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Course: BTA 553 – OL1 Spring 2024

## Term Project

### Topic: Adidas Sales in U.S

#### 1. Introduce the motivation for Adidas's analysis:

Adidas, the renowned athletic and footwear corporation, boasts a storied legacy spanning over 70 years, making it one of the world's oldest sports companies, and cementing its position as one of the most enduring and influential sports brands globally. Originating from Germany, Adidas has cultivated a reputation for excellence, driven by its commitment to innovation, quality craftsmanship, and iconic designs. The brand's illustrious history is punctuated by numerous milestones and achievements, including pioneering advancements in sports technology and forging high-profile partnerships with athletes and teams worldwide. Positioned as the second largest competitor to Nike on the global stage, Adidas offers a diverse array of products, including men's apparel, men's and women's athletic footwear, as well as streetwear for both genders.

This paper utilizes Tableau to explore and analyze sales data, recognizing its critical importance as a key factor in understanding large businesses like Adidas. Through comprehensive analysis, this initiative seeks to identify challenges, inform better decision-making, and enhance future business growth.

#### 2. Present and interpret results:

My Adidas sales dataset comes from Kaggle.com, providing comprehensive insights into the sales of Adidas products within the United States. It encompasses data points such as the number of units sold, total sales revenue, sales location, product type, and the retailers involved. With 9648 rows and 13 columns, this dataset encapsulated detailed information pertaining to each Adidas transaction spanning the years 2020 and 2021.

#### Data Types

character: Non-numeric data values

integer: Numeric data values, integers only

Date: Date with year, month, and day

double: Numeric data values with decimal digits

Variable Name	Type	Definition	Values
Retailer	Character	Individuals or businesses that procure goods from manufacturers (Adidas) (6 different Retailers)	Amazon, Foot Locker, Kohl's, Sports Direct, Walmart, West Gear.
Retailer ID	Integer	ID number of each retailer	1185732 1185732 ... 1185732 1185732
Invoice Date	Date	Date of invoice recorded by each Retailers from 2020 to 2021	2020-01-01 ... 2021-02-22
Region	Character	Region, locations of Retailers in the U.S	Midwest, Northeast, South, Southeast, West

State	Character	State of Retailers located in the U. S	New York ... New Hampshire
City	Character	City of Retailers located in the U. S	New York ... Manchester
Product	Character	Name of Adidas Products Sold (6 different products)	Men's Apparel, Men's Athletic Footwear, Men's Street Footwear, Women's Apparel, Women's Athletic, Women's Street Footwear.
Price per Unit	Integer	Price of each Adidas product sold	From \$7.00 to \$110.00
Units Sold	Integer	Amount of Adidas units sold of each Retailer based on invoice date from 2020 to 2021	From 0 to 1,275
Total Sales	Integer	Total Sale Revenue of each Retailer based on every invoice date.	From \$0.00 to \$825,000
Operating Profit	Double	Profit from each retailer after extracting from revenue and expenses based on each invoice date.	From \$0.00 to \$390,000
Operating Margin	Double	Percentage of Operating Profit based on Total Sales	From 10% to 80%
Sales Method	Character	Adidas channels for customers purchasing Adidas Products (3 different Methods)	In-Store, Outlet, and Online

Within this dataset, the term “retailer” refers to individuals or businesses that procure goods from manufacturers (Adidas), and subsequently sell them to consumers, thereby generating profit margins. These profit margins represent the revenue gained by retailers through the resale of Adidas products to customers after sale activities.

View Data: Data Sales Adidas

Data Sales Adidas 9,648 rows · 13 fields												
City	Invoice Date	Product	Region	Retailer	Sales Method	State	Operating Margin	Operating Profit	Price per Unit	Retailer ID	Total Sales	Units Sold
New York	1/1/2020	Men's Street Footwear	Northeast	Foot Locker	In-store	New York	0.500000	300,000.00	50,000	1,185,732	600,000.00	1,200
New York	1/2/2020	Men's Athletic Footwear	Northeast	Foot Locker	In-store	New York	0.300000	150,000.00	50,000	1,185,732	500,000.00	1,000
New York	1/3/2020	Women's Street Footwear	Northeast	Foot Locker	In-store	New York	0.350000	140,000.00	40,000	1,185,732	400,000.00	1,000
New York	1/4/2020	Women's Athletic Footwear	Northeast	Foot Locker	In-store	New York	0.350000	133,875.00	45,000	1,185,732	382,500.00	850
New York	1/5/2020	Men's Apparel	Northeast	Foot Locker	In-store	New York	0.300000	162,000.00	60,000	1,185,732	540,000.00	900
New York	1/6/2020	Women's Apparel	Northeast	Foot Locker	In-store	New York	0.250000	125,000.00	50,000	1,185,732	500,000.00	1,000
New York	1/7/2020	Men's Street Footwear	Northeast	Foot Locker	In-store	New York	0.500000	312,500.00	50,000	1,185,732	625,000.00	1,250
New York	1/8/2020	Men's Athletic Footwear	Northeast	Foot Locker	Outlet	New York	0.300000	135,000.00	50,000	1,185,732	450,000.00	900
New York	1/21/2020	Women's Street Footwear	Northeast	Foot Locker	Outlet	New York	0.350000	133,000.00	40,000	1,185,732	380,000.00	950
New York	1/22/2020	Women's Athletic Footwear	Northeast	Foot Locker	Outlet	New York	0.350000	129,937.50	45,000	1,185,732	371,250.00	825
New York	1/23/2020	Men's Apparel	Northeast	Foot Locker	Outlet	New York	0.300000	162,000.00	60,000	1,185,732	540,000.00	900
New York	1/24/2020	Women's Apparel	Northeast	Foot Locker	Outlet	New York	0.250000	125,000.00	50,000	1,185,732	500,000.00	1,000
New York	1/25/2020	Men's Street Footwear	Northeast	Foot Locker	Outlet	New York	0.500000	305,000.00	50,000	1,185,732	610,000.00	1,220
New York	1/26/2020	Men's Athletic Footwear	Northeast	Foot Locker	Outlet	New York	0.300000	138,750.00	50,000	1,185,732	462,500.00	925
New York	1/27/2020	Women's Street Footwear	Northeast	Foot Locker	Outlet	New York	0.350000	133,000.00	40,000	1,185,732	380,000.00	950
New York	1/28/2020	Women's Athletic Footwear	Northeast	Foot Locker	Outlet	New York	0.350000	126,000.00	45,000	1,185,732	360,000.00	800
New York	1/29/2020	Men's Apparel	Northeast	Foot Locker	Outlet	New York	0.300000	153,000.00	60,000	1,185,732	510,000.00	850
New York	1/30/2020	Women's Apparel	Northeast	Foot Locker	Outlet	New York	0.250000	118,750.00	50,000	1,185,732	475,000.00	950
New York	1/31/2020	Men's Street Footwear	Northeast	Foot Locker	Outlet	New York	0.500000	300,000.00	50,000	1,185,732	600,000.00	1,200

10,000 → rows

The objective of this research is to conduct a comprehensive assessment of Adidas product performance, evaluate the performance of each retailer, and analyze sale trends. By undertaking these analyses, the aim is to identify growth opportunities for the business and develop tailored strategies to enhance regional revenue growth. Through a thorough examination of

product performance metrics, retailer performance indicators, and overarching sales trends, this research endeavors to provide actionable insights that can inform strategic decision-making within Adidas.

