COMPREHENSIVE VISUALIZATION OF MULTISECTORAL DATA IN PAGAR ALAM CITY: INTEGRATION OF BPS STATISTICS INTO A GOOGLE LOOKER STUDIO DASHBOARD TO SUPPORT REGIONAL PLANNING

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Abstract

This study aims to develop a comprehensive visualization of multisectoral data for the City of Pagar Alam by integrating data from the Central Bureau of Statistics (BPS) into a Google Looker Studio dashboard to support more effective regional planning. Optimal regional planning is expected to drive sustainable growth and improve community welfare. Although BPS provides accurate data, challenges in its presentation and interpretation often hinder effective decision-making. Through the Google Looker Studio platform, this study explores the creation of an interactive dashboard that presents demographic, education, agriculture, and economic sector data, enabling stakeholders to more easily identify patterns and trends. The results of this study show that effective data visualization can enhance transparency and accountability in the planning process and provide deeper insights for strategic decision-making. These findings not only contribute to improving planning in Pagar Alam City but also serve as a potential model for other regions in Indonesia aiming to optimize data use in decision-making.

Keywords

Data visualization, Pagar Alam City, Google Looker Studio, regional planning, BPS statistics integration, interactive dashboard, multisectoral data.

1. INTRODUCTION

Effective regional planning is a crucial component in promoting sustainable growth and development, as well as ensuring the welfare of citizens in urban areas (Shame et al., 2024). In this context, various population-related issues such as population density and demographic distribution must be addressed with serious attention. Furthermore, strategic sectors such as agriculture, livestock, and tourism serve as the main pillars of regional economic structures, which are reflected in the Gross Regional Domestic Product (GRDP). Therefore, integrating data into regional planning through a comprehensive approach is essential to optimize available resources and improve the quality of life of the population.

Technological advancements—particularly in the context of virtualization and artificial intelligence (AI)—have had a significant impact on smart city management. Technologies such as software-defined networking (SDN) offer the flexibility and scalability needed for more dynamic network management and resource allocation (Ali et al., 2023). Moreover, the use of predictive analytics in smart cities enables more intelligent decision-making based on big data, helping local governments utilize information more efficiently (Ali et al., 2023). With the rapid transformation of the transportation industry through mobility platforms, leveraging technology becomes essential to respond to and facilitate more sustainable economic growth (Elwy et al., 2023).

Although the Central Bureau of Statistics (BPS) plays a vital role as the official provider of accurate data across various sectors (Dewi & Wilantika, 2022), challenges in data presentation and interpretation still persist, affecting the effectiveness of regional planning (Kamalia & Nawangsih, 2025). BPS data indicates high poverty levels, particularly in Central Java Province, which requires deep understanding and predictive insight for effective poverty alleviation (Putra et al., 2023). This calls for BPS to be more prepared in applying knowledge management systems that support bureaucratic reform and more efficient data management, especially in the context of environmental challenges such as waste management (Mulyanto & Soerojo, 2022).

Data visualization has become a crucial tool to support regional planning as it helps stakeholders better understand complex information and supports more informed decision-making (Ismayati et al., 2024). With proper visualization, stakeholders can identify patterns, trends, and relationships in data that are difficult to grasp in tabular or textual formats (Imanuel & Alfian, 2025). For example, data from the Higher Education Database (PDDIKTI) can help university leaders understand student graduation patterns and facilitate the development of strategies to improve education quality (Ngatmari et al., 2020). Thus, data visualization becomes a key element in promoting more effective planning across sectors such as education, health, and the economy.

A limitation in previous research lies in the **underutilization of modern data visualization technologies**, such as Google Looker Studio, in the context of data-driven regional planning (Ngatmari et al., 2020). Most earlier studies still rely on conventional and static visualization techniques such as charts and diagrams, which offer limited deep insights (Ismayati et al., 2024). Addressing this gap, the present study aims to explore the implementation of Google Looker Studio as a more interactive data visualization tool to support regional planning, thereby opening opportunities for more effective data usage in strategic decision-making contexts.

This study aims to **explore the implementation of Google Looker Studio** in enhancing the effectiveness and accuracy of regional planning in Pagar Alam City (Darmawan & Karmilasari, 2024). Through the application of modern data visualization technology, this research is expected to make a significant contribution to promoting data-driven regional planning, and to develop visualization dashboards that can monitor and evaluate the implementation of government programs. The findings of this study are not only intended to improve planning in Pagar Alam City but also to serve as a model for other regions in Indonesia seeking to optimize data use in decision-making.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1. LITERATURE REVIEW

In a research study, it is essential to include findings from previous studies conducted by other researchers. Prior research serves as a foundation for analysis and provides relevant references related to the issues being investigated.

