# Landscape of Data Visualization Tools

A Comparative Analysis of Tableau, Power BI and Qlik

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## Executive Summary

This report provides a comparative analysis of three leading Business Intelligence (BI) tools: Tableau, Power BI, and Qlik. While all three have strong capabilities, each tool has been evaluated across several criteria to provide insight into their performance and impact on professionals, to ultimately determine which is most suitable for an organization.

**Purpose**
The purpose of this report is to guide data professionals and decision-makers in selecting the most appropriate BI tool for their teams and organization. By highlighting each tool's features, strengths, weaknesses, and business implications, this report seeks to provide the insights needed to make informed decisions that align with specific business needs.

**Methodology**
To ensure a fair comparison, Tableau, Power BI, and Qlik were evaluated using the same three datasets of various sizes: Titanic, Wine Reviews, and NYC Taxi. Using these datasets, each tool was assessed based on a set of established criteria to determine their performance, capabilities, and overall suitability.

**Comparison Criteria**
The BI tools were evaluated based on the following criteria to provide a comprehensive comparison:

- Ease of Use
- Live vs Extracted Data
- Speed
- Cloud
- Data Types
- Interface
- Charts
- Storytelling
- Collaborative Features
- Cost
- Support Availability

**Business Implications**

- **Tableau**: Best suited for medium to large organizations that prioritize impactful visual storytelling.
- **Power BI**: Ideal for organizations within the Microsoft ecosystem, offering affordable, scalable solutions for small to medium enterprises.
- **Qlik**: Suitable for industries and organizations needing deep analytics, such as in healthcare and finance, where data complexity is high.

**Conclusion**
After evaluating all three tools, Power BI is the recommended BI tool due to its seamless integration in the Microsoft ecosystem, affordability and data connectivity features. Power BI is the ideal choice for teams in an organization already integrated in the Microsoft environment. However, for medium to large teams seeking an all-in-one solution that allows for everything to be done within one interface, Tableau is of great value. Qlik, while a powerful tool, is less suitable for non-technical users and teams that prefer an intuitive interface.

## Introduction

In today's increasingly data driven world, Business Intelligence (BI) tools have become increasingly important to organizations, in order to provide overviews and drill-downs of data through charts and dashboards. The primary purpose of Business Intelligence tools is to enable organizations to make better-informed decisions.

Among the leading BI tools are Tableau, Microsoft Power BI and Qlik. Each of these tools has its own advantages, disadvantages and specialties. This report will explore and compare the features, capabilities and ease of use of each tool, as well as determining where each tool wins out.

Tableau

A leading Business Intelligence tool, Tableau is known for its pleasing visualizations which can be transferred to interactive dashboards. It has a simple and intuitive interface, and supports various data sources, making it accessible to nontechnical users[21].

Power BI

Developed by Microsoft, Power BI integrates seamlessly with other Microsoft products and services. Its affordability and data modeling features make it particularly attractive for organizations already embedded in the Microsoft ecosystem. Power BI is popular for its ability to generate quick analyses.

Qlik

Qlik is a powerful platform that emphasizes enabling users to explore data and conduct in depth analyses. While it allows for the creation of charts and dashboards, its primary focus is on sophisticated and deep data analysis[4]. Although it may be less intuitive than Tableau or Power BI, once users become familiar with its functionalities, Qlik can generate highly impactful insights. It is widely used in industries such as finance, supply chain, healthcare, and retail to monitor performance, operational efficiency, and data-driven decision-making. It is suitable for complex, data-heavy environments where deep analytics are required.

## Methodology

To assess this data and ensure fairness, all three tools were tested with the same three datasets of various sizes. The smallest dataset, Titanic, was 61 KB[7]. The Wine dataset, at 52 MB[8], was used as a sample medium sized dataset. The largest dataset, NYC Taxi, at 2.4 GB[16], was tested on only a few graphs to check how the BI tools handled such large data. Each tool was used to make the same charts on the same data where possible and, in the absence of the same chart, the closest equivalent was used. Both the process of creating the chart, and the visual appeal were considered across each criterion.