Here is a structured breakdown of my analysis goals for the Adidas sales dataset:

1. **Product Performance Analysis:** Identify top-selling products to inform inventory management and marketing strategies
2. **Sales Trend Analysis:** Determine trends in Adidas product sales over time and identify the month with the highest sales volume to optimize stock allocation and promotional efforts.
3. **Marketing Campaign Evaluation:** Assess the effectiveness of marketing campaign by evaluating sales contributions from different retailers to guide future marketing investments.
4. **Geographic Sales Analysis:** Identify the top states in terms of sales performance to focus resources on high-potential markets and tailor marketing efforts.
5. **Pricing Strategy Assessment:** Analyze the relationship between pricing strategies and sales to optimize pricing strategies and maximize revenue.
6. **Sales Methods Evaluation:** Examine sales data from different channels to identify the most effective channels for Adidas products and allocate resources accordingly.
7. **Regional Sale Performance:** Determine which region generated the highest sales to inform regional marketing strategies and distribution efforts
8. **Monthly Sales Trend Analysis:** Analyze the monthly trend of sales to understand growth patterns over time and seasonal variations, enabling proactive planning and resource allocation.
9. **Sales Forecasting:** Forecasting Adidas Revenue in the following year to support financial planning and decision-making processes.

**2.1. Product Performance:** Bar Chart on Product Performance: Applying a Bar Chart for Sale Revenue of different Products with different colors. We have 6 types of Adidas products: Men's Apparel, Women's Apparel, Men's Athletic Footwear, Women's Street Footwear, Men's Apparel, and Women's Athletic Footwear. (Figure 1)

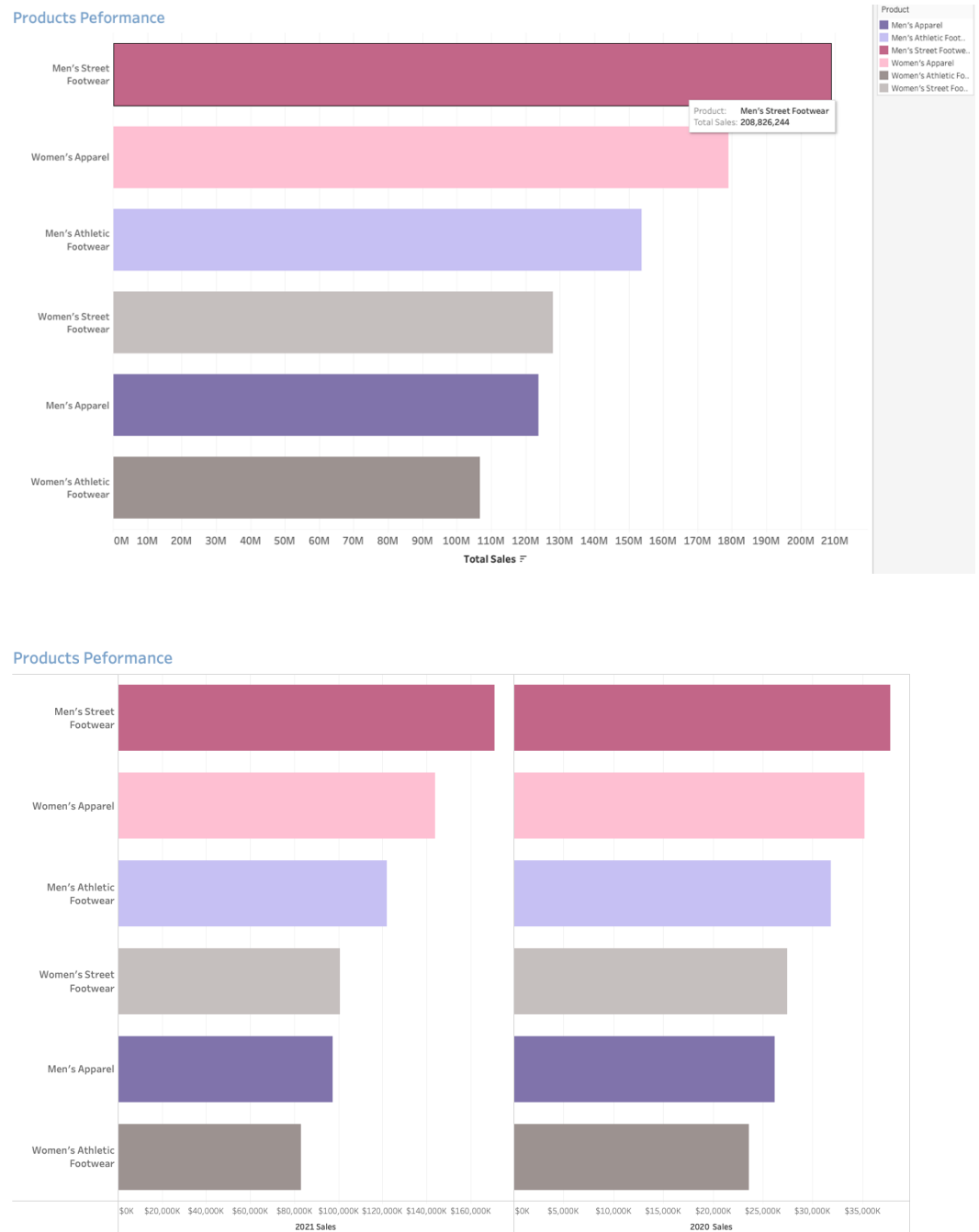


Figure 1: Bar Chart for Product Performance

**Interpret:** Men's Street Footwear consistently leads in sales, with total revenues over two years amounting to \$208,826,244, broken down as follows: \$37,823K in 2020 and \$171,003K in 2021. Following closely is Women's Apparel, with total sales reaching

\$179,038,860, comprising \$35,190K in 2020 and \$143,894K in 2021. Conversely, Women's Athletic Footwear saw the lowest sales, totaling \$106,631,896, with \$23,630K in 2020 and \$83,002K in 2021. Notably, the total revenues for all Adidas products surged over fourfold in 2021 compared to the previous year. This significant increase bodes well for Adidas, indicating a positive trajectory in revenue generation.