Tabel 1. Previous Research

No	Name	Title	Year	Research Metodhs	Objective	Research Result
1	*Shame, R. et al.*	Data-driven planning for sustainable regional development	2024	Qualitative	Examining the importance of data-based planning in achieving sustainable development goals in the region.	Demonstrates that integrating data from various sectors can increase the effectiveness of regional planning.
2	*Ali, A. et al.*	The Role of Technology in Smart Cities: An Analysis of SDN Usage	2023	Qualitative	Analyzing the impact of SDN technology in smart city management and resource allocation.	It was found that SDN provides the flexibility required for city management, improving networ k management efficiency.

3	*Kamalia, S. & Nawangsih, A.*	Challenges in Presenting BPS Data for Regional Planning	2025	Case Study	Identifying challenges in the presentation and interpretation of data by BPS to improve the effectiveness of regional planning.	This study found that complex data presentation often hinders in-depth understanding of poverty issues in the regions.
4	*Putra, R. et al.*	Combating Poverty through BPS Data: A Quantitative Approach	2023	Quantitative	Digging into poverty data from BPS to provide strategic solutions in poverty alleviation.	The results show that better data utilization can help local governments design more effective strategies to reduce poverty rates.
5	*Ismayati, R. et al.*	Data Visualization for	2024	Quantitative	Assessing the role of data visualization in	Proving that effective data visualization improves policy

No	Name	Title	Year	Research Metodhs	Objective	Research Result
		Regional Planning			Improving understanding and decision-making for stakeholders.	understanding, thereby aiding in better decision-making processes.
6	*Ngatmari, A. et al.*	Effectiveness of Information Technology in Education	2020	Quantitative	Analyzing the use of data in the education system to improve the quality of graduates.	Concludes that the use of data can help university leaders in formulating strategies to improve the quality of education..
7	*Mulyanto, D. & Soerojo, T.*	Knowledge Management and Bureaucratic Reform	2022	Qualitative	Investigating the importance of knowledge management in supporting bureaucratic reform in data management.	Found that good knowledge management helps in more efficient and transparent data management.

2.2. HYPOTHESIS DEVELOPMENT

Based on the literature review above, the following hypotheses can be developed for this study:

Hypothesis 1 (H1): The use of Google Looker Studio in multisectoral data visualization will enhance stakeholders' understanding of regional planning information in Pagar Alam City compared to conventional visualization methods.

Hypothesis 2 (H2): The integration of BPS statistical data into a Google Looker Studio dashboard will lead to more accurate and responsive decision-making in regional planning in Pagar Alam City.

Hypothesis 3 (H3): The implementation of modern data visualization technologies, such as Google Looker Studio, will accelerate data analysis and information delivery to stakeholders, positively impacting the effectiveness of regional planning in Pagar Alam City. By testing these hypotheses, this

study aims to provide empirical evidence on the benefits of modern data visualization technologies in supporting data-driven regional planning.

3. RESEARCH METHODOLOGY

This study aims to develop an interactive dashboard that can present multisectoral data from the Central Statistics Agency (BPS) using Google Looker Studio. The methods and stages of the research will be carried out through a series of structured steps to ensure optimal results and usability in regional planning.

1. Data Collection

Data will be collected from the official BPS website, covering relevant statistics. The required data types—such as Gross Regional Domestic Product (GRDP), education levels, population numbers, and other sectoral data—will be selected. Verification and validation will be conducted to ensure the data's accuracy and relevance (Angka, 2025).

2. Data Processing

Based on the research objectives, data processing will be conducted with reference to several relevant sources to assist in cleaning and organizing the data, as well as generating the necessary descriptive statistics. For instance, Maher et al. (2024) demonstrated the use of NVivo software for qualitative data management and thematic analysis. Meanwhile, Alshakhsi et al. (2024) emphasized the use of descriptive statistics and exploratory factor analysis for quantitative data. Similarly, Chawla et al. (2023) utilized NVivo for quantitative content analysis. In this study, tools such as Google Sheets, R, or Python will be used to clean the data and present relevant descriptive statistics to support more effective regional planning in Pagar Alam City.

