Powering up with Power BI within the accounting curriculum: A case approach

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ABSTRACT

The purpose of this paper is to examine the different uses of the leading data analytics software product called Power BI. In this paper, a model will be included of several courses in which it's used in addition to an application script (Appendix A). Microsoft's Power BI is one of today's leading data visualization software used by many accounting users. In light of its extensive use, there is a need to integrate this tool within the accounting curriculum in such a way that enhances the subject matter taught, as well as provides an understanding of real-world applications of analytic software. STARPro is the name given to a series of Power BI user-case applications that can be fully integrated within the accounting curriculum.

Keywords**:** Data Analytics, Data Visualization, Power BI, Big Data, Microsoft

INTRODUCTION:

Power BI is a leading data visualization tool, introduced by Microsoft in 2015, that enables professionals to present data trends and analysis in the form of a visualization. Power BI users have the ability to utilize the many features of Power BI to effectively portray complex narratives generated from a large data set. In today's business world, data is more available now than ever before, and accounting professionals must be able to develop the skills to present a story of the key insights observed in a data set to an audience with varying understandings of financial data. Power BI is both effective and efficient at performing this objective.

A key benefit of Power BI is its compatibility with data from multiple types of sources. Power BI thrives on its inherent integration with its fellow tool in the Microsoft suite, Microsoft Excel, to enable users to utilize the advanced visualization capacity of Power BI to bring their Excel spreadsheets to life. Besides visualizing data directly sourced from Excel, Power BI has a remarkable ability to work with datasets in multiple formats such as Microsoft Excel files (.xlsx) and CSV files (.csv) generated and exported from an array of third-party solutions such as SAP, Oracle, Salesforce, etc. Given the rapid growth in both the user-base and capabilities of cloud-based solutions in the professional marketplace, Power BI has made the ability to integrate with cloud-based data sources a native feature, enabling the possibility of building visualizations that update in real- or near-real-time. Power BI supports many transformation and visualization features to allow the user to use their visual/dashboard as a canvas for telling a story of the data. The STARPro case will focus on eight of these key visualization tools as well as demonstrating how to effectively interface these features into an interactive dashboard.

EDUCATIONAL VALUE OF VISUALIZATION TOOLS SUCH AS POWER BI:

An important tool for the accountant in today's world is the ability to visualize how a business's quantified data relates to the workflow of the decision-makers involved. Due to the vast advantage that this ability has given decision-makers to make more informed business decisions, the criticality and importance of this tool cannot be overstated. It has been proven over time that most people prefer visual content over written content. Further, data visualizations allow for quicker analysis of big data and can often effectively explain the relationships between, and patterns within, the business's data. With the onset of artificial intelligence and advanced technology with increased data availability, the understanding of powerful analytical tools such as Power BI must be introduced early in the educational process given the increasingly competitive global marketplace.

One of the pertinent factors in choosing to pursue Power BI as a teaching tool in the accounting classroom at SJU comes from the widespread appeal and demand it has within the major public accounting firms that recruit and hire SJU students. Input from advisory board members, young alumni starting their careers at these major firms, and many other key stakeholders to the SJU accounting program have made it clear that Power BI is an emerging tool that has business value to the major public accounting firms in the Philadelphia area and beyond.

There are several visualization tools available for educational purposes. An argument can be made for each one, as some may be viewed as more robust, more integrative, with more appealing visualization capabilities. It is the user who decides which tool is best to meet their personal or business needs. The purpose of this paper is to detail the successful outcome of a Power BI rollout within several upper-division accounting courses. It was assumed that students

had some prior knowledge of visualization, although not required. The choice of Power BI was based largely on input from the major public accounting firms that hire SJU students. Power BI has a major advantage in that it is Microsoft's primary data visualization tool. As Microsoft is ubiquitous in that every major professional accounting firm uses it as a major part of their technology framework, students are all the more motivated to gain experience with Power BI and the Microsoft suite, as many have internship and full-time job opportunities with these firms.

