact constellation schemas (Gibb dkk., 2019). We will discuss in more depth each of these models in the next discussion.

But in this journal this research will focus on star schema (Guerrini-Rousseau dkk., 2019), considering the advantages that star chema has an easy-to-understand advantage where the working structure is quite simple and then the performance is fast enough

Starchema is a dimensional model in which the fact table will be located in the center and another table (S. Wang dkk., 2020). Namely in the diemension table area.
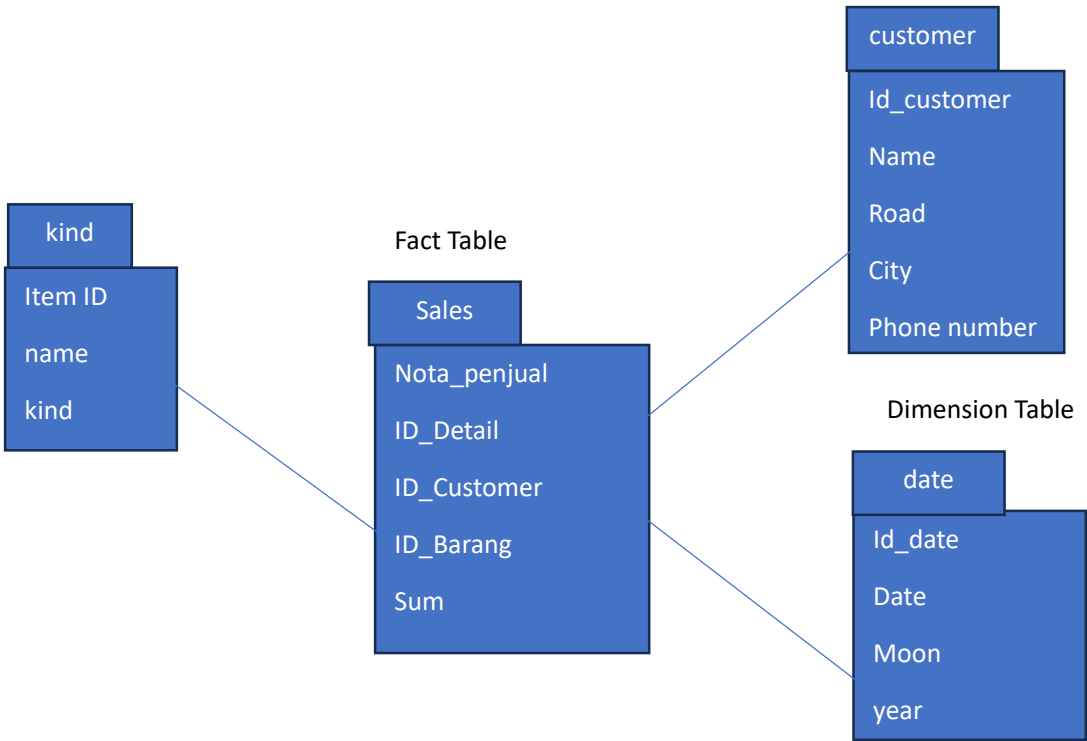
ERD planning

