



# **FINAL PROJECT**

# **BUSINESS INTELLIGENCE ANALYST**

Bintang Ary Pradana

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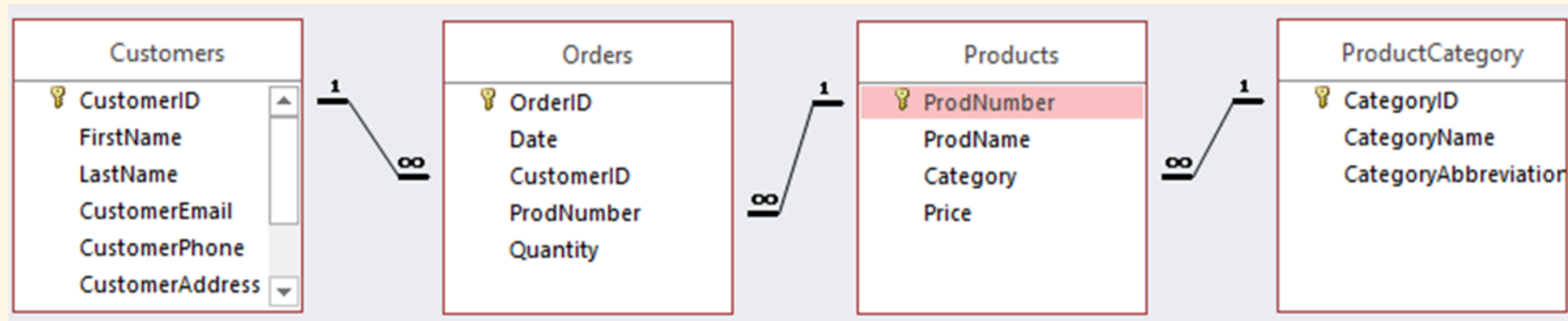
# BUSINESS PROBLEM STATEMENT

As BI Analyst, the task is to develop a comprehensive dashboard aimed at monitoring detailed transaction data. The primary goal is to use this data to uncover insights and trends that inform strategic decisions to boost revenue by addressing customer churn and identifying factors contributing to sales decline. The objectives are as follows:

1. **Sales Monitoring:** Create a real-time dashboard to track sales metrics such as total revenue, units sold, average transaction value, and customer purchase frequency.
2. **Trend Analysis:** Identify patterns and trends in the data that highlight peak sales periods, popular products, and customer preferences.
3. **Customer Insights:** Segment customers based on purchasing behavior to tailor marketing efforts and improve customer retention.



# ABOUT TABLES



There are 4 tables, each with its own primary key:

1. Customer table primary key: CustomerID
2. Products table primary key: ProdNumber
3. Orders table primary key: OrderID
4. ProductCategory table primary key: CategoryID

The tables are connected by relationships between each pair of table.

1. Customers.CustomerID = Orders.CustomerID with one to many relations.
2. Products.ProdNumber = Orders.ProdNumber with one to many relations.
3. ProductCategory.CategoryID = Products.Category with one to many relations.

# TOOLS

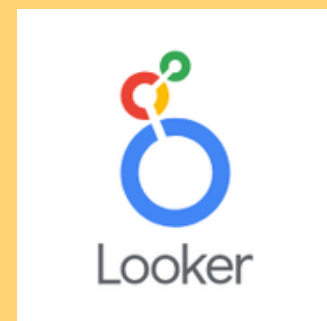
- MySQL is used for joining four tables into one table, and querying the selection.
- Microsoft Excel is used for conducting Exploratory Data Analysis (EDA) and analyzing data to solve business problems.
- Google Data Studio is used for data visualization into dashboard interactive.



**MySQL**



**Microsoft Excel**





**Google Data Studio (Looker)**

# SQL QUERYING



Perform the **JOIN** operation to combine the four tables, using aliases for easier querying. Assign "c" as the alias for the "customers" table, "o" for the "orders" table, "p" for the "product" table, and "pc" for the "product\_category" table.



```
SELECT
    Date AS order_date,
    CategoryName AS category_name,
    ProdName AS product_name,
    Price AS product_price,
    Quantity AS order_qty,
    Price*Quantity AS total_sales,
    CustomerEmail AS cust_email,
    CustomerState AS cust_state,
    CustomerCity AS cust_city
FROM customers AS c
JOIN orders AS o ON c.CustomerID = o.CustomerID
INNER JOIN products AS p ON p.ProdNumber = o.ProdNumber
INNER JOIN productcategory AS pc ON pc.CategoryID = p.Category
ORDER BY order_date, order_qty;
```

# EXPLORATORY DATA ANALYSIS

Unfortunately, in the span of the last two years was a noticeable decline with a 4,08% compared to previous years. Similarly, the number of items sold also experienced a 2,47% decline in 2021. **These declines may suggest various factors such as changes in market conditions, shifts in consumer preferences, or internal challenges faced by the business.**