## Comparison Criteria

### *Ease of Use*

Tableau
Tableau is user-friendly for nontechnical users, thanks to its intuitive drag-and-drop functionality that simplifies creating charts and basic calculations like averages or bins. Visualizations are easy to generate, with straightforward tools for creating impressive visuals, including maps that can be made with just a single click, making it accessible even for beginners looking to create polished presentations. However, complex calculations may require some additional learning.

Power BI
Power BI also provides an intuitive drag-and-drop interface, making it easy to generate visualizations, even for beginners. The learning curve is primarily around advanced features like data modeling and custom calculations[15]. Visualizations such as bar charts, maps, and word clouds were created with relative ease, however, many queries and transformations require knowledge of the excel language.

Qlik
Qlik is generally regarded as a powerful data analytics tool, but its ease of use can vary depending on the user's role, experience, and the specific Qlik product being used. Qlik Sense is more user-friendly as compared to QlikView. On the other hand, QlikView is more complex and requires more technical expertise to build dashboards and reports[3]. Overall, Qlik softwares has a steeper learning curve due to its complex scripting language and data manipulation capabilities[22].

**Winner: Tableau**
In comparison to the other tools, Tableau was found to be the most intuitive tool, particularly for non-technical and new users.

### *Live vs Extracted Data*

Tableau
Tableau offers both live and extracted data options. Extracted data performs better with large datasets as it isn't dependent on source speed, though it may not be up to date. Live connections provide real-time updates, but can be slower with large datasets due to dependence on the source.

Power BI
Power BI offers both live data connections and extracted data options, providing flexibility based on the use case. Similar to Tableau, while extracted data improves performance for large datasets, live connections are beneficial for real-time updates but may be slower with extensive data sources[11]

Qlik

QlikView primarily operates on extracted data that is loaded into memory. It uses pre-loaded data for analysis. Live data support is very limited, and performance depends on the type and size of data.

**Winner: Tableau and Power BI**

All three tools provide the user with the ability to work with both live data as well as extracted data. However Qlik has limited support for live data and remains dependent on the type of data.

### *Speed*

Tableau

Tableau is generally a fast tool, particularly with extracted data, maintaining strong performance even for large datasets. Basic functions and simple calculations typically run smoothly without noticeable slowdowns. Although very large datasets, such as the 2 GB+ NYC Taxi dataset[16] we tested, take slightly longer to load, calculation and chart creation speeds are largely unaffected. As mentioned, while Tableau's performance with extracted data is mostly robust, live connections depend on the source data, which may affect overall speed.

Power BI

Power BI generally offers strong performance, particularly when working with extracted data. Basic functions, such as filtering, creating charts, and exploring data, were executed without noticeable lag, even as the datasets contained thousands of records. However, there was a noticed increase in loading time as the datasets increased in size. Also similar to Tableau, when working with live data connections, the speed in Power BI can vary depending on the source's performance and the complexity of the data queries[11].

Qlik

QlikView uses in-memory processing, which enables fast querying and interaction with large datasets. However, its performance can depend on the complexity of the data model and how well the application is optimized. It works faster for small data sets but it faces difficulty when uploading large data sets.

**Winner: Tableau**

Tableau was the fastest to upload data, regardless of file size and handled the data the best overall.

### *Cloud*

Tableau

Tableau's cloud capabilities are available through the paid Tableau Online, which allows users to publish, access, share, and collaborate on dashboards from anywhere. It can connect to cloud

databases such as AWS, Azure, and Google BigQuery, which is ideal for organizations seeking scalable and remote-access solutions.

Power BI

Power BI offers cloud capabilities through the Power BI Service, allowing users to publish, share, and collaborate on reports and dashboards online. It integrates with Microsoft's cloud infrastructure, such as Azure and Sharepoint, making it a good choice for organizations that rely on Microsoft's ecosystem[10]. However, these advanced cloud features, such as scheduled data refreshes and real-time collaboration, require a Power BI Pro subscription, which is not available in the free version[13].

Qlik

QlikView is primarily an on-premise solution. It enables users to share their reports and sheets, it also offers cloud service where users can work together, but both of these features are for subscribers only and not available in free trial.