After doing some analysis, the next stage is to carry out the process of creating a visual picture of the data structure in an information system or database. With this ERD, it will be easier to do system design (Giudicessi dkk., 2020). Below is the system design using the ERD method
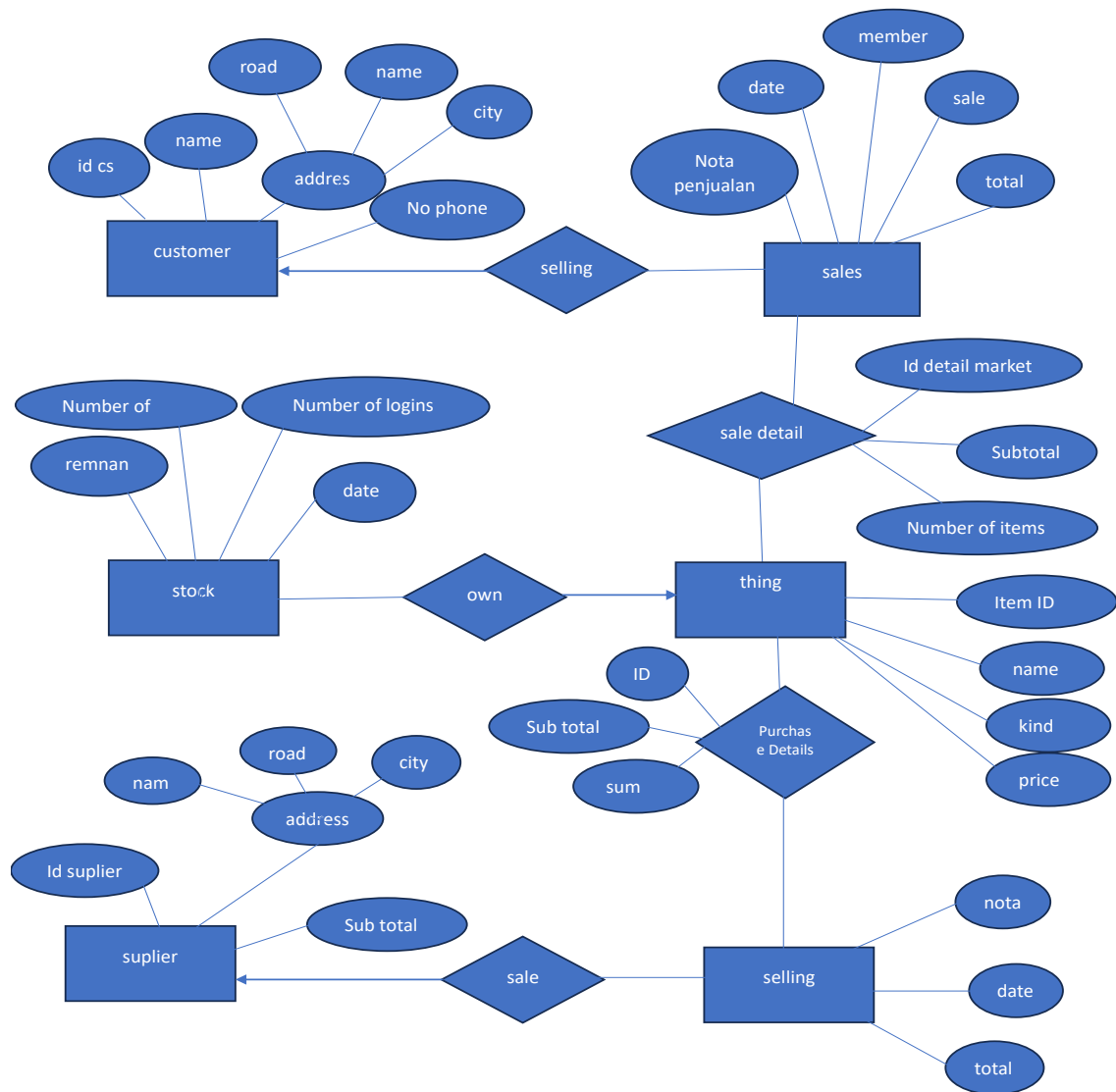
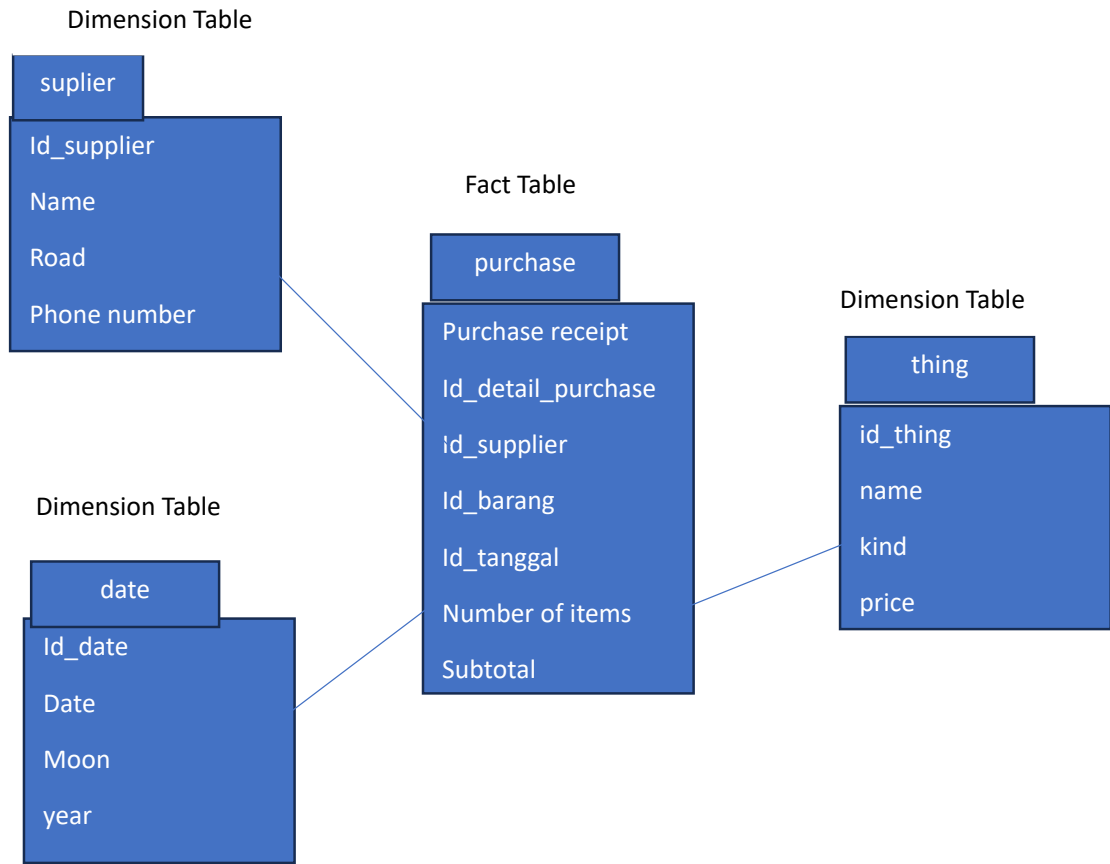**1.1 Design with ERD**