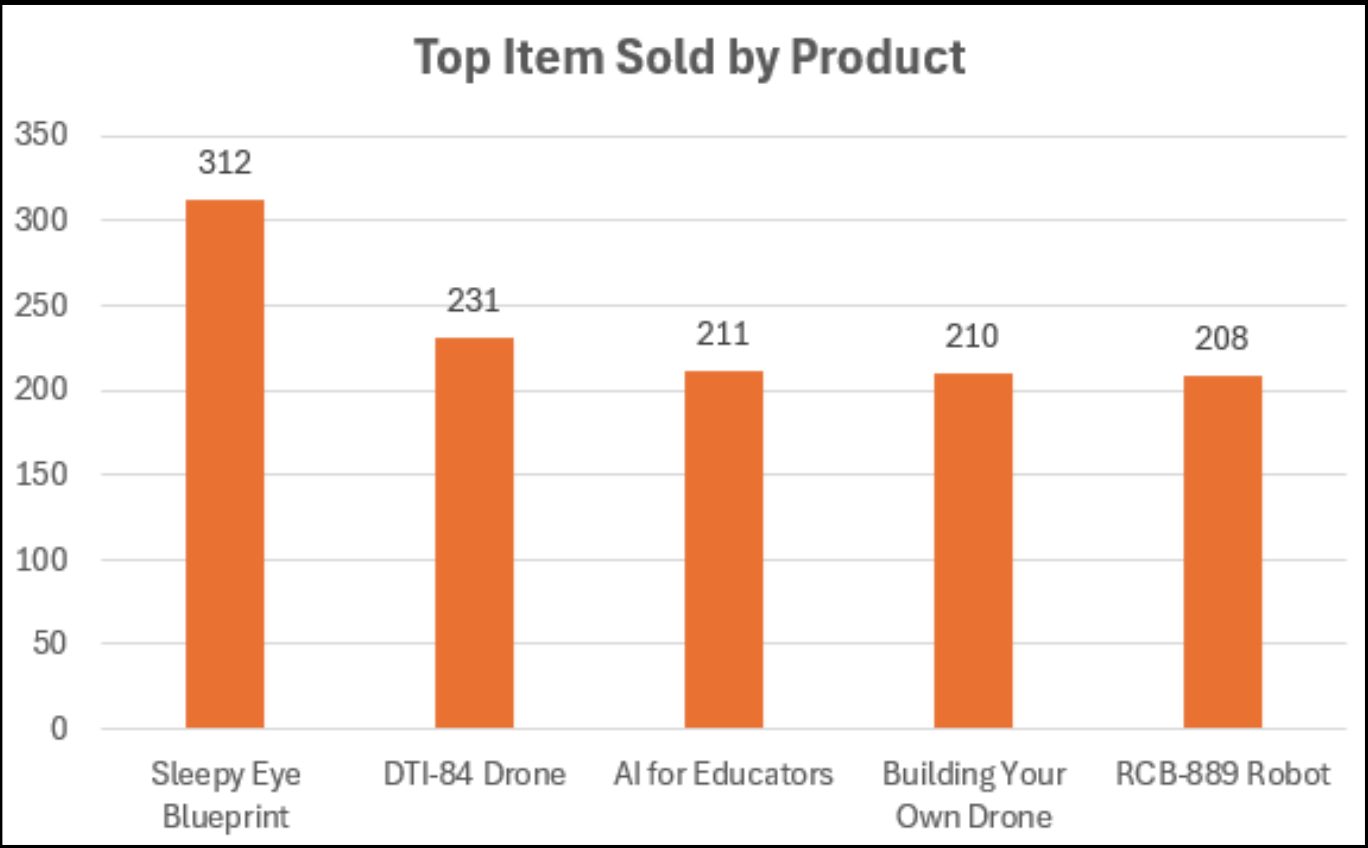
Total Sales and Item Sold By Year				
Row Labels	Sum of total_sales	Sum of order_qty	Proportion Sales	Proportion Item Sold
2020	\$ 913,210.09	5971	52.04%	51.24%
2021	\$ 841,540.48	5683	47.96%	48.76%
Grand Total	\$ 1,754,750.57	11654	100%	100%

Item Sold and Sales By Category				
Row Labels	Sum of total_sales	Sum of order_qty	Proportion Sales	Proportion Item Sold
Robots	\$743,505.00	1053	42.37%	9.04%
Drones	\$477,447.00	1227	27.21%	10.53%
Robot Kits	\$216,437.00	1037	12.33%	8.90%
Drone Kits	\$161,242.50	1515	9.19%	13.00%
Training Videos	\$80,716.15	2081	4.60%	17.86%
eBooks	\$58,968.41	3123	3.36%	26.80%
Blueprints	\$16,434.51	1618	0.94%	13.88%
Grand Total	\$1,754,750.57	11654	100%	100%

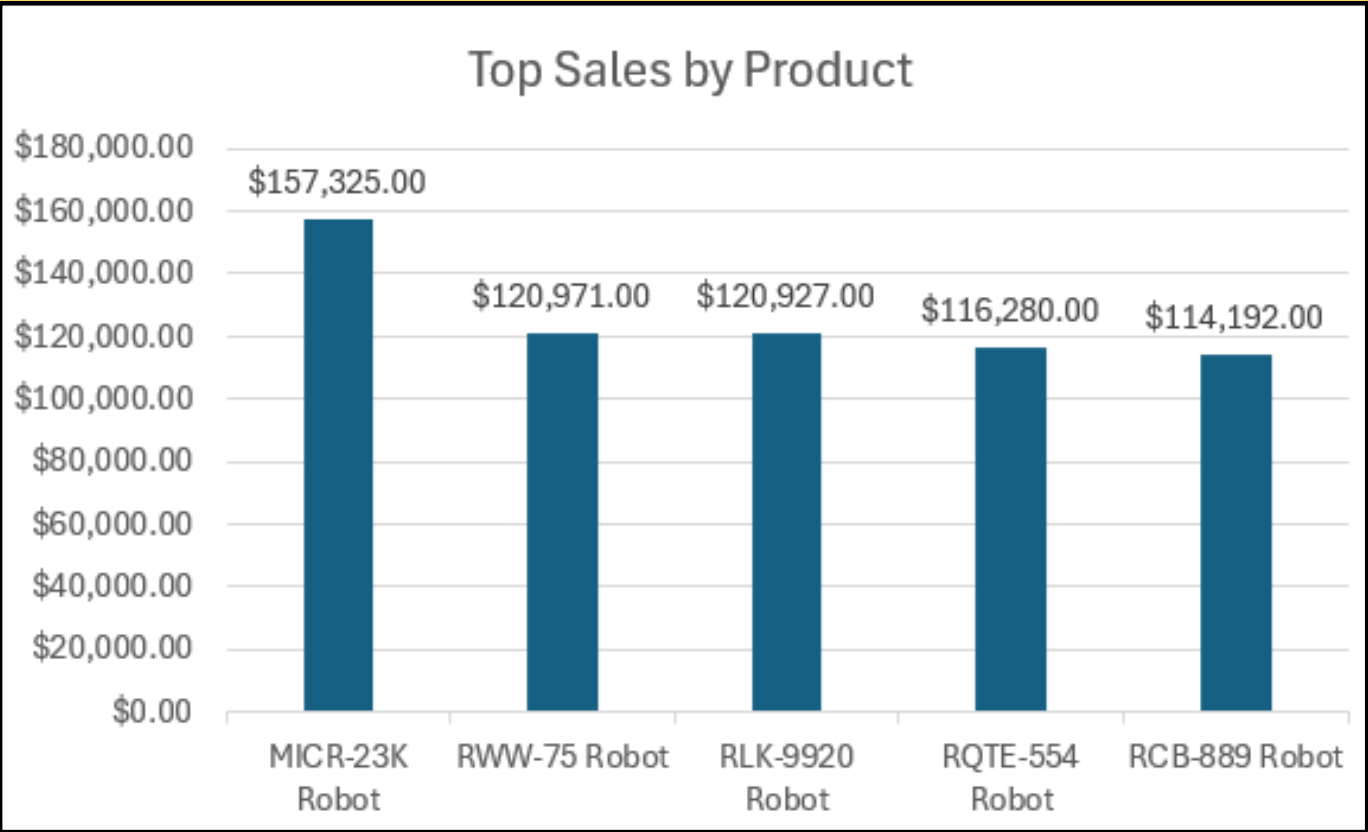
**The dominance of the Robots category, comprising 42.37% of total sales, signifies a substantial revenue contribution.** This suggests that while the eBooks category leads in terms of quantity sold, the Robots category commands higher revenue due to either its higher price point or elevated customer interest and investment.

