Small Medium Enterprise Data Visualization Analysis as Strategic Business Development

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Abstract. Micro, Small, and Medium-Sized Enterprises (MSMEs) are economically productive enterprises that are privately owned. The purpose of micro, small, and medium-sized enterprises is to grow and develop the national economy in tandem with the objective of creating a competitive Indonesian society through local economic growth. Data science is a body of knowledge that incorporates a number of concepts and analytical techniques capable of solving contemporary problems. The implementation of data visualization is an effective method for discovering insights or information concealed within data. This investigation makes use of MSME data for the Jember district for the period 2020-2021. Using the scatter plot model, asset attributes and MSME turnover by region (sub-district) and business type were utilized to visualize the data. The dataset used in the analysis process has been pre-processed to ensure that the research conducted is relevant to the problem to be solved. The scatter plot model was selected for the visualization technique due to its ability to visualize data with attribute characteristics that have a correlation or attachment. Based on the results of a data analysis visualizing the productivity achievements of MSMEs in Jember Regency for the period 2020-2021, the level of achievement for MSME turnover in Jember Regency is no more than Rp. 25,000,000,-. Based on the findings of the analysis, the average proportion of MSMEs at this level is 92%. The results of the analysis also indicate that the type of trading business achieves the greatest turnover. The results of a comparative analysis of data on turnover achievements with assets indicate that the types of production and service businesses have the highest percentage, 64%, whereas the types of trading businesses score 56%.

1 Introduction

Micro, Small, and Medium-Sized Enterprises (MSMEs) are economically productive businesses owned by individuals or legal entities that meet statutory criteria. MSMEs serve as a means to expand and develop the national economy. The objective of MSME development aligns with the objective of creating a competitive Indonesian society through community economic development [1]. One of the functions of MSMEs in a country is to

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serve as a driving force for the economy, as a factor with a high contribution to the growth of gross domestic product, and to create jobs [2]. 97% of the total domestic workforce has been absorbed by MSME employees, according to available data. Capital (51.09%), marketing (34.72%), and other problems (3.93%) account for 72.47 percent of the problems encountered during the development of MSMEs [3]. On the basis of these issues, an appropriate strategic step is required to develop MSMEs so that the prepared strategies are appropriate and consistent with MSME development. Based on East Java Province BPS data, the productivity of MSMEs in Jember Regency rates sixth among all districts/cities in East Java Province [4]. This accomplishment demonstrates that MSMEs in Jember Regency have an excellent opportunity to compete on a broader scale.

Digital transformation is defined as the conversion of analog data into digital format [5]. Digital transformation serves as a method that organizations and businesses can employ to enhance their production processes through product integration. Involvement of technology is the process's primary determinant [6].

Data science is a body of knowledge that incorporates multiple concepts and analytical techniques to solve contemporary issues [7]. Several processes, including collection, management, processing, analysis, visualization, and interpretation, are utilized by data science in the production of knowledge from data processing [8]. Data visualization is the science and practice of disclosing data-concealed information [9]. The implementation of data visualization is an effective method for discovering insights or information concealed within data. Documentation or document The resulting data is presented as a grid-based visualization [10]. Through a process of data visualization, this study aims to glean insights from the productivity data of MSMEs in Jember Regency.

2 Research Method

In research, the research methodology employed serves as a guide for the procedures and stages conducted. The developed research methodology is a description of the research procedure conducted [11]. Figure 1 depicts the process and phases of the research conducted, beginning with the stage of data implementation in the visualization process and concluding with the analysis stage, which describes data on the productivity of MSMEs in Jember Regency.

![Fig. 1. Research Method](image)

2.1 Data Set

This investigation makes use of MSME data for the Jember district for the period 2020-2021. For the purpose of visualization, the turnover and asset information of each MSME is utilized. In addition, regional (sub-district) information and the type of business operated by each MSME are also utilized as attributes.

2.2 Visualization Process

This phase describes the data visualization procedure that is carried out using the research dataset. Using the scatter plot model, asset attributes and MSME turnover by region (sub-district) and business type were utilized to visualize the data. The objective of the data
visualization procedure is to gain insight into the productivity data of Jember district MSMEs [12]. These insights are utilized as informational findings to develop the business via business unit value findings [12][13].

2.3 Analysis Process
The final phase of the research involved analyzing data on the productivity achievements of MSMEs in the Jember district in order to gain insight based on the visualization outcomes. The intended outcome of the analysis is to determine the potential of MSMEs based on the region (subdistrict) and the type of business being conducted.