**2.2. Sales Trend Analysis:** Applying a line chart to identify which months Adidas had the highest performance with the highest sales revenue (Figure 2):

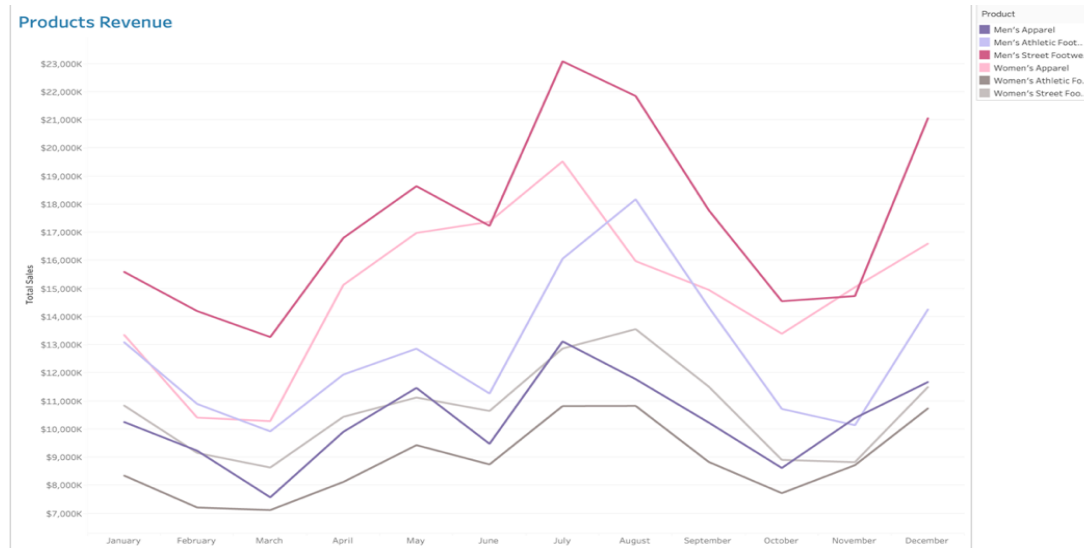


Figure 2- Line Chart for Sales Trend

In general, July and August emerge as the months with the highest unit sales for Adidas products, indicating a peak in customer spending during this period. These months likely coincide with increased consumer activity, possibly driven by factors such as seasonal trends, promotional campaigns, or specific product launches. Understanding these peak periods of sales activity can inform strategic decisions regarding inventory management, marketing initiatives, and sales forecasting, allowing Adidas to capitalize on heightened customer demand and optimize revenue generation opportunities.

## 2.3. Marketing Campaign Effectiveness: Applying a Stack Bar Chart to show total sales of Products and Retailers.

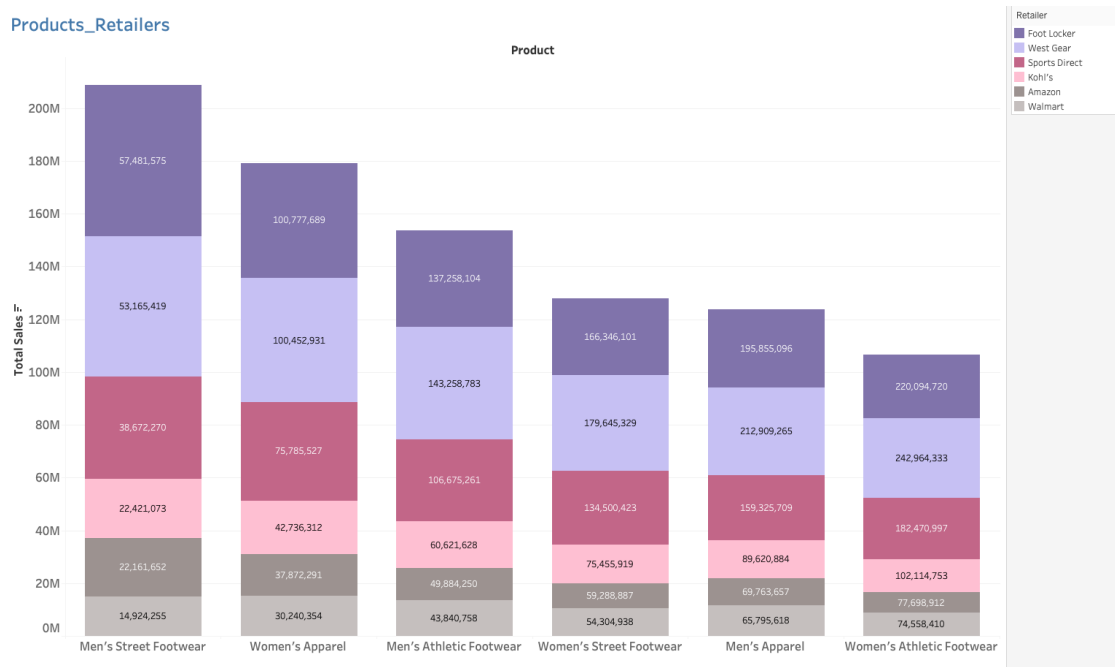


Figure 3 – Stacked Bar Chart for Products Retailer Revenue.

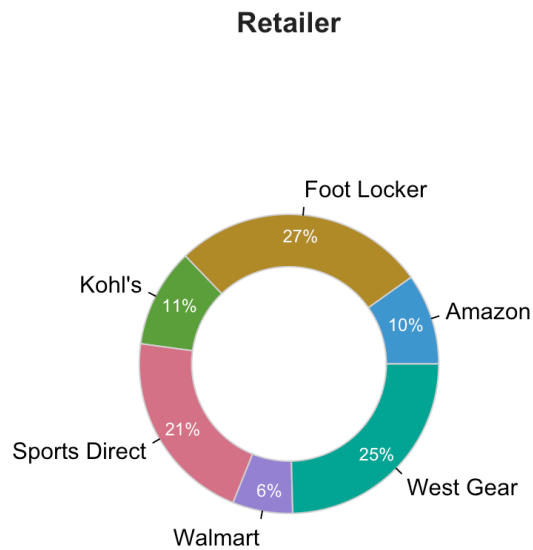


Figure 4 – Retailers

From this chart, it's evident that Men's Street Footwear dominates in terms of sales revenue, as indicated by its significantly taller bar compared to others. Moreover, across all bars, the dark purple section representing Foot Locker stands out prominently, particularly in the categories of Men's Street Footwear and Women's Apparel. This suggests a strong sales partnership between Foot Locker and respective brands, possibly indicating exclusive or preferred retail arrangements. Furthermore, Adidas has emerged as the leading brand in terms of sales from West Gear across several categories, including Men's Athletic, Women's Street Footwear, Men's Apparel, and Women's Athletic Footwear. This highlights the effectiveness of Adidas's marketing strategies or the popularity of its products within the West Gear retail environment. It's worth exploring the specific factors driving this success, such as product design, pricing strategies, or brand loyalty.