**This insight underscores the significance of understanding both sales volume and revenue contribution when assessing product categories performance.** Additionally, it highlights the potential profitability of products within the Robots category, indicating opportunities for targeted marketing, product development, or pricing strategies to further capitalize on this lucrative market segment.





The top-selling product is the "Sleep Eye Blueprint" from the blueprint category. During the period, it sold a total of 312 units, which accounted for approximately 2.68% of the total number of items sold. This indicates a high level of interest and demand for the "Sleep Eye Blueprint" product in the market.



Upon closer examination of the sales by product graph, an interesting finding emerges: despite their relatively lower sales volumes, robotic products secure positions within the top 5. **This indicates a significant market presence driven by their higher price points.**

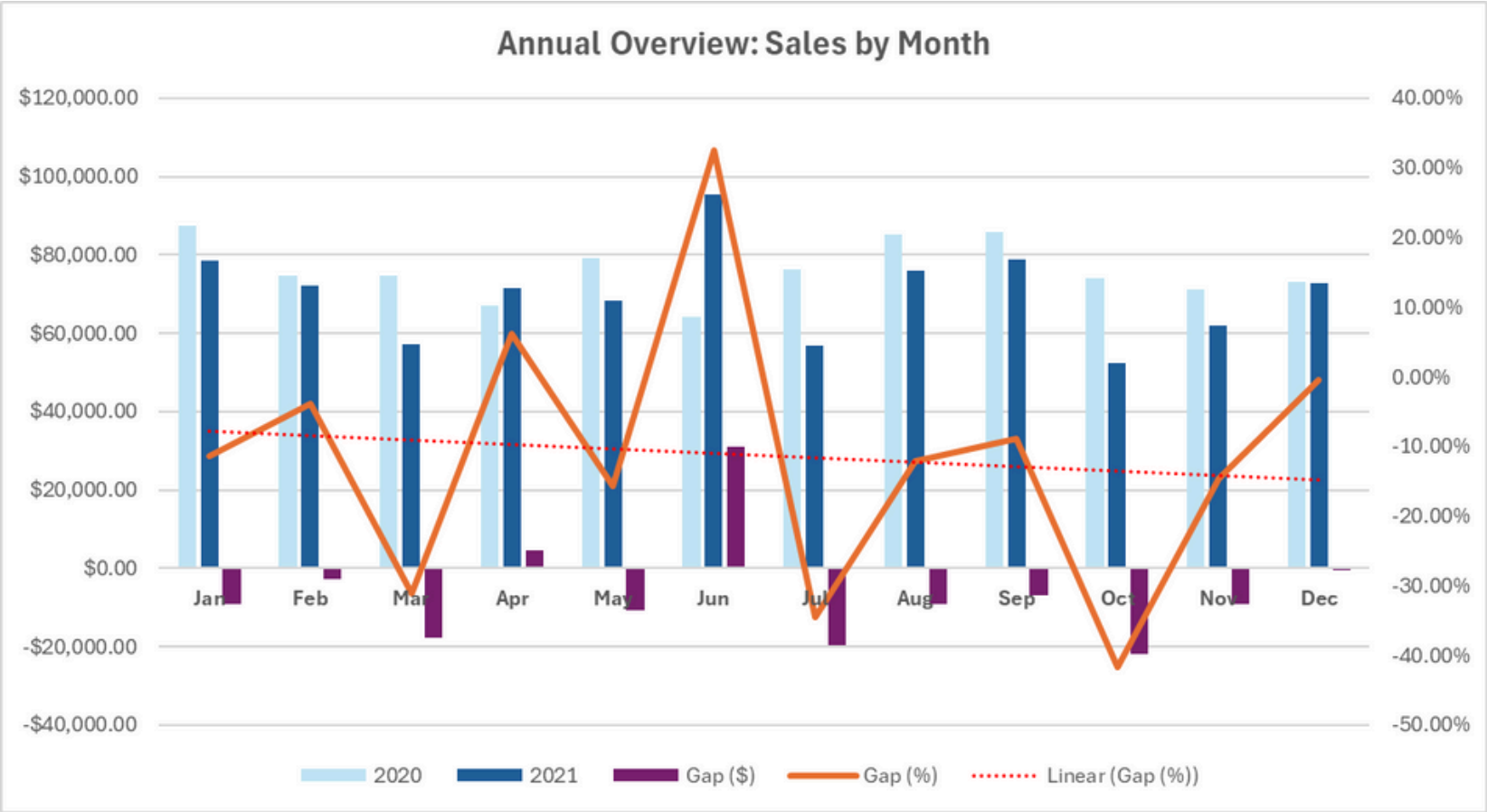
By expanding market reach and targeting broader customer segments, the company can capitalize on both the value proposition and the potential for increased sales revenue. Therefore, **maximizing sales volume becomes essential for sustainable growth and market expansion.**



Sales, Item Sold, & Customer count by State						
Row Labels	Sum of total_sales	Sum of order_qty	Count of cust_email	Proportion Sales	Proportion Item Sold	Proportion customer
California	\$ 237,295.59	1442	408	13.52%	12.37%	12.22%
Texas	\$ 196,228.76	1139	337	11.18%	9.77%	10.09%
Florida	\$ 121,018.31	869	240	6.90%	7.46%	7.19%
New York	\$ 93,019.19	602	167	5.30%	5.17%	5.00%
Pennsylvania	\$ 61,034.69	357	106	3.48%	3.06%	3.17%

From the data above, several interesting observations and insights can be derived:

- Sales Disparity:** California and Texas stand out as the top states in terms of sales with the over 10% proportions. This means that around 1/4 of the total sales come from these two states combined and significant market potential in both states.
- Comparison of Items Sold:** Although California has the highest sales, Texas sells more units, with 1139 units compared to California's 1442 units. This suggests that the average value of items sold in Texas may be lower than in California.
- Customer Profiling:** California and Texas boasts a larger customer base compared to other states, suggesting a broader market or higher customer engagement.
- Proportional Analysis:** Notably, sales, items sold, and customer counts in California and Texas represent over 10% of the total. This indicates significant market dominance in these states, warranting further exploration into consumer preferences and market dynamics.



Month	2020	2021	Gap (\$)	Gap (%)
Oct	\$74,144.48	\$52,348.49	-\$21,795.99	-41.64%
Jul	\$76,299.55	\$56,720.86	-\$19,578.69	-34.52%
Mar	\$74,807.77	\$57,080.91	-\$17,726.86	-31.06%
May	\$79,071.50	\$68,308.81	-\$10,762.69	-15.76%
Aug	\$85,316.33	\$76,127.18	-\$9,189.15	-12.07%
Nov	\$71,137.25	\$62,073.12	-\$9,064.13	-14.60%
Jan	\$87,478.32	\$78,479.05	-\$8,999.27	-11.47%
Sep	\$85,870.99	\$78,851.44	-\$7,019.55	-8.90%
Feb	\$74,764.52	\$72,040.18	-\$2,724.34	-3.78%
Dec	\$73,031.10	\$72,641.89	-\$389.21	-0.54%
Apr	\$66,986.64	\$71,467.02	\$4,480.38	6.27%
Jun	\$64,301.64	\$95,401.53	\$31,099.89	32.60%
Average	\$76,183.35	\$69,951.64	-\$6,231.71	-11.60%

The significant sales declines in our company, notably in March, July, and October, result from various factors requiring thorough investigation. However, the most concerning decline occurred in October, highlighting the need for a detailed analysis.