3. Dashboard Development in Google Looker Studio

In line with the research objectives, several references will guide the design and development of an effective dashboard using Google Looker Studio. For example, Costa et al. (2021) demonstrated that dashboards can enhance transparency and accountability, although challenges remain regarding data accessibility. Ardon et al. (2023) explained the importance of near real-time dashboard updates with system-extracted data that can be accessed by administrators. Furthermore, Haghighi et al. (2022) and Petrides et al. (2022) showed that interactive analytical dashboards can assist in quick and responsive decision-making. These references provide essential guidance for developing a dashboard that can visualize multisectoral BPS data to support regional planning in Pagar Alam City.

4. RESULTS AND DISCUSSIONS

4.1. Results of the Pagar Alam City Population Data Dashboard

Figure 1 Population Data Dashboard

The developed dashboard functions to display and analyze population data based on age groups ranging from 0 to 75+, including the number of individuals and their gender. The following are several outcomes obtained from this dashboard:

a. Interactive Filter for In-Depth Analysis

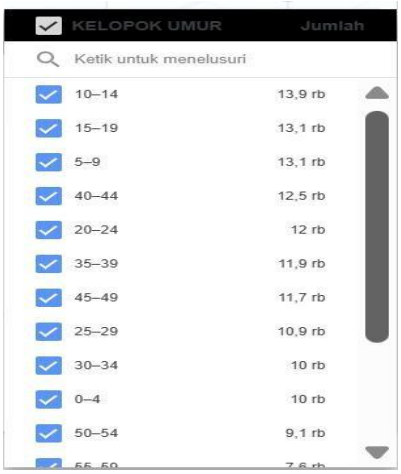

Figure 2 Filter by age group

- Users can use filters based on age to view more specific and detailed data.
- This feature enables users to conduct deeper analysis to identify age groups and population numbers.
- The age group with the highest population is 10–14 years old.

b. Population Visualization Based on Gender

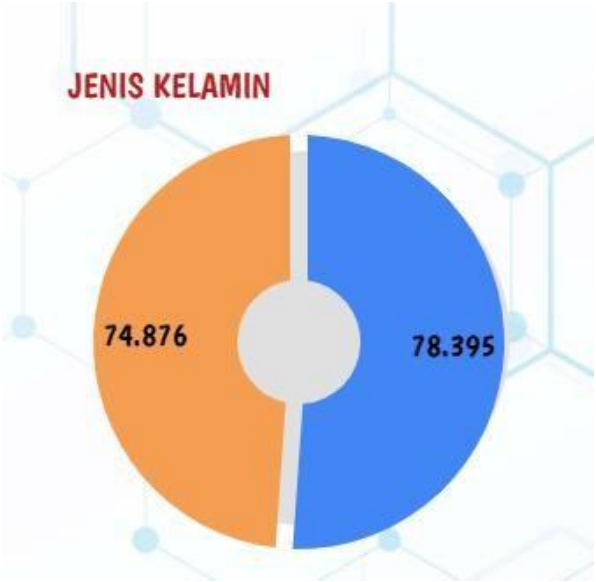

Figure 3 Visualization by Gender

- Doughnut Diagram (Pie Chart) displays the population based on gender
- Males show a higher number than females

4.2. Results of the Education Dashboard in Pagar Alam City and its Distribution

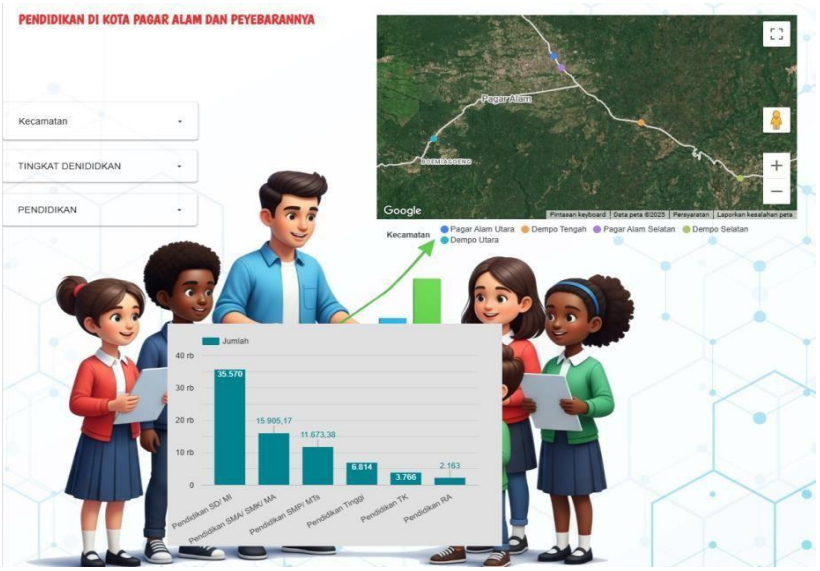

Figure 4 Education Dashboard

The developed dashboard functions to display and analyze education data in Pagar Alam City based on districts (kecamatan), education levels, and educational institutions, and is equipped with a distribution map. The following are some of the insights obtained from this dashboard:

a. Interactive education filter based on sub-district

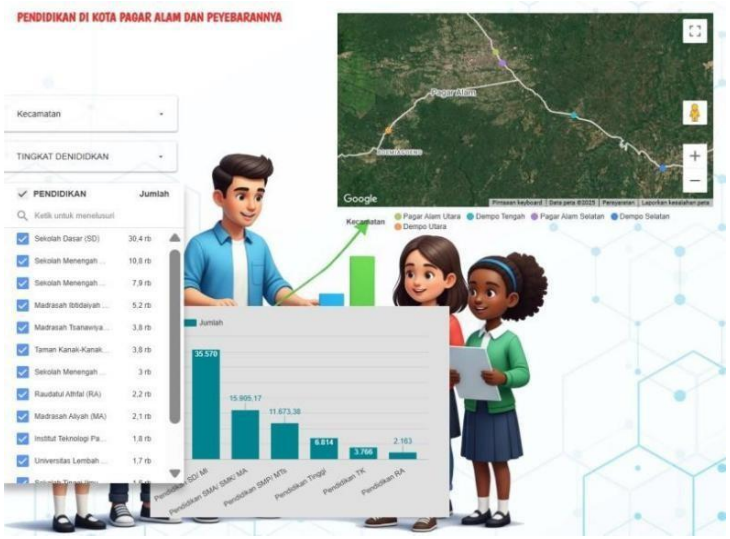

Figure 5 Education filter by district

- Users can apply filters based on districts (kecamatan) to view more specific and detailed education data.
- This feature allows users to conduct deeper analysis to identify education levels and institutions available in each district.
- South Pagar Alam and North Pagar Alam are the two districts with the highest number of residents/students, indicating a higher concentration of population and educational facilities in these areas.

- South Dempo has the lowest number, possibly due to it being more remote or less densely populated.

b. Interactive Filter Education Level

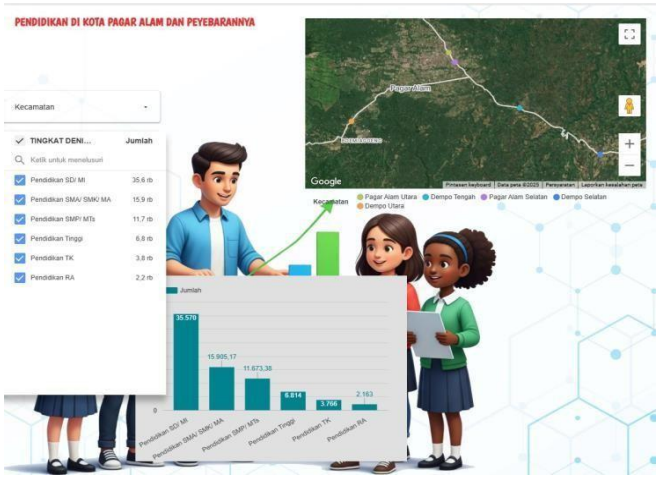

Figure 6 Education level filter

1. Dominance of Elementary Schools (SD/MI) :

   Basic education (SD/MI) is the level with the highest number of students (35,570), reflecting a relatively broad and mandatory coverage of elementary education.

2. Decline at Higher Education Levels:
   The number of students gradually decreases from junior high schools (SMP/MTs) to senior high/vocational schools (SMA/SMK/MA), and drops significantly at the higher education level, with only 6,814 university students.

3. Early Childhood Education (PAUD):
   The number of children enrolled in RA (2,163) and TK (3,766) is relatively small. This indicates a need to increase awareness and access to preschool education.

c. Interactive Filter of Educational Institutions

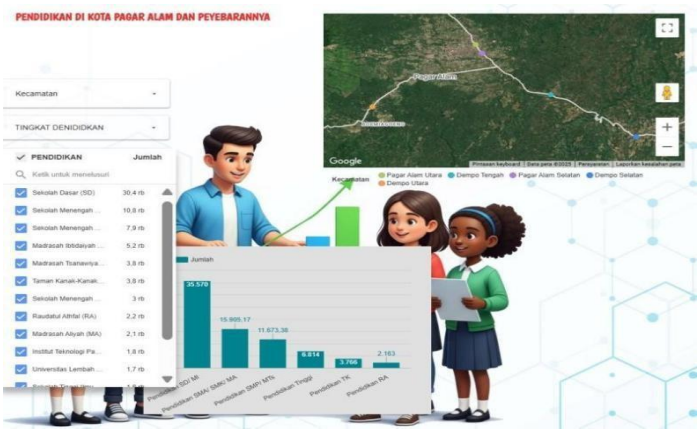

Figure 7 Educational Institution Filter

Figure 7 shows the number of students based on the type of educational institution, providing more detailed information than the previous chart.