**Winner: Tableau**

While Power BI has better connections within the Microsoft ecosystem, Tableau offers cloud capabilities across a more varied range of major cloud platforms.

### *Data Types*

Tableau

Tableau can effectively read, categorize, and identify most data types, including common separators and locations for maps. Users can split columns, correct data, and create bins, and have Tableau alert them to errors, automatically aggregating data for visualization. However, it is recommended to pre-clean data before loading to make the process more efficient, as Tableau has limitations with unclean data.

Power BI

Power BI can handle a wide variety of data sources, including Excel files, CSVs, SQL databases, cloud services like Azure, and even web APIs. The Power Query Editor provides an interface for data transformations[11]. Although it can work with datasets up to 1GB in size for free users, larger datasets require Power BI Pro or Premium licenses and connections to cloud-based services for better performance[13]. Pre-cleaning data in excel before loading it into Power BI was found to be necessary to ensure a smoother and faster data visualization process- once again highlighting the usefulness in using this tool in a microsoft ecosystem.

Qlik

QlikView is capable of handling structured data from a variety of sources. It integrates with multiple systems to pull in data from diverse environments, making it a good fit for organizations with complex, multi-source data requirements[4]. It can handle large datasets effectively. Qlik Script offers powerful data transformation, allowing users to clean and

manipulate data before loading. However, it requires some knowledge of proprietary scripting, making it less accessible to non-technical users.

**Winner: Power BI**
Power BI can handle the widest variety of data types and can handle unclean data better than the other tools tested.

### *Interface*

Tableau
Tableau has a highly intuitive interface centered around a drag-and-drop functionality, which makes it easy for users to create and customize visualizations. The interface is designed to simplify data exploration, allowing even new users to effortlessly build dashboards by connecting various data sources. While visually appealing and accessible to users with diverse technical skills, the full depth of Tableau's interface can present a learning curve for those unfamiliar with advanced features such as creating calculated fields, performing table calculations, data blending and joins.

Power BI
Power BI's interface features a drag-and-drop functionality that makes creating visuals straightforward. The Report view allows users to build dashboards and reports by easily connecting to data sources and selecting visualization types. The Power Query Editor offers a way to clean and transform data before analysis. While basic charts and visuals are easy to create, more complex tasks such as DAX calculations, data modeling, and setting up relationships can introduce a learning curve for beginners.

Qlik
The interface is functional but can be difficult for non-technical users. The terminologies are difficult to understand. It offers flexibility in building custom layouts, but the design and user experience are not as intuitive or modern as newer BI platforms.

**Winner: Tableau**
Tableau had the most intuitive interface for new and nontechnical users. Most basic charts can be designed through simple and apparent actions.

### *Charts*

Here some common chart types are compared. Visual quality and ease of creating various charts were considered. Where a particular chart type was not available in the same format, the nearest equivalent was used.

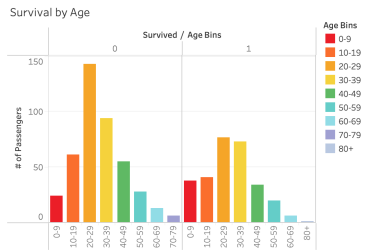
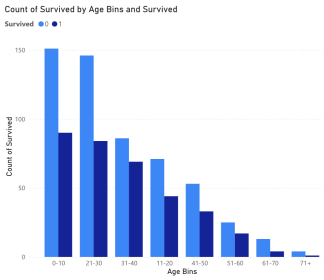
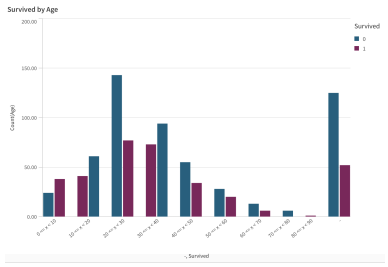
| Bar Charts | | |
|---|---|---|
| 1.1 Tableau | 1.2 Power BI | 1.3 Qlik |
|  |  |  |