States Revenue

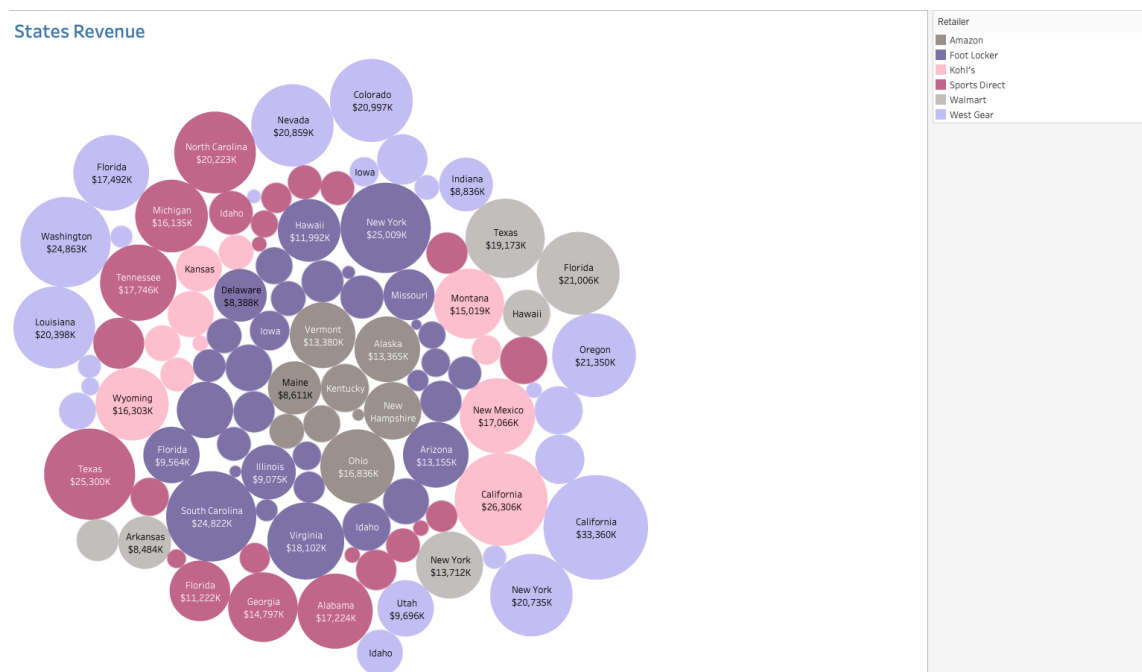


Figure 5 – Bubble Chart of state revenue for each Retailer.

indicating a strong retail presence in the state. New York sees significant contributions from Foot Locker Store, totaling \$25,009K, underscoring the brand's popularity in the region. Furthermore, the chart highlights the importance of specific retailers in driving sales across different states. For instance, West Gear demonstrates strong sales performance across multiple states, including Washington, Oregon, Colorado, New York, and Louisiana, suggesting a widespread consumer appeal and effective retail distribution strategy. Foot Locker also emerges as a significant contributor, particularly in states like New York and South Carolina.

These findings underscore the importance of understanding regional consumer preferences and retail partnerships in maximizing sales revenue. By analyzing sales performance across different states and retailers, Adidas business can tailor its marketing strategies and distribution channels to capitalize on lucrative and enhance overall sales effectiveness.

## 2.5. Pricing Strategy Analysis: Applying Histogram Chart to analyze the relationship between pricing strategies and Units Sold.

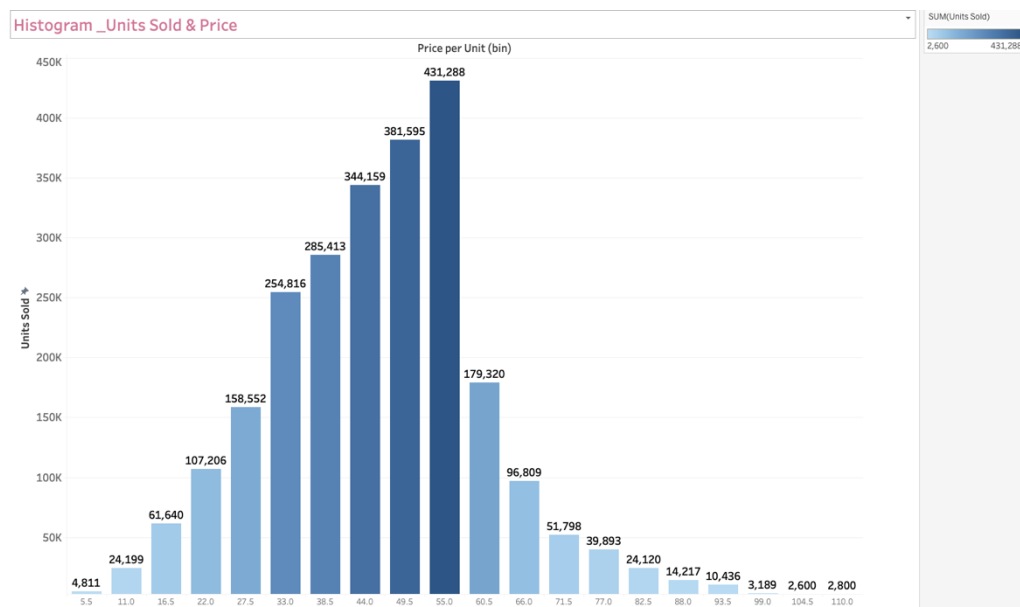


Figure 6- Histogram Chart – Units Sold and Price per Unit

The histogram chart created by using Tableau (Figure 6) , with a bin width of 5.5, illustrates the relationship between the Price per Unit and Units Sold of Adidas products from 2020 to 2021. Upon examination, it becomes evident that the price point of \$55.00 per unit corresponds to the highest volume of units sold, indicating a great point in pricing strategy for Adidas during this period. Products priced in the range of \$45.00 to \$55.00 demonstrate the highest sales volume, suggesting that this price range may be considered ideal for Adidas products. Conversely, Products priced at the lowest end of the spectrum, at \$5.50 per unit, experienced significantly lower sales, with only 4,811 units sold. This suggests that pricing products too low may not generate substantial customer interest or demand. However, it will depend on which products that Customers prefer to buy. Similarly, products priced at the higher end, exceeding \$99.00 per unit, also exhibited reduced customer attraction, indicating that excessively high prices may deter potential buyers.

In general, this analysis underscores the importance of pricing optimization for Adidas, with the \$45.00 to \$55.00 price range emerging as particularly effective in driving sales volume.



By striking a balance between affordability and perceived value, Adidas can capitalize on consumer preferences and maximize profitability.

