CHAPTER II
LITERATURE REVIEW

2.1 Introduction

Based on research, the human brain is able to recognize images in just 13 milliseconds. Other research also states that visual content is processed 60,000 times faster than other types of content. In addition, it has been proven that 90% of the information stored in the brain is visual. That is why almost all data is now displayed visually through effective data visualization processes, such as infographics.

Data visualization is a technology that supports the visualization and interpretation of data in an organization to be able to analyze data and gain insight into it, visualization methods are needed. The purpose of data visualization is to visualize data, convey information completely and effectively. With data visualization, the exploratory analysis of data carried out, has a high value and also the potential to explore the data is greater. Data visualization that can also be used to visually explore data can serve as hypothesis generation. With a visual display, it can allow users to easily see the insights that exist in the data.

2.2 Key Terms and Terminologies

2.2.1 Development

Development is a concept that refers to the process of change and growth that occurs in certain areas. Development can be an activity to improve the performance, quality, or efficiency of a particular product or system. For example, business development is done to increase the turnover and profits of a company, while product development is done to improve the quality and Reliability of the product offered.

2.2.2 Data

Data is a collection of information or facts made with words, sentences, symbols, numbers, and others. The data here is obtained through a search process and also precise observations based on certain sources. Another understanding of data is as a collection of basic information or descriptions thatcome from objects or events.

2.2.3 Comprehensive

The term "comprehensive" means broad, thorough, meticulous and all-encompassing. The term comprehensive is used to express a situation where something can explain information completely and broadly and provide more insight.

2.2.4 Visualization

Visualization is an engineering in the creation of images, diagrams or animations for the appearance of information. In general, visualization in the form of images both abstract and real has been known since the beginning of human civilization. Examples of this include paintings on cave walls from early humans, Egyptian hieroglyphic letterforms, Greek geometry systems, and Leonardo da Vinci's painting techniques for engineering and scientific purposes, etc.

2.2.5 Hybrid

A hybrid is a thing, object or technology that combines two different things, objects or technologies, but retains the properties and characteristics of both elements.

2.3 Review Relevant Literature

According to (Card, Mackinlay Shneiderman, 1998) the definition of visualization is to use computer technology as a support for visually depicting data that is interactive to strengthen observations. Meanwhile, according to (Mc Cormick, 1987) the definition of visualization is a method of using computers to transform symbols into geometric shapes and allow researchers to perform computational summaries that can enrich the scientific discovery process so as to develop a deeper and unexpected understanding.

Based on the above definition, it can be concluded that visualization is a technique of using computers to find the best method of displaying data. By using visualization, the data displayed can make it easier for researchers to see data that is difficult to see by thinking so that researchers can observe simulations and computations, as well as enrich the scientific discovery process and develop deeper and unexpected understanding. One example is by displaying data or information in the form of images, for example: graphs, tree structures, patterns, colors.

Some of the objectives of visualization are:

2.3.1 Exploring

Exploring, also known as exploring or searching, is the act of searching or exploring with the aim of finding something new. In terms of visualization, exploring can be in the form of exploiting existing data or information that can be used as one of the visualizations and decision-making elements.

2.3.2 Counting

Counting is an activity that aims to get an idea about the dimensions/shape of an object. In relation to visualization, counting can be interpreted as the activity of analyzing data in the form of images such as graphs and tables that have been calculated so that management only needs to make decisions from the data that has been calculated.

2.3.3 Conveying

Raw data that is processed and then displayed in forms such as graphs is a form of delivery by means of a visual approach which can make people who see the image can easily conclude the meaning in the picture because in general the data processed in the form of graphs is easier to understand because it is not complicated but directly to the point being emphasized. in theform of graphs is easier to understand because it is not convoluted but directlyto the intended point.