Table 1. Bar Chart - Survived vs Age Bins (Titanic Dataset)

**Winner: Power BI**

Tableau had difficulty creating an unstacked bar chart with two counts next to each other for a clear comparison. As well as this, Qlik and Power BI both had greater variety in type of chart and Power BI overall had more color choices.

| Tables | | |
|---|---|---|
| 2.1 Tableau | 2.2 Power BI | 2.3 Qlik |

Avg Wine Ratings and Prices by Country

| Country | Avg. Points | Avg. Price |
|---|---|---|
| Albania | 88.00 | 20.00 |
| Argentina | 86.00 | 20.79 |
| Australia | 87.89 | 31.26 |
| Austria | 89.28 | 31.19 |
| Bosnia and Herzegovina | 84.75 | 12.75 |
| Brazil | 83.24 | 19.92 |
| Bulgaria | 85.47 | 11.55 |
| Canada | 88.24 | 34.63 |
| Chile | 86.30 | 19.34 |
| China | 82.00 | 20.33 |
| Croatia | 86.28 | 23.11 |
| Cyprus | 85.87 | 15.48 |
| Czech Republic | 85.83 | 18.00 |
| Egypt | 83.67 | |

| country | Average of points | Average of price |
|---|---|---|
| Argentina | 86.71 | 24.51 |
| Armenia | 87.50 | 14.50 |
| Australia | 88.58 | 35.44 |
| Austria | 90.10 | 30.76 |
| Bosnia and Herzegovina | 86.50 | 12.50 |
| Brazil | 84.67 | 23.77 |
| Bulgaria | 87.94 | 14.65 |
| Canada | 89.37 | 35.71 |
| Chile | 86.49 | 20.79 |
| China | 89.00 | 18.00 |
| Croatia | 87.22 | 25.45 |
| Cyprus | 87.18 | 16.27 |
| Czech Republic | 87.25 | 24.25 |
| Egypt | 84.00 | |
| **Total** | **88.45** | **35.36** |

| Country | Avg. Points | Avg. Price |
|---|---|---|
| **Totals** | **87.888461** | **33.132034** |
| US | 87.818789 | 33.653808 |
| Spain | 86.646589 | 27.048529 |
| France | 88.92587 | 45.619885 |
| Italy | 88.41405 | 37.553118 |
| New Zealand | 87.554217 | 24.17329 |
| Bulgaria | 85.467532 | 11.545455 |
| Argentina | 85.996093 | 20.794881 |
| Australia | 87.892475 | 31.25848 |
| Portugal | 88.057685 | 26.332615 |
| Israel | 87.17619 | 31.304918 |

Table 2. Table - Wine Rating Summary (Wine Reviews Dataset)

**Winner: Power BI**

Although aesthetically the tables look similar (apart from color customizations), Power BI provided an automatic summation for the 'Total', when using the table visualization. It was also noticed that Qlik did not have a consistent amount of significant figures applied to the values, leading to a non unified appearance in the data presentation.

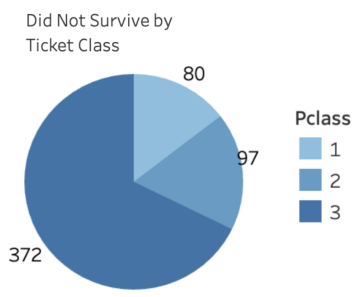
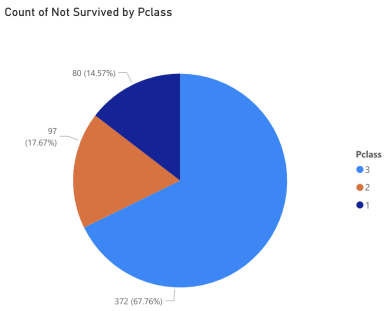
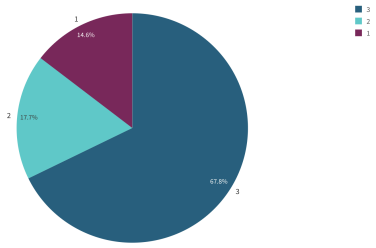
| Pie Chart | | |
|---|---|---|
| 2.1 Tableau | 2.2 Power BI | 2.3 Qlik |
|  |  |  |





Table 3. Pie - Survived vs Ticket Class (Titanic Dataset)

**Winner: Power BI**

All three tools had similar charts but only Power BI automatically and easily provided the option of absolute value and percentage.

