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Comparative Analysis of Data Visualization Tools: Tableau, Power BI & Looker

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ABSTRACT

Data visualization tools are now becoming common due to the usability and function that they offer in different sectors. We are in the era of big data, which means that the usability that is needed for data visualization to work on the data is growing. Data is a growing part of our lives as there comes the need for understanding, analyzing, visualizing, and being able to use the data, which is key to how it is being used in various sectors.

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1. INTRODUCTION

The growth of big data is bringing more focus to the rise of data visualization tools. The paper provides a comparative analysis of the three tools, Tableau, Power BI, and Looker, which are the three tools of focus of this paper. These tools are common and can make data analysis seem like a simple method. Data visualization tools make everything a success in terms of understanding different aspects of how to handle data and what benefits that can come out of the data [1].

With these three tools to discuss, it offers so much insights to what data visualization can offer different users depending on the tools that they decide to use. The paper provides more information in how the three tools to be discussed compares to each other down with the pros and cons of each.

2. Comparative Analysis Of Data Visualization Tools: Tableau, Power Bi & Looker

In order to make the right distinction and comparison between the three tools, it would be easier to compare the three tools based on different aspects: ease of use, data connectivity, visualization capabilities, collaboration and sharing, and then, finally, customization and extensibility.

2.1 Ease of Use

a) Tableau: Tableau can be said to be more of a drag-and-drop, which adds more functionality to how it can be used. It makes everything easier to use and gives its users the ability to accommodate power users within the scripting options. Tableau basics are easy to understand, and the tool can even be used for different basic analyses for data options [2]. At

the same time, its advanced analytics part would need more knowledge and skills on the LOD functions, which requires more advanced analysis skills and knowledge to make everything work.

b) **Looker:** Looker is well known for its user-friendly interface. With this approach, it makes it possible to appeal to beginners and even technical users. Looker offers more ability to create simple and good reports, including dashboards, which is good for user content creation. A user can also analyze and visualize data within the tool; knowledge and training in data modelling concepts could be required to get seamless and quality results. In order for a user to do complicated and advanced work like building queries, reports, and even models, it could require reliance on experts on the tool for them to find results and work [3].

c) **Power BI:** with this tool, users are able to get a better experience and integration for Microsoft-centred organizations, with the tool offering better usability with so many Microsoft products. Power BI offers a user-friendly interface that also provides drag-and-drop functionalities. In this way, users are able to create reports, dashboards and clear visualizations without having expertise in the tool. Power BI offers more capabilities with the Power Query Editor, including the Pivot functionalities, which would offer more ways of data visualization from cleaning, manipulating and transforming data in different capabilities.

2.2 *Visualization Capabilities*

a) **Power BI:** this tool is so capable within the visualization capabilities with more expertise on having a huge range of extensive customization and visual capability. Power BI is capable of offering more visualization options to offer more specifications for the tools that it would offer. Compared to the others, it is more competitive with tools like matrices, maps, charts, and even tree maps, which have other specialized visual functionalities. Power BI also offers Q&A, which enables asking questions in natural language and then offers the generation of visualizations based on queries provided.

b) **Looker:** Looker offers a wide array of visualization functions from charts to graphs and even specialized visualizations like box plots, tree maps, heat maps, and so much more. It is not so much into data visualization capabilities as it is limited and lacks advanced customized features. Looker also offers more interactivity and more capabilities like drill-down abilities. It also allows users to explore data using a hierarchy based on filters and parameters that users can set.

c) **Tableau:** Tableau is well known for its rich visualizations. Users are able to create better, intricate and interactive reports and dashboards, making it the supreme tool for visualization. Tableau offers more functions with drag-and-drop interfaces for building better visualization capabilities. It also brings functionality by enabling the use of storytelling to be a key towards creating data visualizations with more options surrounding the interaction as the main stage. It adds more interactive dashboards for the users to take advantage of to guide what

would work with better insights and narratives, making the tool better to use in creating intuitive visualizations [4].

2.3 *Data Connectivity*

a) **Looker:** Looker excels at this capability by offering more functions within the data transformation and modelling as the cornerstone of the tool. It offers users the ability to support different data sources, which is a good one as there are so many sources of data. Looker also offers support for data connections, which can include traditional SQL databases like Oracle, SQL server and even MySQL. Users can also integrate with other modern data warehouses like Snowflake, Amazon Redshift, and even Google Big Query. Looker is also capable of enabling direct connection to the data sources, which can also enable data extraction capabilities.

b) **Tableau:** Tableau is capable of offering more connections to handling large datasets easily with no problem. It is also capable of connecting data sources from traditional databases like Oracle down with cloud-based warehouses like Snowflake and Google BigQuery. Tableau is also capable of supporting live connections and data extraction, which is key to its usability options.

c) **Power BI:** This tool is versatile and has many functions, such as connecting to data sources through the integration of Azure services [5]. Power BI offers more connectivity by offering a huge range of data sources, with its best seamless integration with Microsoft products like Excel, cloud services like Salesforce, and even other databases like PostgreSQL. With these integrations, Power BI becomes a shining tool when it is used with Microsoft products and tools. Power BI also offers direct query connections to various sources, including the import and transformation of data extracted.

2.4 *Customization And Extensibility*

a) **Tableau:** Tableau is very much focused on customization for users based on their work and preferences. The tool also offers support for the scripts to offer more functions, which makes it ideal for complex queries and visualization work. Users get better customization with the ability to play with different tools, from labels, colours, and even formatting based on their preferences. Tableau offers support extensions for better custom visualization, making the tool the best in terms of the functionalities and customization that it would bring to users.

b) **Looker:** looker is limited in its ability to offer complex customization for the preferences that users would require. It cannot integrate custom code or plugins for user customization options. At the same time, users would put more emphasis on better customization efforts by offering LookML. Looker offers users the ability to define their data models, customize data visualizations, add custom logic for business and even create reusable definitions.

c) **Power BI:** This tool is capable of offering support for custom visuals, which adds to its integration with Azure services. This integration offers more extensions in terms of functionality opportunities that it would add to the specific choices used. Users using this tool would add more creation of custom

visuals through Visual SDK. This tool would bring more functions for building and integrating custom visualizations through the reports and dashboards [6].

2.5 *Collaboration And Sharing*

a) **Power BI:** Power BI is a simplified tool that offers more capable services that would integrate with other Microsoft tools for better collaboration. Better collaboration with Microsoft products and SharePoint offers more sharing options than other tools. Users are able to get role-based access control systems, which is key for managing collaboration and sharing depending on managing user roles and access permissions. It also allows users to create app workspaces, including sharing reports and dashboards, which is good for a centralized location for the users.

b) **Tableau:** this tool is robust in terms of offering better collaboration features for users. This ability allows users to publish reports to the Tableau server for sharing, which is good for collaboration. Tableau is capable of a content management system that enables better organization of files or content that should be shared and categorized.

c) **Looker:** Looker excels in this aspect. Users get the ability to facilitate reporting and a dashboard, which is key for platform sharing and is a good tool for collaboration. Users have control over permissions, user roles, and access. Better collaboration offers users access to the same dataset while reducing issues in data interpretation [7].

3. CONCLUSION

With so many comparisons between the three tools, it adds more details to decide on which tool one can choose, depending on which aspect is important for their work. These three tools are capable of making data visualization work easier based on queries and types [8].

The tool that offers so much capability would be tableau that I can choose given that it almost does everything as compared to the other depending on context and application that it offers. It would be the best for what one would choose as it does everything which shows how it can be the best tool for use to show how data visualization works and its benefits.

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