PROJECT/CASE FRAMEWORK

In approaching this scenario in a class, the STARPro series is introduced as a 3-Dimensional project. The first phase is data readiness and reliability. Critical to the delivery of this project is a dataset that the students can easily relate to and understand. Adidas is a well-established firm that has widespread appeal in America, especially amongst younger demographics. Adding to that appeal is the dynamic robustness of marketing data made available by Adidas, particularly when it can be compared over time and among business units and divisions. This Adidas sales dataset was downloaded from Kaggle.com, one of the many external sources that provide datasets for use in data visualization cases. A minor modification of updating the years in the dataset was made. Power BI has the ability to visualize data from multiple source forms. For this case, the Adidas dataset was in the form of a Microsoft Excel file (.xlsx).

The next phase is to develop the visualization. This design function is critical in that the student must keep in mind what the visualization's end-use is and also the type of graph/chart that will most effectively represent the data to the end-user. Use of color, size, and other visual cues become very important here. Each individual visualization must effectively integrate into a dashboard that tells a story of the data and allows for meaningful conclusions and recommendations to be drawn.

The third phase is delivery of the project. Delivery of the project involves completing the dashboard and responding to questions that could vary from student team to student team. One of the features I find most useful in project analysis and presentation is the Slicer tool, which allows students to analyze sales performance by city. In their storytelling, it is possible for students to make a number of assumptions, limit the size of their graphs and charts, and expand recommendations based on what-if analyses.

LEARNING OBJECTIVES OF CASE:

1. Understanding the importance of data visualization as a tool in presenting accounting information
2. Providing students experience with Power BI, a leading visualization tool in the accounting profession
3. Expanding critical thinking skills around the business decision-making process.

PROJECT ASSESSMENT OF LEARNING

There are two major learning goals in the course. The first is that the students develop some capability with the Power BI software. The second is that they develop a deeper appreciation for the use of analytics in communicating accounting outcomes to a user community. Each student submission is reviewed in tandem with the objectives listed below. Successfully recreating the scripted dashboard allows for the first objective of this case to be met. 96% of students were able to meet that objective. A second objective is to broaden the perspective of accountants to another major field of business. In this case, that means identifying the strengths and weaknesses of the sales operations of a major company. Some 76% of the students successfully met that objective. The third objective, a very important in this case, was the design and development of a dashboard using some of the major tools of Power BI. Some 85% of students successfully met this objective. Overall, performance on this STARPro project (86%) exceeded the target goals established

| Skill Goals	Objectives	How it Will Be Assessed
Student's goals are: 1. To acquire skills using Power BI to visualize and interpret datasets. 2. To require students to think critically by analyzing their completed dashboards and making business recommendations based on dashboard trends. 3. Effectively communicate data analysis findings by answering a series of assigned questions.	Student's objectives are: 1. Using simulated data provided in a Microsoft Excel file, create an interactive Power BI dashboard. 2. Identify strengths and weaknesses of the sales operations of a major company. 3. To understand the components of an effective data visualization/dashboard (i.e. components, chart types, etc.).	Student measures include: 1. Ability to analyze and interpret key sales metrics as well as positive/negative aspects of the company's sales operations. 2. Ability to navigate Power BI to create the scripted dashboard as well as all other assignment objectives. 3. Ability to explain the benefits/advantages that data visualization provides to a business.

SUGGESTED ASSIGNMENT QUESTIONS:

- What is the percent change in sales from the beginning of 2024 to the end of 2024 for Adidas? What factors may account for this percent change in sales?

- What do you conclude from considering the pie chart containing sales method information? What does it tell you about Adidas' sales structure?

- Which states and regions have the most sales success, and which states/regions have had the least success? What recommendations would you make to Adidas to improve their sales performance?

- Using the slicer tool, evaluate the sales performance of Philadelphia, Baltimore, Houston, and Boston.

APPENDIX A:

<u>Load Data into Power BI</u>

1. Download the Excel file from your course Canvas page.

2. Open Power BI and select "Blank Report" under the "New" tab.

Blank report
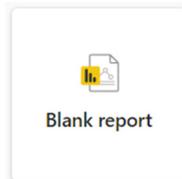
3. Then, click "Import data from Excel." Navigate to the Excel file you downloaded, select it, and open it. When Power BI loads the Excel data, check the box by "Sheet 1," then click "Load." Your report should open.