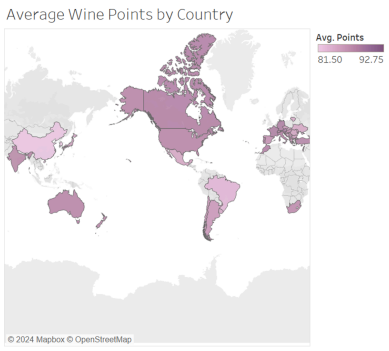
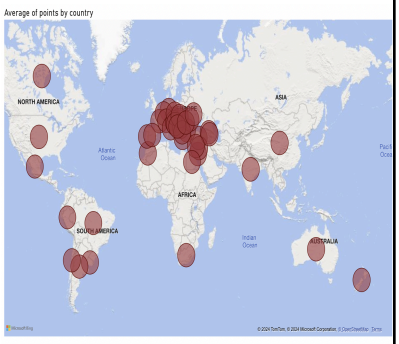
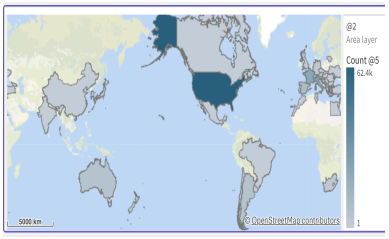
| Maps | | |
|---|---|---|
| 4.1 Tableau | 4.2 Power BI | 4.3 Qlik |
|  |  |  |







Table 4. Map - Average Wine Points by Country (Wine Reviews Dataset)

**Winner: Tableau**

Tableau created the clearest map; it was easiest to read, and the automatic application of the heatmap showed data distribution clearer and was also visually the easiest to interpret.

| Word map | | |
|---|---|---|
| 5.1 Tableau | 5.2 Power BI | 5.3 Qlik |
|  |  |  |



Table 5. Map - Average Wine Points by Country (Wine Reviews Dataset)

**Winner: Power BI**

Qlik and Tableau required extensive cleaning and sorting to create an appropriate word map, and without extensive efforts, only Power BI sifted through the data and created both a clear and visually appealing word map. Although not an already installed feature in Power BI, it was very easy to install and use; it was also simple to format in order to exclude certain words, as well as alter the colors.

**Overall Winner for Charts: Power BI**

Power BI showed the greatest capacity to handle data issues, as was apparent in the word cloud, and had equal variety to Tableau. While Tableau's visualization quality was a little better, Power BI showed greater versatility in chart adjustments.

## *Storytelling*

Tableau

Tableau has a standout function called "Story", which allows users to create a sequence of visualizations that work together to convey information and tell a story. This feature can help guide stakeholders through data-driven insights in a clear, structured manner, without needing a human to present it, making Tableau an excellent tool for storytelling. There is a learning curve however for newer users; understanding the Story sheets, AKA "story points", are confusing to navigate without instruction.

Power BI

Power BI offers storytelling capabilities through features like Bookmarks, which allow users to create a sequence of report views to guide through insights. In addition, interactive visuals and Power BI Storytelling in PowerPoint enable users to embed live reports into presentations,

providing a dynamic narrative flow. However, unlike Tableau, there is no dedicated "Story" feature allowing for a structured, step-by-step sequence of visualizations within the tool itself. Power BI relies on tools like Bookmarks and PowerPoint integration for storytelling[9].

Qlik
QlikView lacks dedicated storytelling features. However, users can build dashboards with drill-down capabilities for presenting insights, though it's more data-centric than narrative-driven. Most of the features in Qlik are paid and monthly subscriptions are quite expensive.

**Winner: Tableau**

Despite the learning curve, Tableau is the only tool with a dedicated Storytelling feature, allowing the narrative to be shared without external presenters.