Besides that, I also applied R to check the relationship between factors that contribute to Total Sales Revenue (Figure 7):

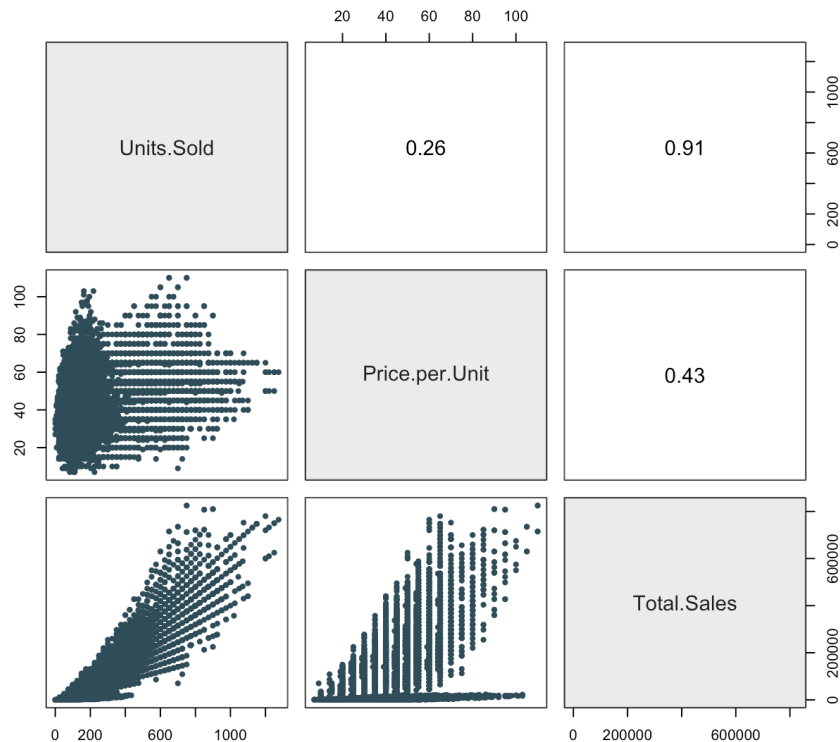


Figure 7- Relationship between Units Sold, Price Per Unit, and Total Sales

**Interpret:** Utilizing R to visualize the scatterplot (Figure 7), it becomes apparent that there exists a strong relationship between Units Sold and Total Sales of Adidas products, with a correlation coefficient of 0.91. This high correlation indicates a significant impact of Units Sold on the overall Total Sales figure for Adidas. This suggests that the number of Units Sold directly influences the total revenue generated by Adidas. Understanding and leveraging this strong relationship between Units Sold and Total Sales can inform strategic decision-making processes for Adidas, allowing the company to optimize sales strategies and maximize revenue generation.

**2.6. Sales Channel Analysis:** Applying the Boxplot for Sale Methods: In-Store, Online, and Outlet to examine sales data from different channels. This will help to identify the most effective channels for Adidas (Figure 8).

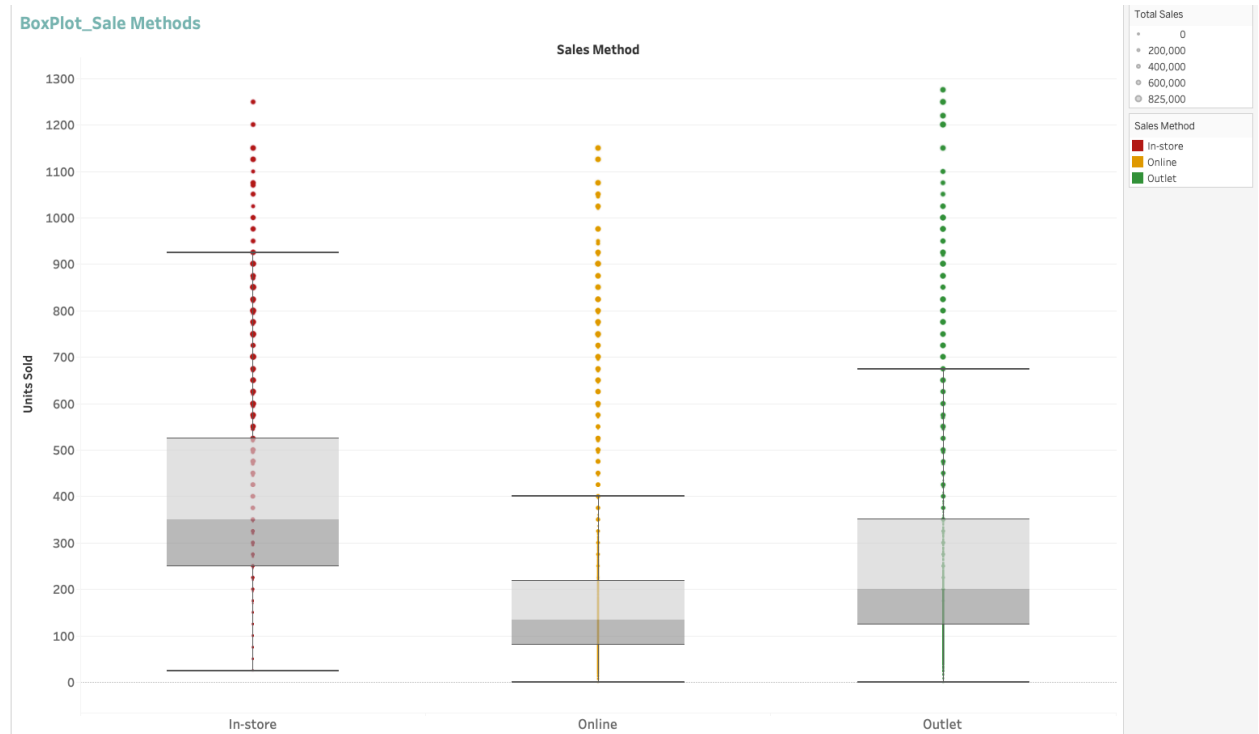


Figure 8- Boxplot for Adidas Sales Method.

Based on the boxplot depicted in Figure 8, it shows that Outlet and In-store channels are favored by customers for purchasing Adidas products. The units sold through Outlet is 1275 units with a median of 200 units, while for In-store, it is 1250 units with a median of 350. This indicates that customers tend to purchase more Adidas products through these physical retail channels compared to others. Conversely, while Online sales show slightly lower units sold (1150 units) compared to in-store and Outlet, it merges as the channel with the highest sales revenues. Despite a lower median unit sold (135), the online channel demonstrates its strength in generating higher sales revenues, suggesting that customers may be purchasing higher – priced items or larger quantities per transaction through this channel.

**2.7. Regional Sale Analysis:** Leveraging a scatterplot stratification (Figure 9) analysis enables us to discern which regions have generated the highest sales for Adidas. Thus, Adidas can develop informed strategies to allocate resources effectively and drive profitability across different regions.