Import data from Excel

Adidas US Sales Datasets (STARPro III).xlsx
☑ Data Sales Adidas
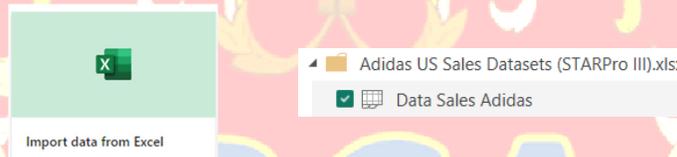
Create Key Performance Indicators (KPIs)

1. In the "Visualizations" section, choose "Card" [123] (4th Row, 5th Column), and then in the "Data" section expand the fields toolbar under "Data Sales Adidas"

   ∨ ⊞ Data Sales Adidas

2. Check the box next to "Total Sales" to have that be the subject of your KPI.

3. Go to the "Format your visual" section under "Visualization" and under the "Visual" section flip the "Category label" switch to "Off." Next, go to the "General" section General and flip the "Title" label switch to "On"

4. Expand the "Title" dropdown and insert "Total Sales 2023-2024" in the "Text" box. Increase the font size of the title to 17 and select the bold icon. Select the middle icon in the "Horizontal alignment" section to center the title.

5. Resize your KPI by adjusting the corners of the KPI on your worksheet. Click outside of your KPI in the empty space of your worksheet to deselect the KPI.

6. Create a second KPI that contains "Units Sold". Repeat steps 1-4, adjusting the title to "Total Units Sold 2023-2024"

7. Position your KPIs to be stacked on top of each other in the top left of your worksheet. <u>Leave some room at the top of the worksheet for your dashboard title.</u>
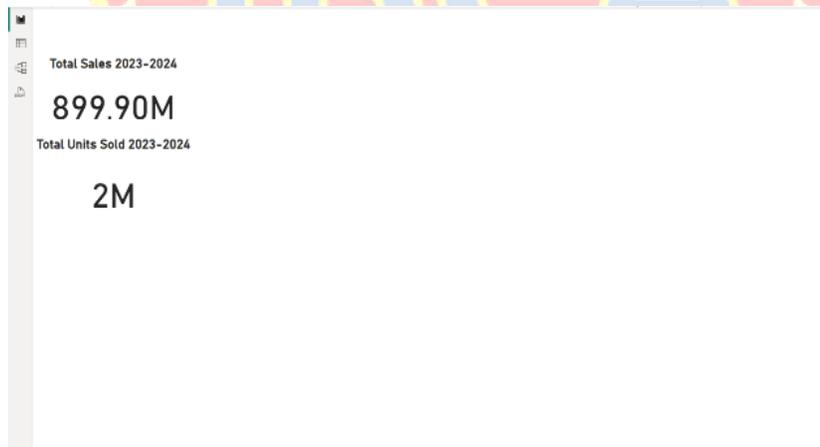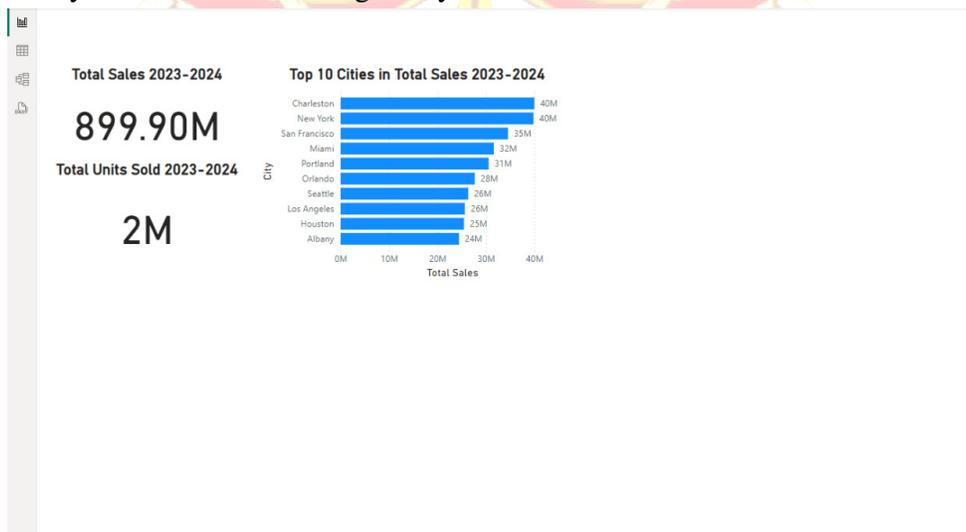
Create a Clustered Bar Chart

Before creating your clustered bar chart, <u>make sure that you click into the white space of your worksheet to deselect any visual</u>.