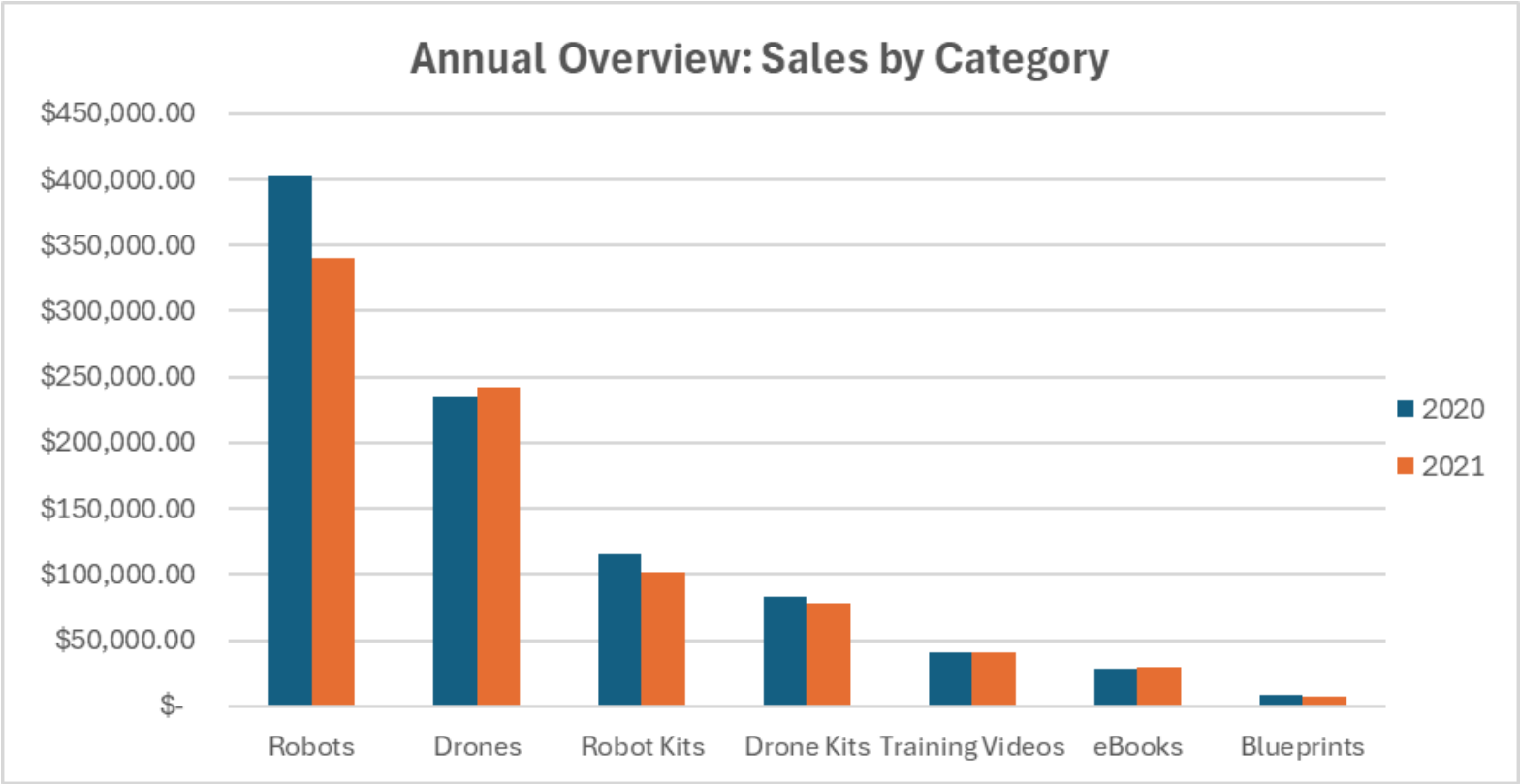
This review will focus on product analysis and sales by state, as well as assess the performance of high value products such as robot category items. We will examine if there are decreases in the number of items sold or any significant changes in product categories contributing to the sales decline.

Identifying the root causes of these declines is essential for developing targeted solutions and improving our sales performance.