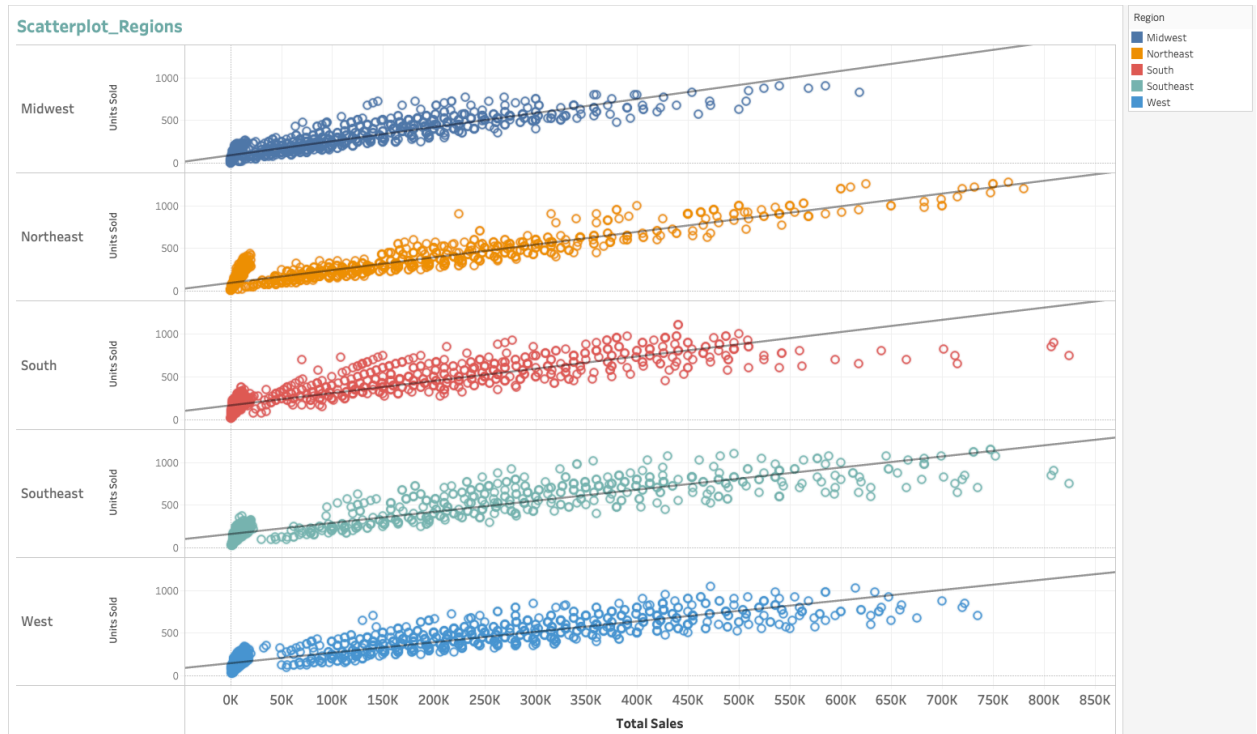


Figure 9-Scatterplot \_ Regions

The Scatterplot Stratification illustrated in Figure 9 above reveals that the South and Southeast regions emerged as the top contributors to Adidas' sales, each generating \$825,000 in revenue from 2020 to 2021. Following closely are the Northeast and West regions. Interestingly, the Northwest region recorded the highest number of units sold with 1275 units. Conversely, the Midwest region exhibited the lowest sales performance, with total sales amounting to \$618,750.

These findings highlight the varying sales performance across different regions and underscore the importance of regional strategies in maximizing profitability for Adidas. By focusing on regions with the highest sales potential and implementing tailored marketing, distribution, and sales strategies, Adidas can effectively leverage its strength and capitalize on emerging opportunities, ultimately driving sustainable revenue expansion and solidifying its competitive advantage in the market.

**2.8. Monthly Sales Trend:** Using Times Series Plotting to analyze the monthly trend of sales to understand growth patterns over time (Figure 10).

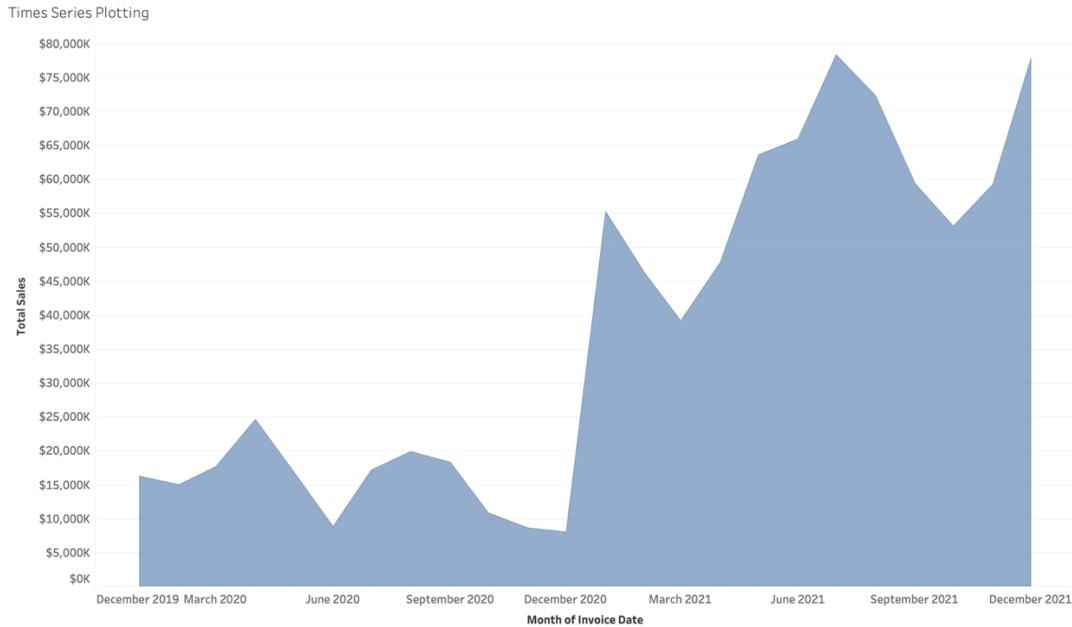


Figure 10-Times Series Plotting for Adidas's Total Sale

The Time Series Plot (Figure 10) spanning from January 2020 to December 2021 demonstrates notable trends in Adidas's total sales. From January 2021 onwards, there was a remarkable surge in total sales, increasing nearly 7 times from \$8,027K in December 2020 to \$55,226K in January 2021. This sharp uptick signals a period of optimism and robust growth for Adidas. By July 2021, the total sales peaked at \$78,335K, indicating sustained momentum. However, there was a subsequent decline in October 2021, with total sales dropping to \$53,078K. This dip coincided with previous analysis indicating higher customer preference for Adidas products in July and August. Despite the temporary setback, total sales rebounded to \$77,815K by the end of 2021, showcasing Adidas's resilience and ability to recover from fluctuations in sales and performance.

**2.9. Forecasting:** Creating a plotted forecasting (Figure 11) in Tableau for Adidas's Total Sales Revenue extending to December 2022 (because we just only limited historical data) is a proactive step in predicting future performance and guiding strategic decision-making. By leveraging this forecast, Adidas can estimate its potential revenue growth over the following year and implement targeted actions to enhance revenue and profitability.