- The City of Pagar Alam has a relatively even distribution of educational institutions across levels, with a dominance at the elementary level.
- There is a balance between public schools and madrasahs, indicating a diversity of educational options.
- The number of early childhood education (PAUD) students (RA + TK) remains low compared to the elementary level, presenting an opportunity to increase early-age educational interventions.

4.3 Agriculture and Plantation

Figure 8 Agriculture and Plantation Dashboard

The developed dashboard serves to display and analyze agricultural and plantation data, presenting information on types of agriculture, crop types, sub-districts, and members of farmer groups, complete with a distribution map. The following are some of the insights obtained from this dashboard:
a. Interactive Filter for Types of Agriculture.

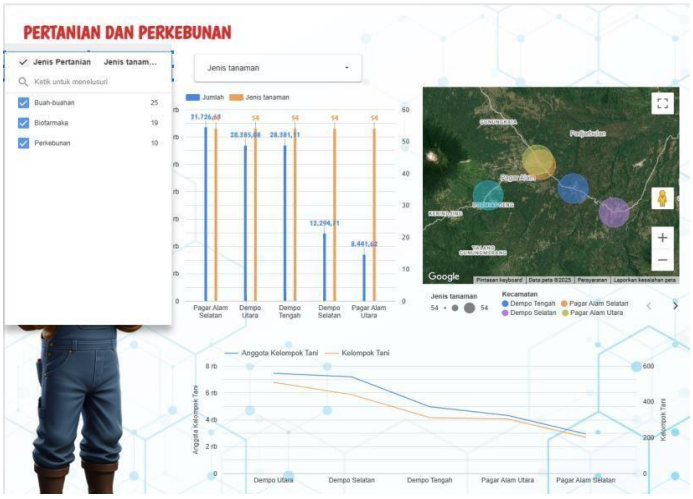

Figure 9 Agricultural Type Filter

Based on the agriculture type filter visualization dashboard, the following information was obtained:
Observed Agriculture
Types Three types:

- Fruits (25 data)
- Biopharmaceuticals (19 data)
- Plantations (10 data)

Bar Chart: Number & Type of
Plants per District Component:

- X-axis: Districts (South Pagar Alam, North Dempo, Central Dempo, South Dempo, North Pagar Alam)
- Left Y-axis (blue): Number of plants (in thousands)
- Right Y-axis (orange): Number of

plant species Findings:

- Highest number of plants: South Pagar Alam: ±31,726
  North & Central Dempo: ±28,381 Lowest number of plants:
  North Pagar Alam: ±8,441

The number of plant species is consistent across all sub-districts: 54 species

Interpretation:

- Although crop types do not vary across sub-districts, production/planting volumes vary significantly, indicating differences in land scale, farmer group effectiveness, or geographic conditions.
- The highest productivity is in South Pagar Alam and Central/North Dempo, despite the same crop types.
- North Pagar Alam and South Dempo need to improve production and

strengthen farmer groups. This data is suitable for:

- Determining policies for distributing aid or farmer training
- Analyzing disparities in agricultural output between regions
- Mapping potential agribusiness investments

b. Interactive Plant Type Filter

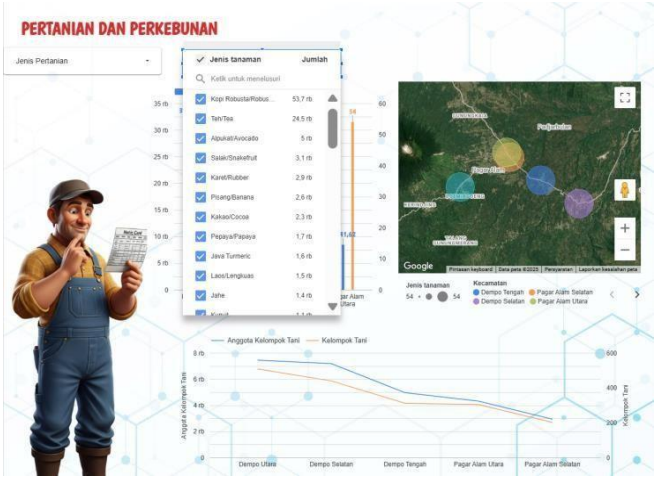

Figure 9 Plant Type Filter

Based on the dashboard visualization using the crop type filter, the following information was obtained:

- Robusta coffee and tea are the main flagship commodities in Pagar Alam.
- Other commodities such as avocado, banana, cocoa, and herbal plants (ginger, turmeric, galangal) have the potential to be developed for agricultural diversification or local processed products.
-

c. Farmer Group Graph

Figure 9 Farmer Group Filter

The Farmer Group Graph presents farmer groups and their members per sub-district, which can be seen in table 2 below:

Table 2 Farmer Groups

Subdistrict	Farmer Group Members	Farmer Group
North Dempo	Highest	Highest
South Dempo	Medium	Medium
Central Dempo	Decrease	Decrease
North Pagar Alam	Low	Low
South Pagar Alam	The Lowest	The Lowest

4.4 Animal Husbandry

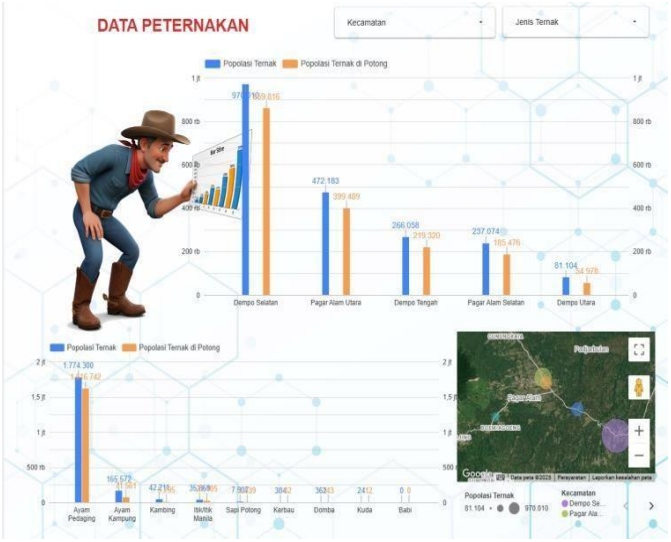

Figure 11 Livestock Type Filter

Using the Livestock Type Filter, users can view more specific and detailed data. This feature allows users to perform deeper analysis to identify specific types of livestock of interest and connect them with sub-district charts, livestock population graphs, and distribution maps.
Based on the Livestock Type Filter Dashboard in Pagar Alam City, the following conclusions can be drawn:

- Broiler chickens are the backbone of livestock farming in Pagar Alam City, both in terms of production and slaughter.
- Dempo Selatan is the livestock farming center, for both poultry and other animals.
- The population of large livestock (such as cattle, buffaloes, and sheep) is still very small — this presents a potential opportunity for development.
- High efficiency: the majority of livestock raised are also slaughtered (with few idle), indicating a well- functioning production cycle.

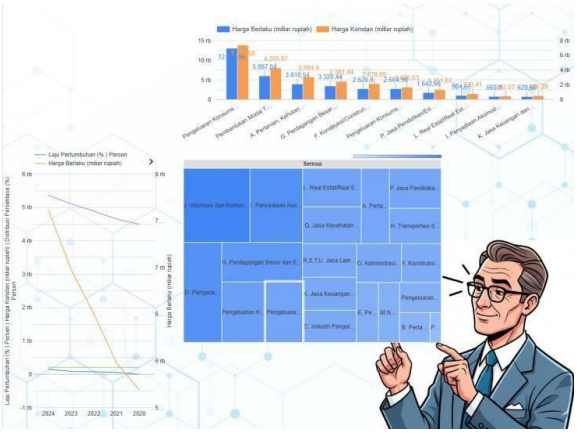

Figure 12 Dashboard GRDP

4.5. Gross Regional Domestic Product (GRDP)

The following is a comprehensive analysis of the economic dashboard you presented, which includes the structure of the Gross Regional Domestic Product (GRDP) based on current prices, constant prices, and economic growth by sector:

- Household consumption is the largest contributor to GRDP.
- Agriculture and trade are also key sectors in the economy.
- The gap between current prices (HB) and constant prices (HK) indicates sectoral inflation (prices are rising, but volume may be stagnant).

