Comparative Essay

Prachi Shivam Parashar

Muma College of Business, University of South Florida

ISM 6419 Data Visualization

Dr. Han Reichgelt

July 14, 2024

Introduction

In today's world, we generate a lot of data on a daily basis, which can be beneficial for lots of businesses to get maximum profit. Therefore, to convert these raw data into informative graphs and charts data visualization tools are helpful. With the help of data visualization, businesses can quickly interpret complex data and make better data-driven decisions. It also helps in identifying trends and patterns that can drive strategic actions. Various data visualization tools and programming languages have been developed to represent raw data into meaningful data, each tool and language has its own strengths and weaknesses. In the class of data visualization, I learned many tools such as Tableau, Power BI, Qlik, R, etc. Each type of tool serves different needs and requires different skill levels. In this essay, I will compare all the prominent data visualization tools and programming langauges. The comparison will cover similarities and differences, ease of use, and overall effectiveness in creating visualizations. Data visualization tools can be categorized into three main types: general data visualization tools, cloud-based data visualization tools, and programming-based data visualization tools.

General Desktop Data Visualization Tools:

These are independent software applications that anyone can install directly on the computer. These applications can be operated locally on computer to create visualizations. For instance, Tableau Desktop and Power BI which I used in the course as well. The main advantage of these application is that people can work offline without having an internet connection and it is easy to use. These tools often provide a user-friendly interface and are suitable for users with varying levels of technical skills.

Tableau Vs. Power BI

In the first week of class, I got the exposure on the Tableau. It has a user-friendly interface and powerful visualization capabilities. After that I got exposure of Power BI another popular data visualization tool, it integrates seamlessly with other Microsoft products, and I felt that it needed more technical skills than tableau. Personally, I found Power BI a bit more difficult than Tableau. However, since I have a technical background, it wasn't a problem for me. But beginners, especially those from non-technical backgrounds, might find it challenging. Overall, I will choose tableau in future to create data visualization.

Similarities in Tableau Vs. Power BI

Tableau and Power BI are both powerful data visualization tools that support a wide range of data connections, including databases, cloud services, and spreadsheets. In this course, I used excel sheets to connect with data. Both the platforms have a feature drag-and-drop interfaces, making them accessible even for non-technical users. They allow users to create interactive and shareable dashboards with minimal or no programming knowledge. Both tools provide strong analytical features, including the ability to create calculated fields, I can export data and visualizations in multiple formats, and design customizable dashboards. They distinguish between measures (quantitative data) and dimensions (qualitative data) and support real-time data updates.

Differences in Tableau Vs. Power BI

Power BI and Tableau are both great tools for making data visualizations, but they have some differences as well. Power BI's hierarchy and drill-down options are very easy to use where anyone can just click to see more detailed data. Tableau also has this feature, but it's a bit more complex and gives us more control. For example, in Power BI, I can click on a year in a sales chart to drill down to see sales by month. In terms of calculated fields, Tableau is

stronger for complex calculations, while Power BI is simpler and better for basic ones. Furthermore, Tableau offers more types of charts and allows for more customization. Tableau has more advanced sharing options through Tableau Server and Tableau Online, which are good for larger teams.

Cloud-Based Data Visualization Tools:

The other type of visualization tool is a cloud-based tool. In the class of data visualization, I used two clouds-based tools that are Qlik and Google Looker. As a name implies these are hosted on the cloud and they provide all the functionalities of general data visualization tools like Power BI but with the added benefits of cloud computing. Cloud based tools provides a greater scalability, remote access, and collaborative features that allow multiple users to work on the same project simultaneously. These tools are ideal for teams that need to access data visualizations from different locations. I believe that one disadvantage of cloud-based tools is that they require a good internet connection to access.

Qlik Vs. Google looker Studio

In module 7, I learned about the Qlik and Google Looker Studio and both are cloud-based tools. Qlik provides two main products for data visualization: QlikView and Qlik Sense. Qlik is more costly. On the other hand, Google Looker, now part of Google Cloud, offers a modern approach to data analytics and visualization. It is designed to work seamlessly with cloud data warehouses and provides a powerful platform for creating custom dashboards and reports. Among both I prefer to work on the Qlik because I found it easy, and I feel like it provides more flexibility.