1. In the "Visualization" section, choose "Clustered bar chart" (Row 1, Column 3)
2. In the "Data" section, check the boxes next to "City" and "Total Sales" to observe the cities with the highest sales of Adidas products.
3. In the "Filters" section ▽ Filters click on the dropdown arrow on the "City" filter in the "Filters on this visual" section. Change the "Filter type" from "Basic filtering" by selecting the dropdown arrow and selecting "Top N." In the "Show items" section, type "10" in the text box to the right of "Top" to filter the top 10 cities.

   In the "By value" section, click and drag "Total Sales" from the "Data" section into the "Add data fields here" section. Click "Apply filter" when finished.
4. Change the name of the X-axis by navigating to the "X-axis" section of the "Visualizations" section and double-clicking on the auto-generated "Sum of Total Sales" in the X-axis text box and changing it to "Total Sales"
5. Navigate to the "Format your visual" tab and in the "Visual" section Visual turn "Data labels" to "On"
6. Give your chart a title by navigating to the "General" section General of the "Format your visual" tab and selecting the dropdown on "Title". Replace the auto-generated title in the "Text" box with "Top 10 Cities in Total Sales 2023-2024". Increase the font size of the title to 17 and select the bold icon. Change the alignment to center alignment by selecting the middle icon in the "Horizontal alignment" section.
7. Position your bar chart to the right of your KPIs

Create a Clustered Column Chart

Before creating your clustered column chart, <u>make sure that you click into the white space of your worksheet to deselect any visual</u>.
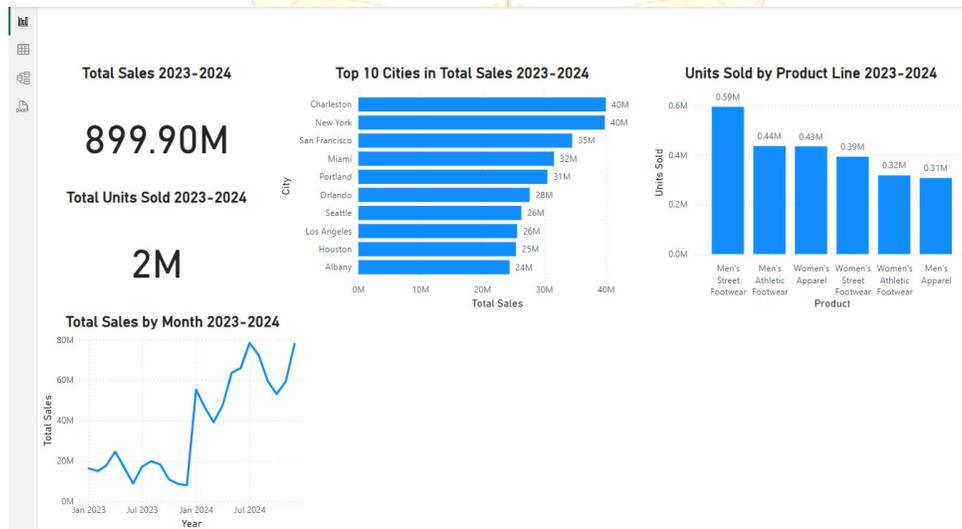
1. In the "Visualization" section, choose "Clustered column chart" (Row 1, Column 4)
2. In the "Data" section, check the boxes next to "Product" and "Units Sold" to observe the Adidas product lines that sold the most units.
3. Change the name of the Y-axis by navigating to the "Y-axis" section of the "Visualizations" section and double-clicking on the auto-generated "Sum of Units Sold" in the Y-axis text box and changing it to "Units Sold"
4. Navigate to the "Format your visual" tab and in the "Visual" section **Visual** turn "Data labels" to "On"
5. Give your chart a title by navigating to the "General" section **General** of the "Format your visual" section and selecting the dropdown on "Title". Replace the auto-generated title in the "Text" box with "Units Sold by Product Line 2023-2024". Increase the font size of the title to 17 and select the bold icon. Change the alignment to center alignment by selecting the middle icon in the "Horizontal alignment" section.
6. Position your column chart to the right of your bar chart and adjust the two charts to take up the majority of the top of your worksheet evenly
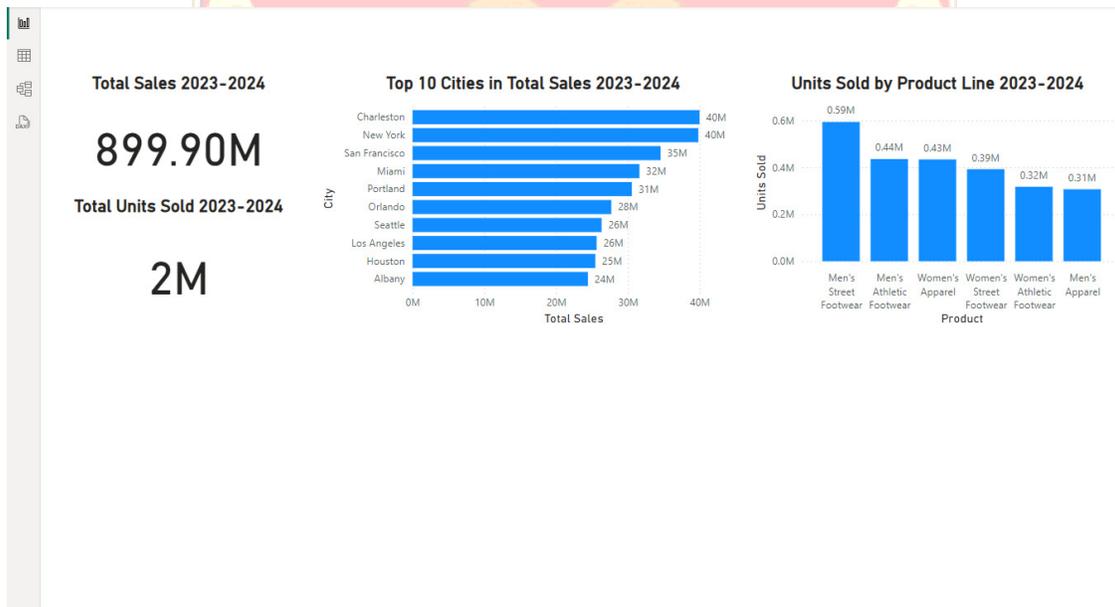
Create a Line Chart