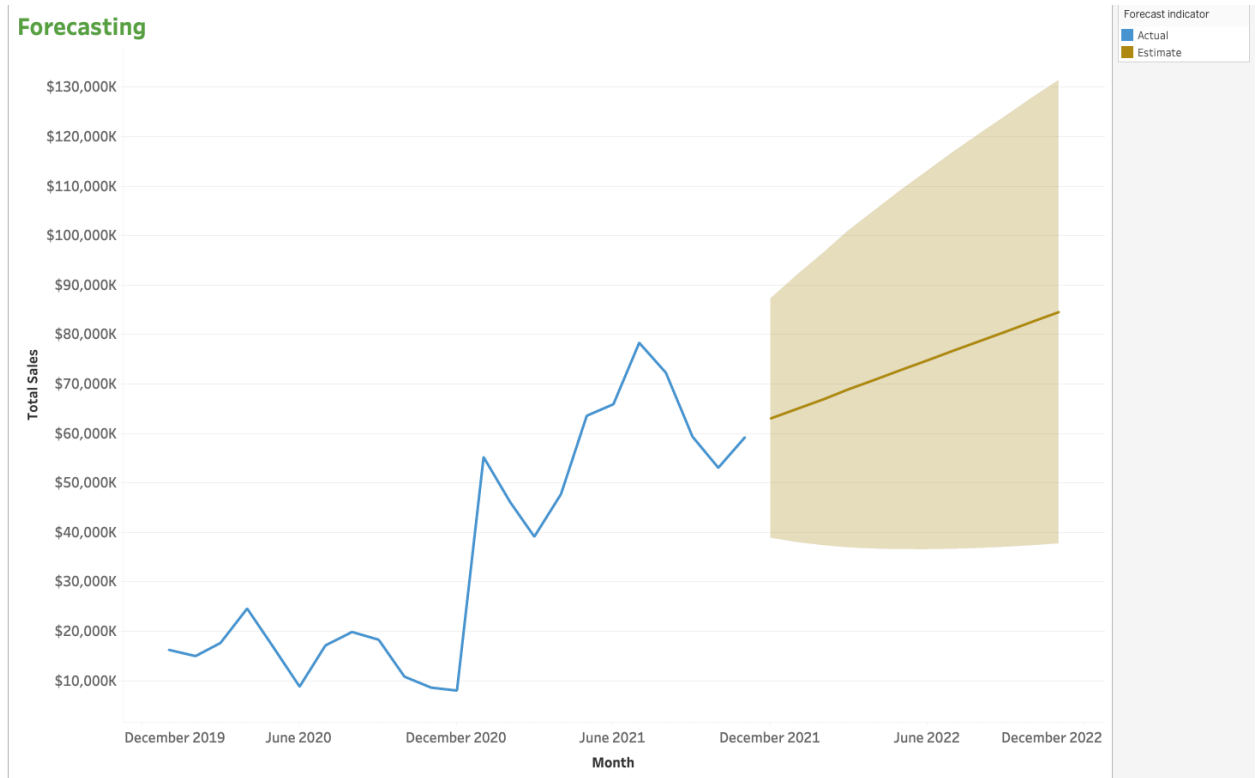


Figure 11-Sale Forecasting

According to the Plotted Forecasting Chart (Figure 11), it is predicted that Adidas's total Sales Revenue will increase by \$84,536K in December 2022 compared to the previous year. This forecast provides valuable insights into the potential growth trajectory of Adidas's sales. The forecast data provide valuable insights into potential sales trends, allowing Adidas to allocate resources effectively, optimize marketing strategies, adjust product offerings, and capitalize on emerging opportunities. Additionally, by continuously monitoring actual performance against forecasted figures, Adidas can adapt its approach in real-time to maximize revenue, drive sustainable growth, and maintain its competitive edge in the market.

## 2.10. Map:

Applying Tableau to display a visualization and a filled Map (Figures 12 & 13) for Adidas Sales in the U.S. from 2020 to 2021 is an effective way to gain insights into geographic sales distribution. This visualization will provide a comprehensive overview of Adidas sales across different states in the U.S. enabling stakeholders to identify patterns, trends, and opportunities for growth.



Figure 12- Visualization Map of Adidas Sales in the U.S

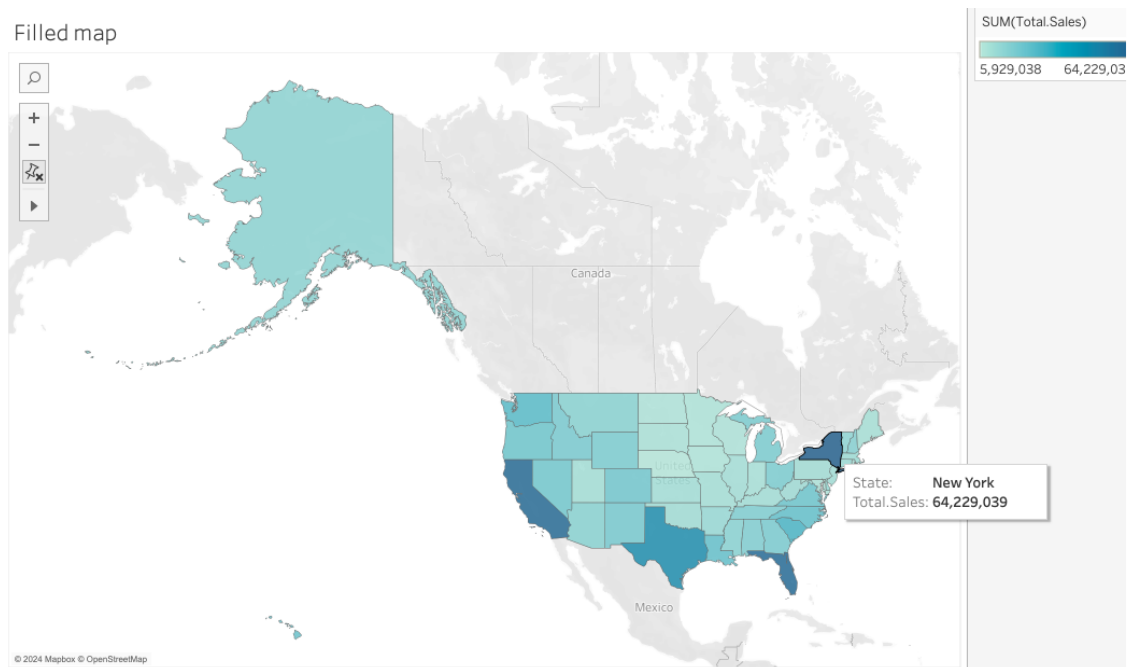


Figure 13- Filled Map of Adidas Sales Revenue in the U.S

New York stands out as the top-performing state in terms of Adidas product sales, boasting an impressive total of \$64,229,039. This robust sales figure underscores the importance

of the New York market for Adidas and highlights the potential for further growth and investment in this region. By recognizing and leveraging the strength of the New York market, Adidas can develop targeted strategies to maximize sales, enhance brand visibility, and deepen customer engagement. Investing in initiatives such as localized marketing campaigns, strategic partnerships with local retailers, and community-focused events can help Adidas solidify its presence in New York and establish stronger connections with consumers. Additionally, leveraging data analytics to gain insights into consumer preferences and behaviors in the region can inform product development and marketing strategies, ensuring alignment with market demands.

**2.11. Dashboard:** Using a comprehensive Sales Dashboard (Figure 14) in Tableau to analyze Adidas' performance from 2020 to 2021 involves integrating various charts and visualizations to provide detailed insights and comparisons. This supports to create a cohesive story for Adidas's performance. Provide annotations, insights, and explanations to guide Adidas business through the dashboard and facilitate data-driven decision-making.