### *Collaborative Features*

Tableau
Tableau facilitates collaboration through the paid versions Tableau Server and Tableau Online, and enables teams to publish, share, and interact with dashboards. Users can collaborate, receive real-time updates, and conduct live analyses, making it ideal for teams operating within a data-driven organizational culture.

Power BI
Power BI allows for collaboration through shared workspaces, where teams can manage and edit reports and dashboards, however, this is only available in the paid Pro and Premium versions. In addition users can share content, comment on specific visuals, and collaborate in real time. There is also integration with Microsoft Teams which enhances collaboration by allowing reports to be embedded in channels. Power BI Apps also streamline the distribution of content, making it ideal for collaborative data analysis in organizations, though all these features require a paid license[11].

Qlik
QlikView supports sharing of dashboards and reports across teams, allowing for collaborative data exploration. However, it does not have cloud-based collaborative features, and sharing is more traditional through reports and dashboards.

**Winner: Power BI**
With its integration with Microsoft Teams, Power BI's collaborative features are enhanced compared to the other two.

***Cost***

| Tableau | | | |
|---|---|---|---|
| **Version** | **Features** | **Cost per user per month (USD)** | **Cost per 20 users per month (USD)** |
| **Tableau Public** | Limited features | Free | Free |
| **Tableau Viewer** | Basic dashboard viewing | $15 | $300 |
| **Tableau Explorer** | Data exploration and interaction | $42 | $840 |
| **Tableau Creator** | Full data creation and management | $75 | $1500 |
| **Enterprise Viewer** | Basic viewing capabilities with Advanced Management and Data Management. | $35 | $700 |
| **Enterprise Explorer** | Enhanced data exploration with Advanced Management and Data Management. | $70 | $1400 |
| **Enterprise Creator** | Full-featured data creation and management | $115 | $2300 |

Table 6 - Cost Per User for Tableau[19, 21]

| Power BI | | | |
|---|---|---|---|
| **Version** | **Features** | **Cost per user per month (USD)** | **Cost per 20 users per month (USD)** |
| **Free** | Create interactive reports; included in Microsoft Fabric; no credit card required; 1 GB per dataset, 10,000 rows/hour for real-time data | Free | Free |
| **Power BI Pro** | Publish and share reports; included in Microsoft 365 E5 and Office 365 E5; 1 GB per dataset, 8 data refreshes/day, 10 GB storage/user | $10 | $200 |
| **Power BI Premium Per User** | All Pro features plus enterprise-scale features, larger model sizes, and more frequent refreshes; 100 GB per dataset, 48 refreshes/day, up to 400 GB storage | $20 | $400 |
| **Power BI Embedded** | Customer-facing reports, dashboards, automated management; Variable data limits depending on SKU | Variable | Contact sales |

Table 7 - Cost Per User for Power BI[13]

| Qlik | | | |
|---|---|---|---|
| **Version** | **Features** | **Cost per user per month (USD)** | **Cost per 20 users per month (USD)** |
| Standard | Automated report compilation and delivery, Augmented analytics with advanced AI | $40 | $825 |
| Premium | Predictive analytics with automated machine learning | $125 | $2500 |
| Enterprise | Personalized customer success plan & onboarding | On demand | On demand |

Table 8 - Cost Per User for Qlik[17]

**Winner: Power BI**

Power BI is the cheapest tool of the three, while also providing value in its features for the price you do pay.

### *Support Availability*

Tableau

Tableau offers comprehensive support, including community forums, training resources, and customer support. Like most BI tools, Tableau has an active community forum where users can troubleshoot issues and share knowledge. Additionally, Tableau provides support through email and phone channels.

Power BI

Microsoft offers official Power BI support through self-service resources, support tickets, and Microsoft Learn. The platform has a strong user community sharing knowledge in forums. While customer support reviews are mostly positive, experiences vary[6]. Microsoft provides extensive learning materials, regular updates, integration support, and noticeably- an AI chat tool for assistance[15].