Design Using Star Schema

Starschema itself has a function as a support tool for decision making. Therefore (Al-Fraihat dkk., 2020), the design designed must be in accordance with the needs conveyed by the managerial party so that decision making will be appropriate (Chen dkk., 2021). If the required sales schema needs to be adjusted as follows (Nurazizah dkk., 2023):

kind

Item ID

name

kind

Fact Table

Sales

Nota_penjual

ID_Detail

ID_Customer

ID_Barang

Sum

customer

Id_customer

Name

Road

City

Phone number

Dimension Table

date

Id_date

Date

Moon

year

1.2 Star Schema for Sales

Purchase schema

In the star schema previously described for the minimarket stock control process (Verdoliva, 2020), the table that serves as the main factor is the stock table (Jarvis dkk., 2019), while the dimension table is the date table and item table (Naparstek & Cohen, 2019). The stock table has the primary key of the item table, which is ID_Tanggal, and also has the primary key of the item table itself, which is ID_KIND.

Dimension Table

suplier

Id_supplier

Name

Road

Phone number

Fact Table

purchase

Purchase receipt

Id_detail_purchase

Id_supplier

Id_barang

Id_tanggal

Number of items

Subtotal

Dimension Table

thing

id_thing

name

kind

price

Dimension Table

date

Id_date

Date

Moon

year

1.3 star schema for purchase

Star Schema Stock

Star schema in the stock section itself has a meaning as a design of a sedain structure in a data warehous that will be used as storage and will classify a data related to stock or an inventory of goods in a business (M. Wang & Deng, 2021). This schema has two most important components, namely the fact table, this table contains information such as the amount (Lyu dkk., 2019), transaction date, storage location and so on (Fitri dkk., 2019). Then in the dimension table which contains an attribute related to stocks
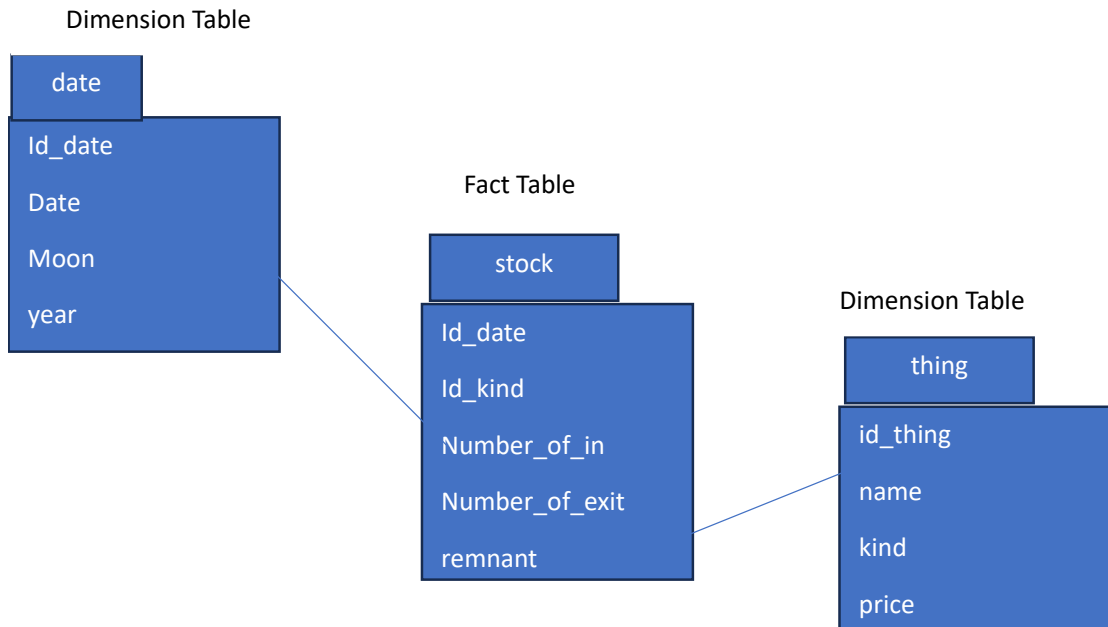
1.4 star schema for stock

CONCLUSION

at this stage will lead to a conclusion of analysis and design using the ERD method combined with a conceptual model that can be concluded as below:

1. Data design using ERD is a model that can describe data with entities in a database and the interconnected relationships between these entities
2. Star schema is a fairly simple model that makes it very easy to understand. Where there is only one fact table surrounded by dimension tables
3. ERD is a method that is very suitable for use in a system that is used daily which is transcational in nature while in the coceptual model taken to support decision making

SUGGESTION

The author needs to emphasize data analysis because this stage is key in effective decision making and ERD methods and conceptual models are the tools used to optimize data analysis. Need to go deeper into understanding in data warehouse models A deeper understanding of star schema, snowflake schema, and fact constellation schema. Include examples or illustrations that clarify the differences between the three.

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