# FLOW ROOT CAUSE ANALYSIS



# IDENTIFIED SALES BY CATEGORY (YOY)

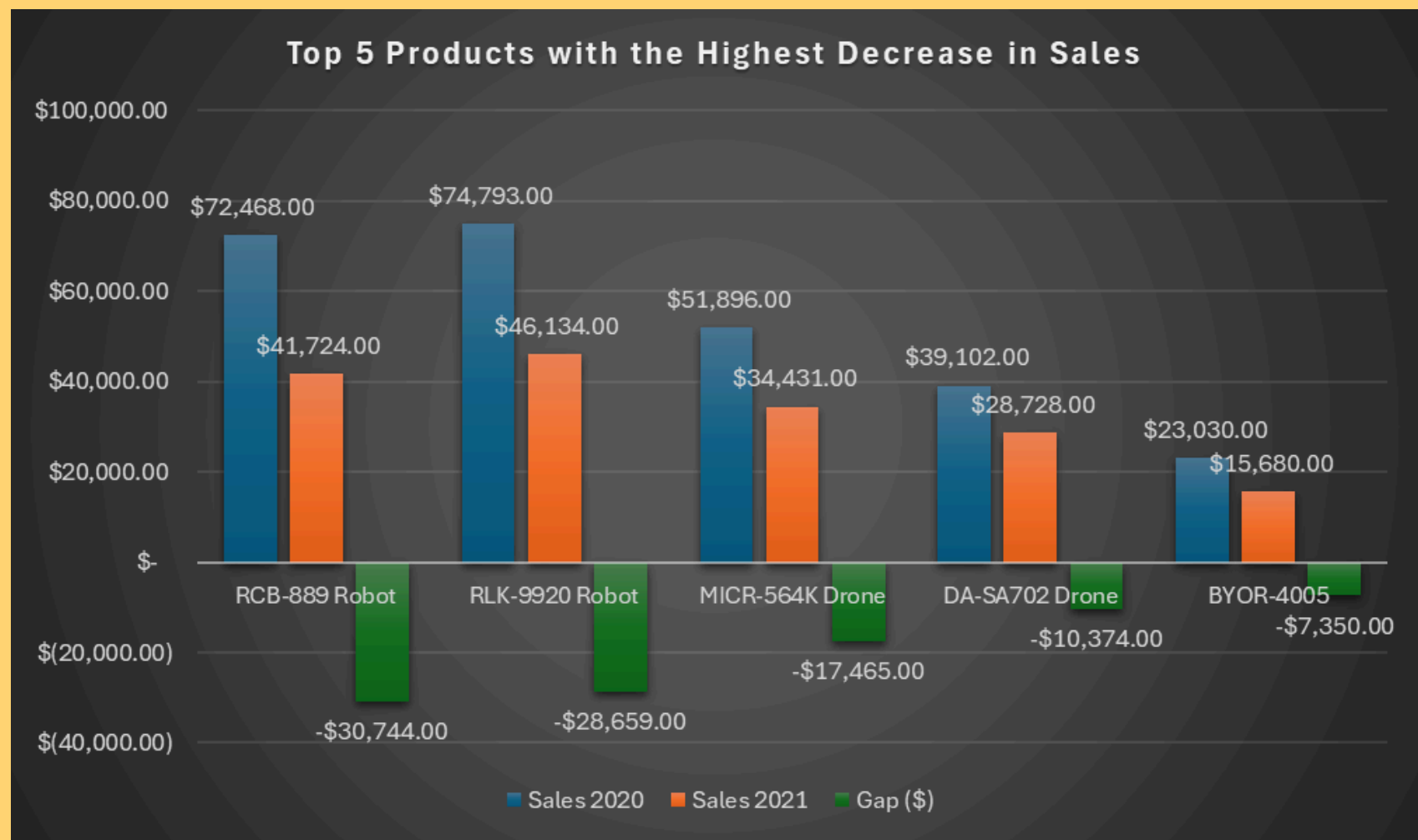


Category	Sales 2020	Sales 2021	Gap (\$)	Gap (%)
Robots	\$402,835.00	\$340,670.00	-\$62,165.00	-18.25%
Robot Kits	\$114,675.00	\$101,762.00	-\$12,913.00	-12.69%
Drone Kits	\$83,033.40	\$78,209.10	-\$4,824.30	-6.17%
Blueprints	\$8,753.49	\$7,681.02	-\$1,072.47	-13.96%
Training Videos	\$40,174.68	\$40,541.47	\$366.79	0.90%
eBooks	\$28,875.52	\$30,092.89	\$1,217.37	4.05%
Drones	\$234,863.00	\$242,584.00	\$7,721.00	3.18%

The data reveals some critical insights into our product performance. **Notably, the robots category experienced an 18.25% drop in sales, indicating potential issues such as decreased market demand, increased competition, or product quality problems.** Similarly, declines in robot kits and blueprints suggest broader challenges in high-sales categories that require immediate attention to prevent further revenue loss.

In contrast, the Drones, eBooks, and Training Videos category showed a slight increase, likely reflecting growing demand or effective marketing strategies. However, **this modest gain does not offset the significant decline in the sales in robots category.** Stability in training videos and eBooks suggests potential for future growth, but these gains are insufficient to balance the losses in higher revenue-generating products.

# TOP 5 PRODUCT WITH THE HIGHEST DECREASE IN SALES



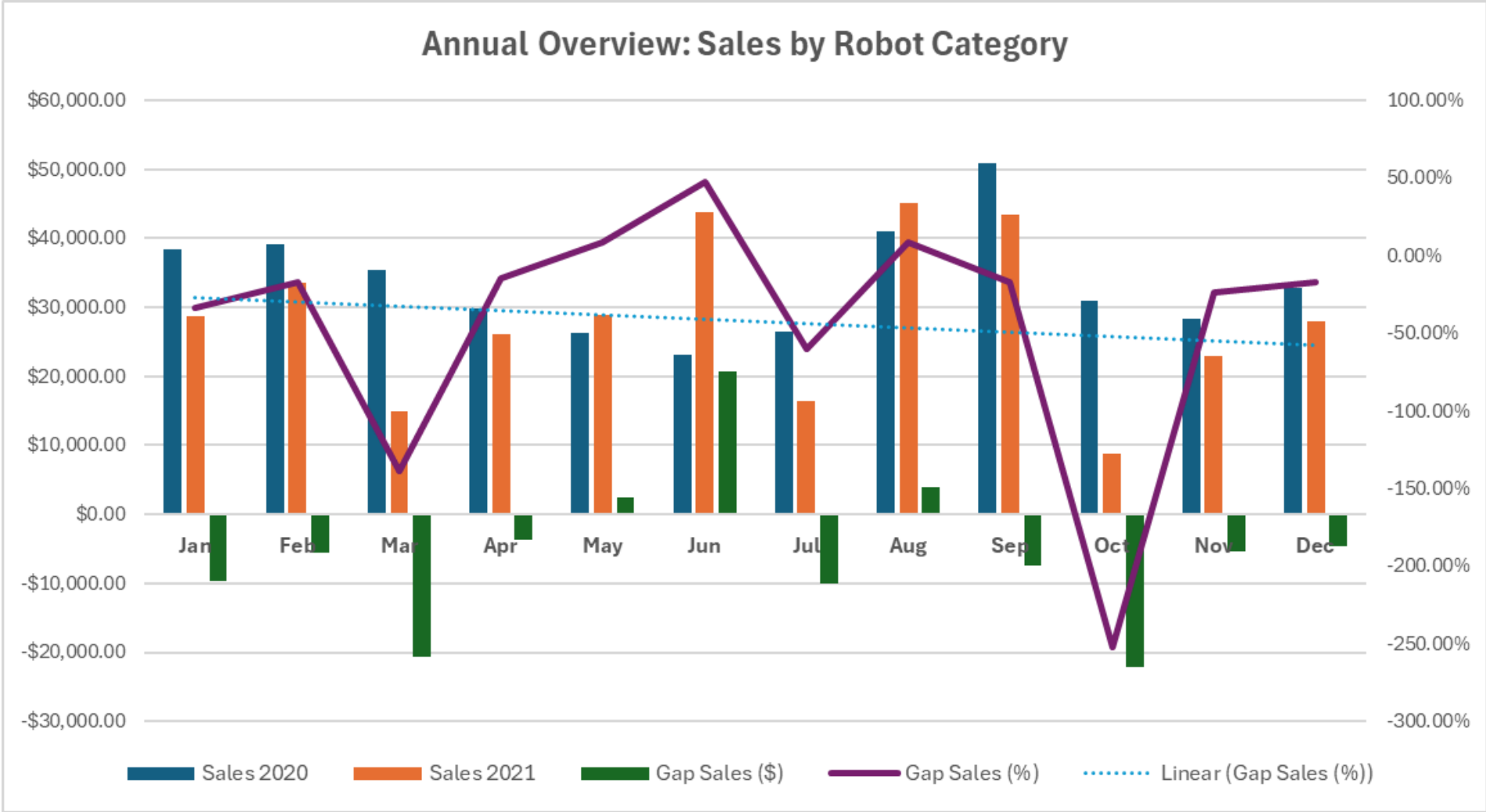
Product	Sales 2020	Sales 2021	Gap (\$)	Gap (%)	Category
RCB-889 Robot	\$ 72,468.00	\$ 41,724.00	-\$30,744.00	-73.68%	Robots
RLK-9920 Robot	\$ 74,793.00	\$ 46,134.00	-\$28,659.00	-62.12%	Robots
MICR-564K Drone	\$ 51,896.00	\$ 34,431.00	-\$17,465.00	-50.72%	Drones
DA-SA702 Drone	\$ 39,102.00	\$ 28,728.00	-\$10,374.00	-36.11%	Drones
BYOR-4005	\$ 23,030.00	\$ 15,680.00	-\$7,350.00	-46.88%	Robot Kits