2.4 Review of Related Product

2.4.1 Tableau

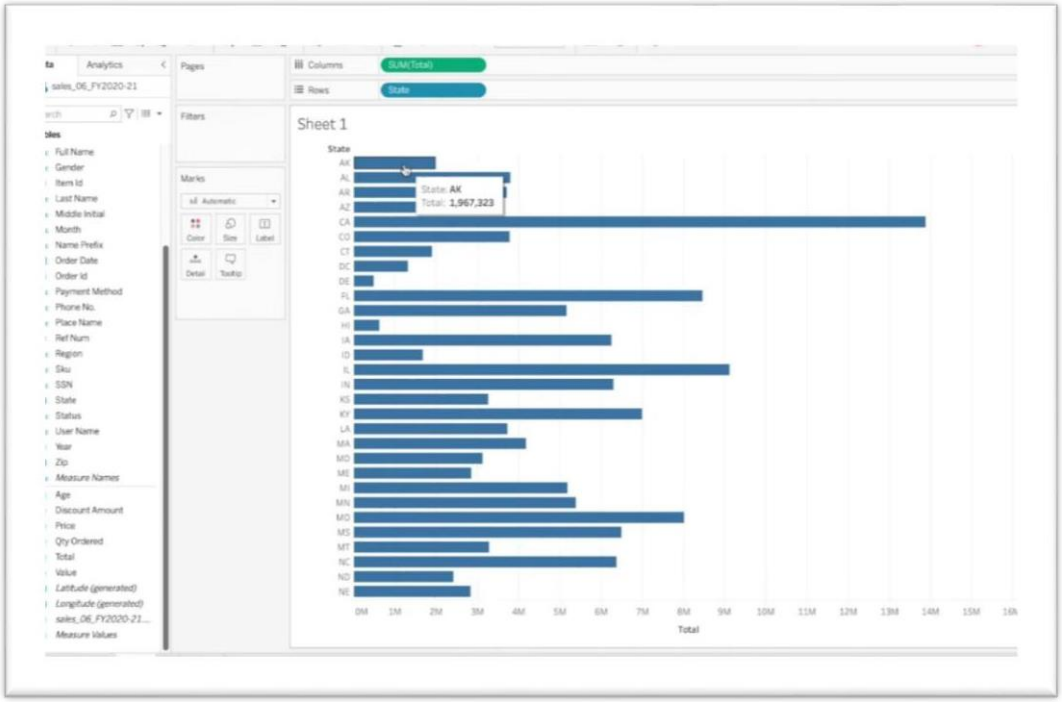

Figure 2. 1 Tableau Application

Tableau was founded in 2003 as a result of a computer science project at Stanford that aimed to improve the flow of analysis and make data more accessible to people through visualization. Co-founders Chris Stolte, Pat Hanrahan, and Christian Chabot developed and patented Tableau's foundational technology, VizQL which visually expresses data by translating drag-and-drop actions into data queries through an intuitive interface. Since our foundation, we've continuously invested in research and development at an unrivaled pace, developing solutions to help anyone working with data to get to answers faster and uncover unanticipated insights.

Tableau supports sophisticated data discovery and exploration, allowing

users to quickly gain important insights/information. Users do not have to be proficient in programming and can be used by beginners.

2.4.2 Power BI

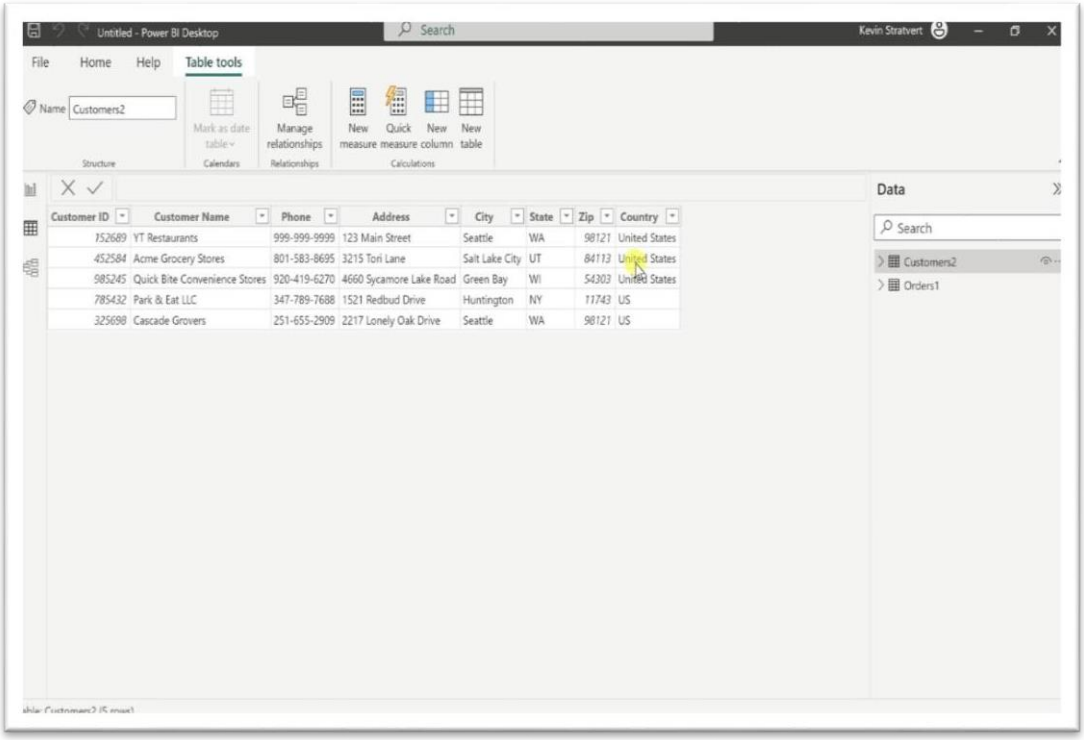

Figure 2. 2 *Power BI Application*

Power BI is a collection of software services, apps, and connectors that work together to turn your unrelated sources of data into coherent, visually immersive, and interactive insights. Your data might be an Excel spreadsheet, or a collection of cloud-based and on-premises hybrid data warehouses. Power BI lets you easily connect to your data sources, visualize and discover what's important, and share that with anyone or everyone you want.

If your business needs a powerful analytics tool, Microsoft Power BI is a great choice. This tool allows companies to visualize and analyze their company data easily. Not only that, the insights offered are also considered effective for the company's business needs in the future.

2.5 Comparisons of Related Products or Systems

Table 2. 1 Comparison Product

Features	Tableau	Power BI	Data Visualization Website (kochart)
Login/Sign up	✓	✓	✓
Input Data	✓	✓	✓
Visualize Data	✓	✓	✓
Export PDF	✕	✕	✓
Free	✓	✕	✓