Similarities in Qlik Vs. Google looker Studio:

Qlik and Google Looker are similar in several ways. Both the tools provide strong hierarchy

and drill-down options, allowing users to explore data details with ease. For example, in each tool, I can click on a high-level sales report to see individual sales by region or product. They also support calculated fields, which let users create custom calculations from their data, like profit margins or growth rates. When it comes to dashboards and charts, each platform allows users to create interactive and visually appealing dashboards that display various types of charts and graphs, such as bar charts and line graphs. Visualization sharing is straightforward in all three tools and users can easily share their dashboards with others, whether through a link, or within their organization's network. This makes collaboration and data sharing convenient and efficient.

Differences in Qlik Vs. Google Looker Studio:

Qlik and Google Looker are both great for data visualization, but both have some key differences. First, Qlik offers strong hierarchy and drill-down options, allowing users to explore data in detail with ease. Whereas, Google Looker also has these features but focuses more on data exploration through a simple, user-friendly interface. On the other hand, for calculated fields, Qlik is powerful and flexible, ideal for complex data calculations and google looker is more straightforward and easier for beginners. Both platforms create dashboards and charts, but Qlik provides a wider range of customizable visualizations. For sharing visualizations, Qlik's Qlik Sense allows users to share insights across teams efficiently, while Looker's integration with Google Cloud makes it easy to share visualizations and collaborate in real-time.

Programming-Based Data Visualization Tools:

Another type of visualization tool I used which involves programming-based visualization using Python and R. Programming based tools are the libraries within programming environments to create data visualizations for instance, the gglot in R. In programming tools

people need write code to generate visuals it does not provide drag and drop feature. These tools offer maximum flexibility and customization options, making them suitable for more complex and specific data visualization needs. Programming based tools are good for people with technical background instead of the non-technical. They are mostly preferred by data scientists or developers to perform advanced data analysis.

Python vs. R

In module 8 and module 9, I learned to create visualization in the programming language Python and R. First, Python, it is a flexible language that is widely used for data analysis and visualization. Libraries such as matplotlib provide powerful tools for creating a wide range of visualizations. Whereas R is another language that is specifically designed for statistical computing and graphics. In R, I used ggplot2 package to create complex and aesthetically good visualizations. Among both languages, I found R easier

Similarities in Python Vs. R:

When it comes to the similarity Python and R Looker share several similarities. Both tools support efficient data loading, allowing us to import data from various sources. Both offer hierarchy and drill-down options, which enables us to explore data in depth. In terms of calculated fields, both Python and R Looker provide strong options to create and manipulate data calculations field. With Python and R Looker, I can easily share these visualizations in different formats and on various platforms, making it simple to share reports with others.

Differences in Python Vs. R:

Both Python and R can be used to create a visualization, but they both work differently. First, both are different coding language. For me, writing code in Python was a bit difficult, whereas I found R Looker to be a language that makes it easy to load and analyze data with a

user-friendly interface. For creating hierarchies and drilling down into data, R Looker has simple, built-in options, while Python requires more coding. Another thing I think is that creating calculated fields is easy in R Looker, but in Python, we have to do the calculations ourselves. Both can create dashboards, but R Looker has built-in tools for this, while Python uses libraries like matplotlib for more custom options. I found that making charts and graphs in R was quick, whereas in Python, I needed to do more detailed customization. Overall, I prefer to work on R.

Conclusion

In conclusion, the choice of data visualization tools or programming languages depends on the individual choice. Every tool fulfils different requirements, and each tool has its own strengths and weaknesses. The best choice of tool depends on ease of use, cost, integration capabilities, and specific project requirements. For non-technical users, I have found Tableau and Power BI to be the easiest to use because they have user-friendly interfaces. On the other hand, Qlik, which is a cloud-based tool, needs more learning but provides strong data exploration features, making it better for advanced users. Between Qlik and Google Looker Studio, I find Qlik is easier to use. Furthermore, in programming tools, both languages are flexible, but the best choice depends on personal preference. From my experience, I find R easier and more suitable. In the future, I prefer to work on a desktop tools like Tableau and Power BI because they are easier to use for me, and their interface is also user friendly. Overall, understanding these differences helps everyone to pick the best tool to get the best results from their data.