Firstly, there's a notable decline in sales for high-priced products such as robots and drones in 2021 compared to the previous year. **Since these products are expensive, even a slight reduction in the number of buyers significantly impacts overall sales.**

**This decline indicates that the high prices may be a barrier to maintaining consistent purchase volumes. To address this issue, the company may need to explore pricing strategies, enhance the value proposition of these products, or investigate other factors affecting consumer purchasing decisions.** Understanding these elements will be crucial in formulating effective strategies to boost future sales.



# IDENTIFIED SALES BY ROBOT CATEGORY (YOY)

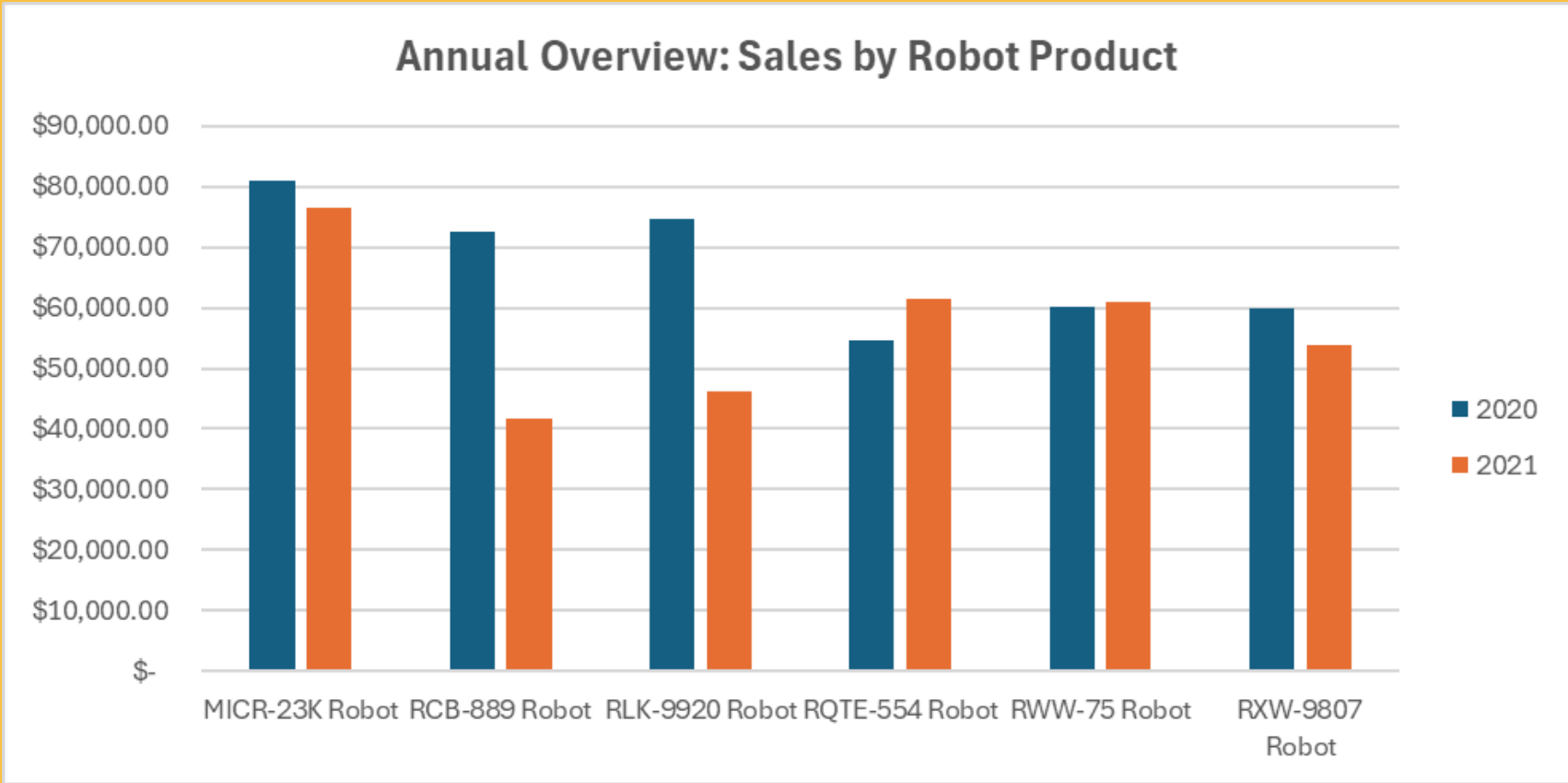


Month	Sales 2020	Qty 2020	Sales 2021	Qty 2021	Gap Sales (\$)	Gap Sales (%)	Gap Qty (item)	Gap Qty (%)
Oct	\$30,945.00	45	\$8,793.00	12	-\$22,152.00	-251.93%	-33	-275.00%
Mar	\$35,450.00	51	\$14,856.00	23	-\$20,594.00	-138.62%	-28	-121.74%
Jul	\$26,421.00	39	\$16,475.00	25	-\$9,946.00	-60.37%	-14	-56.00%
Jan	\$38,322.00	57	\$28,638.00	39	-\$9,684.00	-33.82%	-18	-46.15%
Sep	\$50,900.00	74	\$43,422.00	58	-\$7,478.00	-17.22%	-16	-27.59%
Feb	\$39,206.00	60	\$33,576.00	49	-\$5,630.00	-16.77%	-11	-22.45%
Nov	\$28,265.00	40	\$22,894.00	33	-\$5,371.00	-23.46%	-7	-21.21%
Dec	\$32,734.00	44	\$28,040.00	40	-\$4,694.00	-16.74%	-4	-10.00%
Apr	\$29,919.00	40	\$26,148.00	38	-\$3,771.00	-14.42%	-2	-5.26%
May	\$26,382.00	43	\$28,919.00	37	\$2,537.00	8.77%	-6	-16.22%
Aug	\$41,095.00	53	\$45,055.00	60	\$3,960.00	8.79%	7	11.67%
Jun	\$23,196.00	31	\$43,854.00	62	\$20,658.00	47.11%	31	50.00%

The graph shows that the most significant declines in robot category sales occurred in October, March, and July. These three months were crucial contributors to the overall monthly sales drop, reflecting both the highest reductions in sales revenue and quantities items sold.