Before creating your line chart, <u>make sure that you click into the white space of your worksheet to deselect any visual</u>.
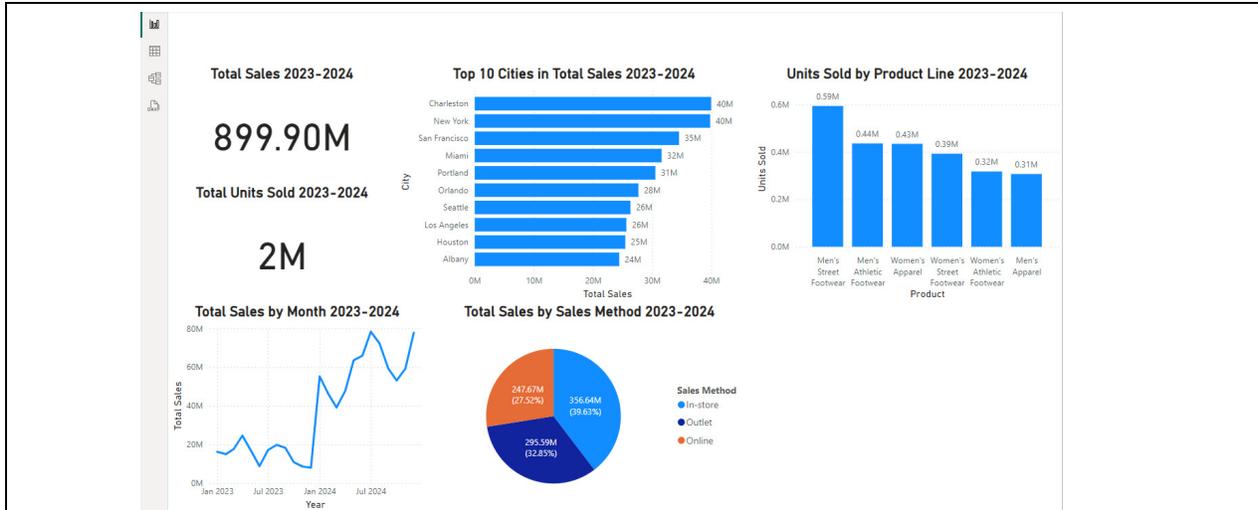
1. In the "Visualization" section, choose "Line chart" (Row 2, Column 1)
2. In the "Data" section, check the boxes next to Total Sales and Invoice Date
3. In the "X-axis" section of the "Visualization" section, remove "Day" and "Quarter" from the "Invoice Date" dropdown so that only "Year" and "Month" remain
4. Rename the Y-axis to "Total Sales." Title your line chart "Total Sales by Month 2023-2024". Increase the font size of the chart title to 17, select the bold icon, and middle align it.
5. Adjust your line chart to take up the bottom left corner of your dashboard.