Qlik

Qlik provides extensive support options, including community forums, training resources, and direct customer support. Its active community forum allows users to troubleshoot issues, share insights, and learn from one another. Additionally, Qlik offers support through email and phone.

**Winner: Power BI**
While all three tools have comprehensive support options, Power BI stands out with its AI chat tool for further assistance.

## Pros and Cons

| | Pros | Cons |
|---|---|---|
| **Tableau** | • User-friendly with a highly intuitive interface<br>• High-quality visualizations with diverse interactive chart options<br>• Effective storytelling capabilities with "Story" feature | • More expensive compared to other BI tools<br>• Steeper learning curve to perform advanced calculations<br>• Difficult to clean data within the tool, best pre-clean data<br>• Limited free collaborative features |
| **Power BI** | • Strong Microsoft Office integration with apps like Excel and Teams[2]<br>• Extensive data connectivity, supporting multiple sources and formats.<br>• Regular updates providing access to the latest features, including real-time analytics and interactive visuals | • Steep learning curve and complex interface, especially for beginners.<br>• Performance issues with large datasets and display optimization problems on some devices.<br>• Limited compatibility with non-Microsoft tools and challenging DAX syntax for non-technical users. |
| **Qlik** | • Data integration[3]<br>• Data Handling<br>• Advanced analytics | • Steep learning curve[4]<br>• Not user-friendly<br>• Limited free options |

Table 9 - Pros and Cons of Power BI, Tableau and Qlik

## Business Implications

Tableau

Tableau is ideal for organizations that prioritize visual analytics and need to make data-driven decisions efficiently[21]. Data analysts, marketers, and professionals seeking impactful insights can greatly benefit from its capabilities. It is particularly suitable for medium to large companies that can invest in a premium tool and have dedicated data teams, especially in industries like finance, healthcare, and consulting, where visual storytelling is crucial for strategy.

Power BI

Power BI is ideal for companies already using the Microsoft ecosystem, as it integrates seamlessly with tools like Excel, Azure, and SharePoint. Its affordability makes it accessible for small to medium-sized businesses that seek data-driven strategies without a large financial investment. Power BI's interactive dashboards and support for real-time analytics benefit industries like retail, e-commerce, and supply chain management, where timely decisions are essential. However, the learning curve for advanced features like DAX means that companies with dedicated data teams may gain the most from its capabilities[14].

Qlik

Organizations requiring strong analytics capabilities and extensive data exploration should choose Qlik Sense. It functions effectively in fields requiring complicated data, like finance, healthcare, and supply chains, where making precise decisions based on data is crucial. Because of its complexity and learning curve, companies with dedicated data analytics teams and strong technical backgrounds are better suited for using Qlik Sense. In the premium edition, its capacity to manage huge datasets makes it an invaluable tool for businesses looking to extract deep insights from their data[19].

## Conclusion

| | Tableau | Power BI | Qlik |
|---|---|---|---|
| **Ease Of Use** | ★ | | |
| **Live Vs Extracted** | ★ | ★ | |
| **Speed** | ★ | | |
| **Cloud** | ★ | | |
| **Data Types** | | ★ | |
| **Interface** | ★ | | |
| **Charts** | | ★ | |
| **Visualization** | ★ | ★ | |
| **Storytelling** | ★ | | |
| **Collaborative** | | ★ | |
| **Cost** | | ★ | |
| **Support** | | ★ | |
| **Overall** | ★ 7 | ★ 7 | ★ 0 |

Table 10 - Summary chart of Criterion Winners.

**OVERALL**

While there is a tie between Power BI and Tableau, each offers unique advantages to specific organizations. Due to its integration into the Microsoft system, Power BI emerges as the top choice for teams already embedded with Microsoft services. It excels when it comes to cost, ability to handle various data types, user support, and collaboration. However, a lot of its useability is due to its connection to the Microsoft system. It also relies on knowledge of DAX language, which may not be intuitive to new users. On the other hand, for organizations seeking a comprehensive all in one ecosystem without being attached to Microsoft, Tableau provides excellent value for money, with stunning visual quality and a simple interface. While Qlik is a strong tool, it falls short of these two industry leaders.

## Sources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