The economic growth rate declined sharply from 2022 to 2024.

Although the GRDP value (at current prices) did not drop significantly, real growth (calculated at constant prices) slowed down → indicating real economic pressures such as:

- Weakened purchasing power
- Stagnant production
- Low investment
- The economy is relatively diversified: not dependent on a single sector.
- Agriculture, education, real estate, and information and communication are the main drivers of the region's GRDP.

Recommendations

- Promote productive and sustainable sectors such as modern agriculture, agrotourism, and the digital economy.
- Increase private investment and Gross Fixed Capital Formation (GFCF) to maintain a healthy long-term economic structure.
- Optimize the communication, education, and health sectors through incentives and infrastructure development.
- Strengthen household consumption resilience through subsidies, market access, and support for MSMEs.

4.6. Tourism

Figure 13 Dashboard Tourism

The following is an analysis of the "Tourism Data and Supporting Data" dashboard for Pagar Alam City based on the visual elements presented:

- There is great potential in nature tourism, but the development of cultural narratives is needed to also grow cultural tourism.
- Dempo Selatan and Pagar Alam Utara are strategic areas for the development of nature-based tourism.
- A sharp decline occurred in 2020–2021, likely due to the COVID-19 pandemic.
- Recovery began in 2022, but has not yet returned to pre-pandemic levels.
- Domestic tourists dominate over international visitors — this could be the main market focus.
- In 2024, a significant growth in facilities is seen — indicating the revival of the tourism sector post-pandemic.
- Cultural tourism re-emerged in 2024 after being absent in previous years.
- Restaurants remained stable, while hotel and room accommodations increased sharply — indicating a rising interest from tourism investors.

Recommendations:

- Focus on promoting **nature-based tourism** through **ecotourism** and **adventure tourism**.
- Revive **cultural tourism** through festivals, local events, and **digital storytelling**.
- Support **culinary and accommodation MSMEs** to enhance the overall tourist experience.
- Encourage **inter-district collaboration** to develop **integrated tourism routes**.

5. CONCLUSION

This study has demonstrated that multisector data integration in Pagar Alam City through visualization using Google Looker Studio can make a significant contribution to supporting data-driven regional planning. By utilizing statistics provided by Badan Pusat Statistik (BPS) and offering an interactive and easily understandable representation, Google Looker Studio enables stakeholders to better understand the complexity of information related to population, economy, and other strategic sectors.

The results of the study show that the platform's ease of access and data interpretation can enhance faster and more accurate decision-making. This aligns with global trends in using advanced technology to create smart cities that are more efficient and responsive to public needs.

Furthermore, the study identifies that although there are challenges in data presentation by BPS, the use of modern visualization tools can help overcome these obstacles. Through this approach, stakeholders in Pagar Alam City can not only recognize patterns and trends in the data but also formulate more effective policies to improve public welfare.

Therefore, the use of Google Looker Studio as a tool for presenting multisector data is expected to serve as a model for other regions in Indonesia—not only to enhance regional planning efficiency but also to ensure that every decision made is based on strong and accurate evidence. This research offers an important first step toward more data-driven, transparent, and responsive regional planning in the digital era.

LIMITATION AND STUDY FORWARD LIMITATION

- Develop Partnerships with BPS:
  To overcome data access issues, it is recommended to build stronger partnerships with BPS and other statistical agencies. This can be done through collaboration in data collection and updating processes.

- Enhance User Skills:
  Provide training for stakeholders and users of Google Looker Studio to ensure they can operate the software effectively. With proper training, users will be able to fully utilize the software's features for more effective data analysis.

- Engage Multiple Stakeholders:
  Involve relevant parties such as government agencies, academics, and civil society in the data collection and analysis process. This can help in gaining broader perspectives and identifying important variables that may have been overlooked.

- Pilot Testing and Feedback:
  Conduct pilot testing of the visualization dashboard and collect feedback from users to improve the design and functionality. Prototype testing can help tailor the visualization tool to user needs before a full rollout.

- Allocate Sufficient Research Time:
  Extend the duration of the research to allow more time for deeper analysis and data validation, so that the scope of the study can be expanded more effectively.

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Acknowledgements
The authors thank to reviewers for insightful comments.