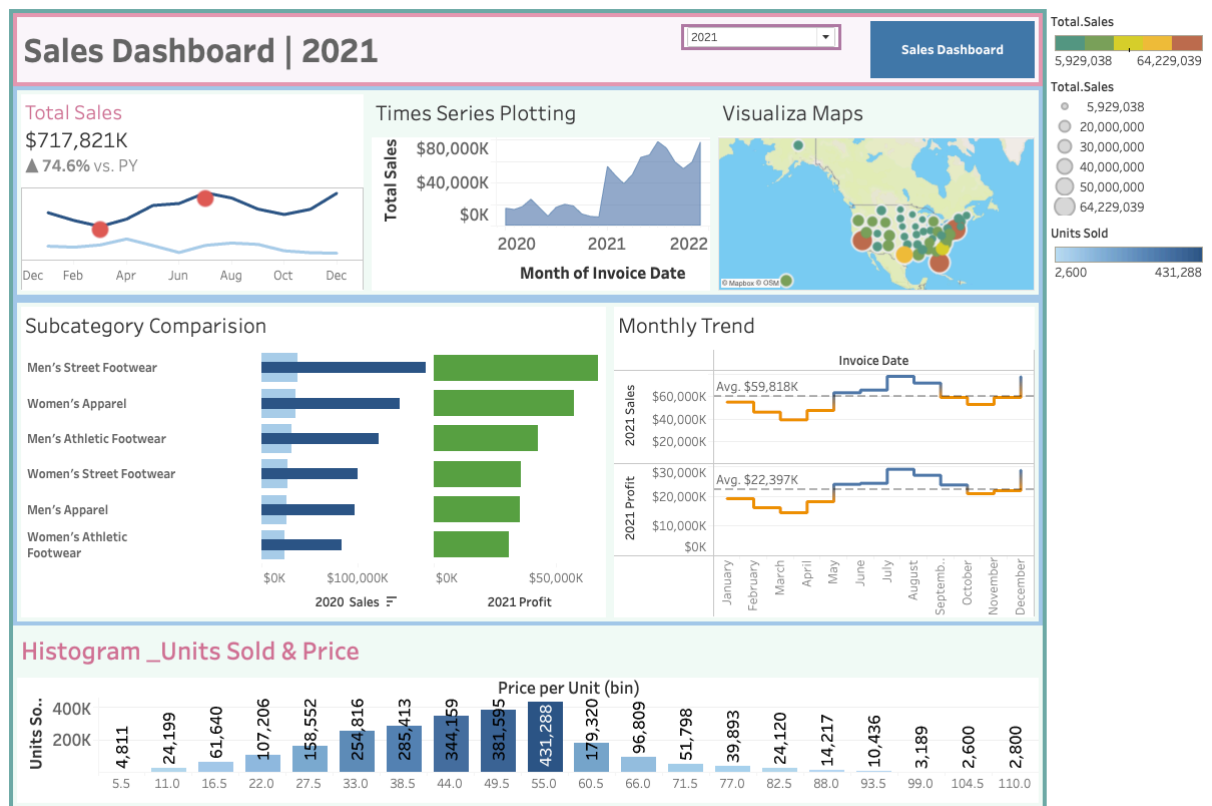


Figure 14- Adidas's Sales Dashboard.

### **3. Summarize what you learned:**

The visualization created by Tableau serves as powerful tool for analyzing business performance across various dimensions. In the case of Adidas, these visualizations offer a comprehensive overview of the company's performance from 2020 to 2021, covering key aspects such as product categories, sales channels, regional sales, pricing optimization, and sales trends over time.

Men's Street Footwear leads in sales, with total revenues over two years reaching \$208,826,244, followed by Women's Apparel, and Women's Athletic Footwear. Total revenues surged over 4 times in 2021 compared to 2020, indicating positive growth. Seasonal sales trends show peak performance in July and August.

Retail partnerships, particularly with Foot Locker and West Gear, significantly contribute to sales revenue, highlighting successful collaborations. Regional analysis identifies the South and Southeast regions as top contributors to sales revenue, with California, Texas, and New York emerging as key markets. Pricing optimizations is crucial, with products priced between \$45.00 to \$55.00 demonstrating the highest sales volume, emphasizing the importance of pricing optimization for maximizing profitability.

In-store and Outlet channels are favored by customers, while Online sales generate the highest revenue, suggesting a balanced approach to distribution strategy. The forecast predicts continued growth in total sales revenue for December 2022. Besides that, New York stands out as a top-performing state, emphasizing the importance of regional strategies.

Despite there is potential limitation of the analysis which is the availability of only 2020 and 2021 data, the analysis remains robust, and with updated datasets for recent years, similar analyses can be conducted effectively to inform strategic decision-making processes.

In conclusion, the visualization and analysis tools provide valuable insights and recommendations to guide Adidas in achieving its business objectives and maintaining competitiveness in the market.

### **4. Suggestion for business practice:**

Leveraging visualizations for data analysis by using Tableau, R or other visualization tools is a powerful strategy for businesses seeking to gain a competitive edge, make informed decisions, and drive growth in line with market opportunities and customer needs. Firstly, visualizations offer a comprehensive performance overview, providing stakeholders with a clear and concise understanding of business performance across various metrics. This aids in data-driven decision-making, strategic planning, and revenue optimization by offering insights into market trends, competitor analysis, and consumer behavior, as well as analyzing sales data and performance metrics. Additionally, visualizations enhance customer engagement by enabling businesses to better understand consumer behavior and preferences. Lastly, they facilitate sustainable growth by allowing businesses to monitor key performance indicators and align strategies with market opportunities, enabling timely adjustments to strategies and tactics to ensure long-term success. In summary, visualizations are an essential tool for businesses to drive success and maintain competitiveness in the market



## **5. Imitations and Conclusion:**

It is crucial to acknowledge the inherent in real-world business cases involving big data. While tools such as R and Tableau are invaluable for preliminary analyzes, their capabilities may be somewhat limited when faced with intricate datasets requiring thorough cleaning and analysis. Looking forward, I perceive essential value in diversifying my skill set to encompass SQL and Python. These languages offer robust capabilities for storing and connecting large volumes of data, enabling more effective analysis and forecasting. While SQL excels in querying and manipulating structured data stored in databases, Python offers a broader toolkit for data analysis, including data cleaning, preprocessing, modeling, and visualization. Also, learning Python opens up a world of possibilities in data analysis, machine learning, and automation.

By mastering SQL, Python, R, and Tableau, I aim to enhance my ability to navigate complex datasets and extract meaningful insights, thereby strengthening my analytical prowess in the realm of big data analysis. These tools offer a comprehensive toolkit for data analysis, each bringing unique strengths to the table. SQL provides powerful capabilities for querying and manipulating structured data stored in databases, while Python, R, and Tableau offer versatility in data preprocessing, analysis, visualization, and modeling. Together, these tools empower analysts to extract valuable insights from data and drive informed decision-making processes across various domains and industries.