Create a Pie Chart

Before creating your pie chart, <u>make sure that you click into the white space of your worksheet to deselect any visual</u>.

1. In the "Visualization" section, choose "Pie chart" (Row 3, Column 5)
2. In the "Data" section, check the boxes next to Total Sales and Sales Method
3. Navigate to the "Format your visual" tab and click the dropdown on "Detail labels". Click the dropdown on "Position" and select "Inside"
4. Adjust your pie chart outwards until the detail labels fit completely inside the pie chart
5. Title the chart "Total Sales by Sales Method 2023-2024". Increase the font size of the chart title to 17, select the bold icon, and middle align it.
6. Adjust your pie chart to take up the middle-bottom of your dashboard

Create a Table

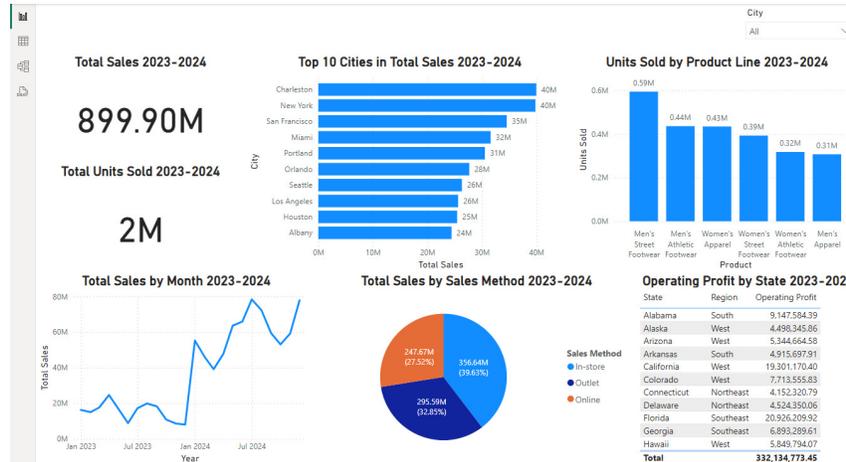Before creating your table, <u>make sure that you click into the white space of your worksheet to deselect any visual.</u>

1. In the "Visualization" section, choose "Table" 🏢 (Row 5, Column 4)
2. Check the boxes next to State, Region, and Operating Profit in that order
3. Navigate to the "Columns" section [Columns] under "Visualizations" and double-click "Sum of Operating Profit". Adjust the title of this column to say "Operating Profit."
4. Add a title to the table by navigating to the "General" section of the "Format your visual" section and turning the "Title" switch to "On". Title your table "Operating Profit by State 2023-2024". Increase the font size of the chart title to 17, select the bold icon, and middle align it.
5. Adjust your table so that it takes up the bottom right of your dashboard

Add a Slicer

Before creating your slicer, <u>make sure that you click into the white space of your worksheet to deselect any visual</u>.

1. In the "Visualization" section, choose "Slicer" 🖼️ (Row 5, Column 3)
2. In the "Data" section, check the box next to City
3. Navigate to the "Format your visual" tab and click the dropdown on the "Slicer settings". In the "Options" section, change the style to "Dropdown".
4. Position the slicer in the top right corner of your dashboard

Add a Dashboard Title

Before adding a dashboard title, <u>make sure that you click into the white space of your worksheet to deselect any visual</u>.

1. In the "Home" group on the top ribbon, select "Text Box" in the "Insert" group
2. Insert the title "Adidas Sales Analysis 2023-2024" in the text box. Highlight your title and increase the font size to 32, select the bold icon, and middle align it.

3. Adjust the text box so that your title takes up a majority of the top of your dashboard

5. Analyze your dashboard and save it to your computer.