Consequently, these periods heavily impacted the total sales performance for the corresponding months. This indicates that the products in the robot category have a significant influence on overall monthly sales. Addressing the factors causing these sharp declines in robot sales is essential for improving future sales.

# IDENTIFIED SALES BY ROBOTS PRODUCT (YOY)

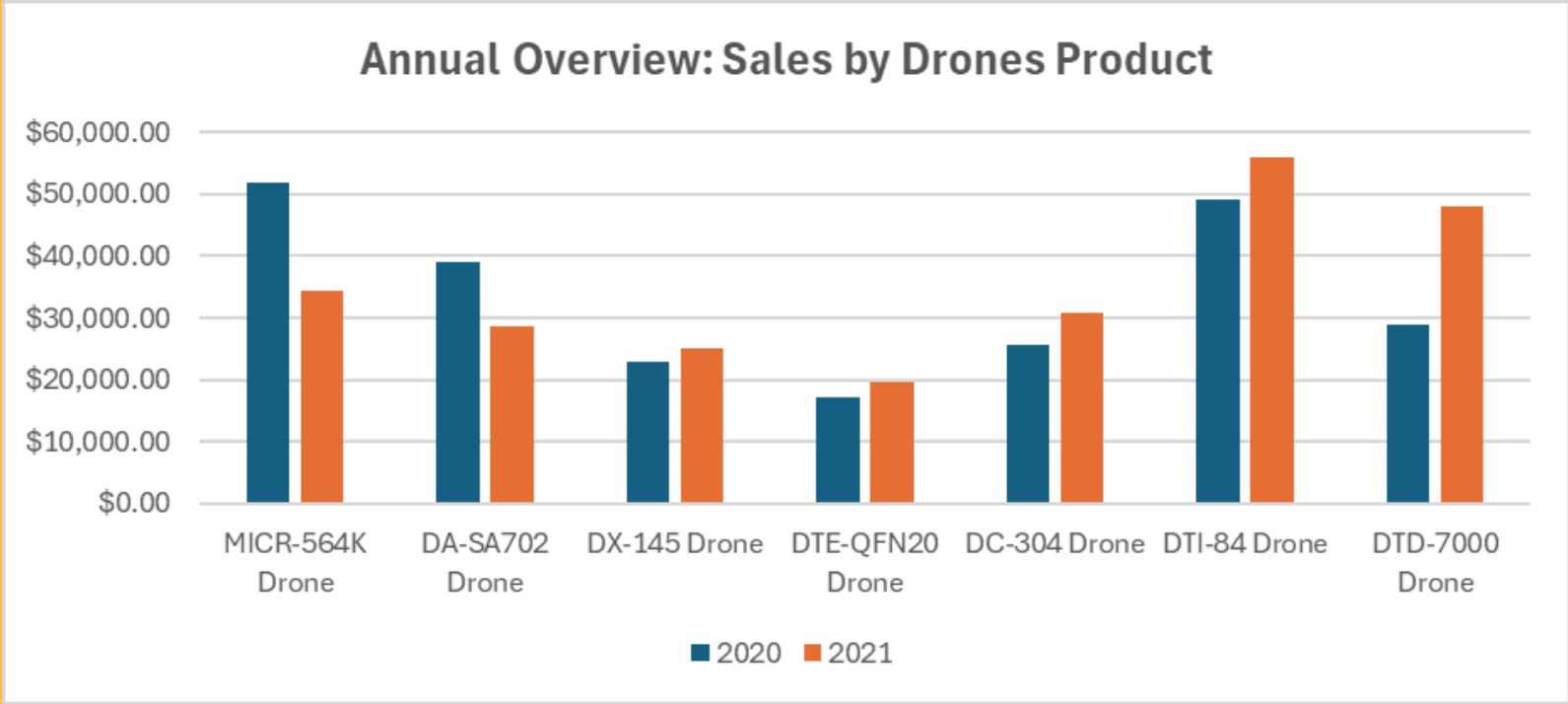


Category	Sales 2020	Sales 2021	Gap (\$)	Gap (%)
RCB-889 Robot	\$ 72,468.00	\$ 41,724.00	-\$30,744.00	-73.68%
RLK-9920 Robot	\$ 74,793.00	\$ 46,134.00	-\$28,659.00	-62.12%
RXW-9807 Robot	\$ 59,900.00	\$ 53,910.00	-\$5,990.00	-11.11%
MICR-23K Robot	\$ 80,910.00	\$ 76,415.00	-\$4,495.00	-5.88%
RWW-75 Robot	\$ 60,044.00	\$ 60,927.00	\$883.00	1.45%
RQTE-554 Robot	\$ 54,720.00	\$ 61,560.00	\$6,840.00	11.11%

- **Varied Sales Performance:** The sales performance of robot products varied significantly, with some experiencing substantial declines while others showed positive growth. This indicates potential differences in market demand and product competitiveness.
- **Identifying Underperforming Products:** The data highlights specific products, such as RCB-889 Robot and RLK-9920 Robot, that have encountered significant sales decreases. Understanding the reasons behind this decline is essential for devising effective strategies to address the issue. This may involve product improvement, pricing adjustments, or even considering discontinuation if necessary.
- **Product Differentiation:** The contrasting sales trends among robot products suggest the importance of product differentiation and innovation. Products like RQTE-554 Robot and RWW-75 Robot, which saw sales growth, may have unique features or market positioning that resonated well with customers.