REFERENCES

Ali, S. A., Elsaid, S. A., Ateya, A. A., ElAffendi, M., & El-Latif, A. A. A. (2023). Enabling Technologies for Next-Generation Smart Cities: A Comprehensive Review and Research Directions. *Future Internet*, *15*(12), 398. https://doi.org/10.3390/fi15120398

Alshakhsi, S., Babiker, A., Sindermann, C., Al-Thani, D., Montag, C., & Ali, R. (2024). Willingness to Pay for Digital Wellbeing Features on Social Network Sites: A Study With Arab and European Samples. *Frontiers in Computer Science*, *6*. https://doi.org/10.3389/fcomp.2024.1387681

Angka, D. (2025). *KOTA PAGAR ALAM* (Vol. 25).

Ardon, O., Klein, E. A., Manzo, A., Corsale, L., England, C., Mazzella, A., Geneslaw, L., Philip, J., Ntiamoah, P., Wright, J., Sirintrapun, S. J., Lin, O., Elenitoba-Johnson, K. S., Reuter, V. E., Hameed, M., & Hanna, M. G. (2023). Digital Pathology Operations at a Tertiary Cancer Center: Infrastructure Requirements and Operational Cost. *Journal of Pathology Informatics*, *14*, 100318. https://doi.org/10.1016/j.jpi.2023.100318

Chawla, S., Sareen, P., Gupta, S., Joshi, M., & Bajaj, R. (2023). Technology Enabled Communication During COVID 19: Analysis of Tweets From Top Ten Indian IT Companies Using NVIVO. *International Journal of Information Technology*, *15*(4), 2063–2075.

https://doi.org/10.1007/s41870-023-01242-6

Costa, N. M. d., Mileu, N., & Alves, A. (2021). Dashboard COMPRIME_COMPRI_MOv: Multiscalar Spatio-Temporal Monitoring of the COVID-19 Pandemic in Portugal. *Future Internet*, *13*(2), 45. https://doi.org/10.3390/fi13020045.

Darmawan, S. A. D., & Karmilasari, K. (2024). Penerapan Metode ≪i>K-Means Clustering ≪/I>dan ≪i>Simple Moving Average ≪/I>untuk Memprediksi Jenis Penyakit Di Provinsi Jawa Timur. *Jurnal Teknologi Informasi Dan Ilmu Komputer*, *11*(4), 877–886. https://doi.org/10.25126/jtiik.1148703

Dewi, N. K. A. K., & Wilantika, N. (2022). Pengembangan Sistem Informasi Layanan Dokumen Alumni Politeknik Statistika STIS. *Jurnal Teknologi Informasi Dan Ilmu Komputer*, *9*(2), 255–362. https://doi.org/10.25126/jtiik.2021864776

Elwy, F., Aburukba, R., Al-Ali, A. R., Nabulsi, A. A., Tarek, A., Ayub, A., & Elsayeh, M. (2023). Data- Driven Safe Deliveries: The Synergy of IoT and Machine Learning in Shared Mobility. *Future Internet*, *15*(10), 333. https://doi.org/10.3390/fi15100333

Haghighi, M., Adhimoolam, D., Kwan, R., Gitman, M., McGuire, M., Mendu, D. R., Firpo-Betancourt, A., McBride, R. B., Cordon-Cardo, C., & Craven, C. K. (2022). Creating Surveillance Data Infrastructure Using Laboratory Analytics: Leveraging Visiun and Epic Systems to Support COVID-19 Pandemic Response. *Journal of Pathology Informatics*, *13*, 100164. https://doi.org/10.4103/jpi.jpi_54_21

Imanuel, D. A., & Alfian, G. (2025). Visualisasi Segmentasi Pelanggan Berdasarkan Atribut RFM Menggunakan Algoritma K-Means Untuk Memahami Karakteristik Pelanggan Pada Toko Retail

Online. *Jurnal Teknologi Informasi Dan Ilmu Komputer*, *12*(2), 283–292. https://doi.org/10.25126/jtiik.2025128619

Ismayati, H., Syahidin, Y., & Yunengsih, Y. (2024). Perancangan Sistem Automatic Indikator Rumah Sakit Menggunakan Metode Agile Guna Menunjang Rekam Medis Elektronik. *Jurnal Teknologi Informasi Dan Ilmu Komputer*, *11*(3), 615–624. https://doi.org/10.25126/jtiik.938893

Kamalia, A. Z., & Nawangsih, I. (2025). Identifikasi Pola Tingkat Kesenjangan Ketuntasan Pendidikan Di Indonesia Dengan Menggunakan Metode K-Medoids Clustering. *Jurnal Teknologi Informasi Dan Ilmu Komputer*, *12*(2), 321–330. https://doi.org/10.25126/jtiik.2025129219