3 Result and Analysis

3.1 Data Set
The data used for analysis pertains to the accomplishments of MSMEs in the Jember Regency from 2020 to 2021. The sample dataset utilized in the analysis is displayed in Table 1. In the analysis procedure, the dataset was pre-processed to ensure that the research conducted corresponds to the problem to be solved [14].

<table>
<thead>
<tr>
<th>No</th>
<th>Village</th>
<th>District</th>
<th>Business</th>
<th>Business Activity</th>
<th>Asset</th>
<th>Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>5598</td>
<td>Tegal Besar</td>
<td>Kaliwates</td>
<td>Trading</td>
<td>Selling Martabak and Terangbulan</td>
<td>1.000.000</td>
<td>300.000</td>
</tr>
<tr>
<td>4895</td>
<td>Gebang</td>
<td>Patrang</td>
<td>Trading</td>
<td>Make Pastel Cakes</td>
<td>220.000</td>
<td>1.200.000</td>
</tr>
<tr>
<td>326</td>
<td>Tegal Besar</td>
<td>Kaliwates</td>
<td>Service</td>
<td>Motorcycle Service</td>
<td>1.000.000</td>
<td>180.000</td>
</tr>
<tr>
<td>14</td>
<td>Sukama kmur</td>
<td>Ajung</td>
<td>Service</td>
<td>Tailor</td>
<td>400.000</td>
<td>175.000</td>
</tr>
<tr>
<td>15</td>
<td>Ajung</td>
<td>Ajung</td>
<td>Service</td>
<td>Mobile Service</td>
<td>1.200.000</td>
<td>1.500.000</td>
</tr>
</tbody>
</table>

3.2 Visualization Process
Using the MSME achievement data set table 1 as a starting point, the scatter plot method is employed to visualize the data. The selection of the scatter plot model in the visualization technique is due to the model's capacity to visualize data with attribute characteristics that exhibit a correlation or attachment [15]. However, the irregular nature of the scatter plot's visual representation is a drawback of the model. In Figures 2 and 3, the results of the visualization of MSME achievement data in Jember Regency make use of the attributes of turnover and assets that have been reduced in dimensions and arranged as the x-axis and y-axis of a cartesian diagram. Moreover, the marks or nodes used in the visualization represent MSME business type (figure 2) and subdistrict (figure 3) based on the achievement data of MSMEs in Jember Regency.

3.3 Analysis Process
The results of the data analysis indicate that 92% of the MSME turnover achievements in Jember Regency fall within the range of an average turnover value of 25,000,000 and that 99% of the average asset value is 50,000,000. Based on the visualization results, it was
determined that there was only one SME with minimal assets or capital but a high turnover, namely the type of trading business depicted in Figure 2. Moreover, based on the results of the visualization depicted in Figure 3, it is evident that the district of Patrang is home to the MSMEs with the highest revenue achievements. The business activities of the MSMEs take the form of grocery stores that sell equipment for the community's daily requirements.

![Fig. 2. Asset and Revenue Data Visualization Based on MSME Business Types](image)

![Fig. 3. Visualization of Assets and Revenue Data based on District Data](image)

Achievement During the period of 2020-2021, the total revenue of MSMEs in Jember Regency is IDR 24,893,904,500. Based on these data, the percentage of business categories with the highest turnover value is the trading business type with a value greater than 60 percent. Figure 4 depicts the outcomes of each MSME business type's revenue attainment.
Fig. 4. Revenue achievement results based on the type of business

The type of production and service business has a higher comparative value than the type of trading business, based on the results of a comparison of the value of assets and revenue of each MSME business type. This is illustrated in Figure 5.

Fig. 5. Results of Comparison of Revenue and Asset Values for Each Type of Business

Furthermore for analysis result has been described in fig. 6 and fig. 7 data visualization for MSME productivity. Based on the results of the visualization, the visualization data has been illustrated the gaps in data productivity achievement from each commerce (perdagangan) and production/service (produksi dan jasa) MSME business type.
4 Conclusion

Based on the results of a data analysis visualizing the productivity achievements of MSMEs in Jember Regency for the period 2020-2021, the level of achievement for MSME turnover in Jember Regency is no more than Rp. 25,000,000,00. Based on the findings of the analysis, the average proportion of MSMEs at this level is 92%. The results of the analysis also indicate that one MSME has a higher turnover achievement value than other MSMEs. Small and medium-sized enterprises engage in the trading industry. However, it is not possible to conclude that trading businesses have the highest levels of revenue. Because a comparative analysis of data on turnover achievements with assets reveals that production and service business types have the highest percentage, namely 64%, while trading business types have a value of 55%, production and service business types have the highest percentage.

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References