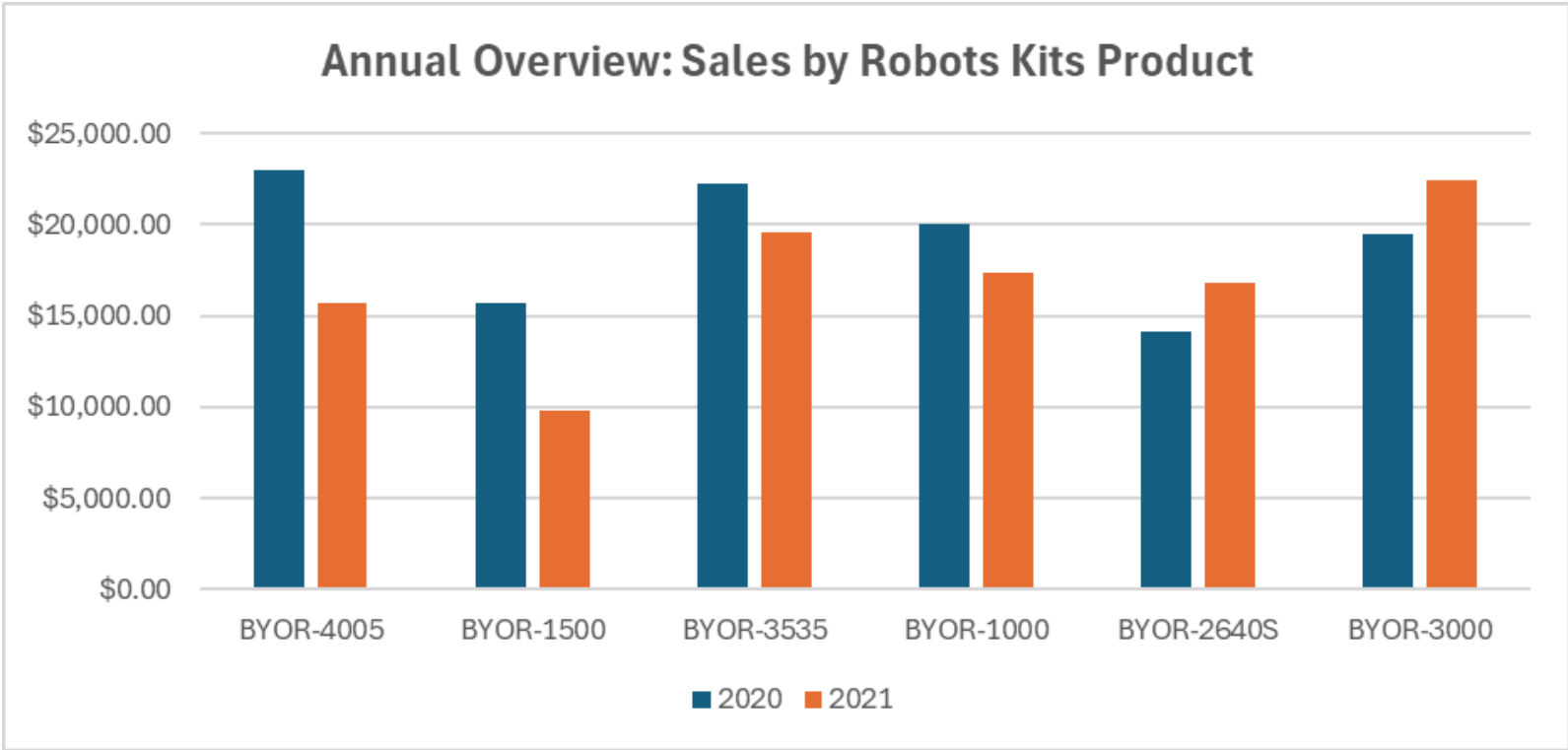


# SALES BY DRONES PRODUCT (YOY)



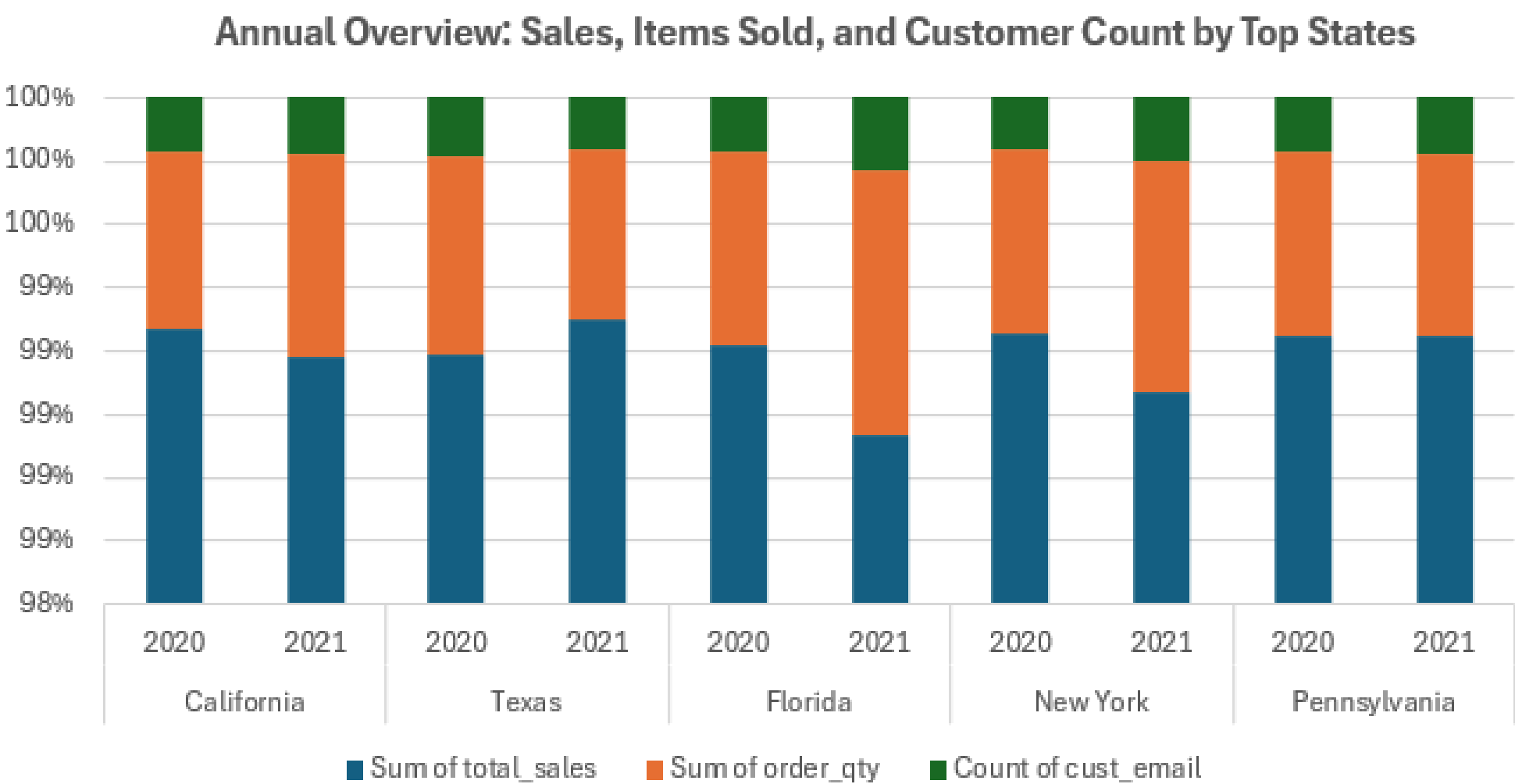
In the drones category, there's a notable disparity in sales performance among different products. While some drones experienced significant declines, others showed positive growth. **Products like MICR-564K Drone and DA-SA702 Drone notably encountered sales decreases.**

# SALES BY ROBOTS KITS PRODUCT (YOY)



In the robot kits category, sales declines were prevalent across most products, albeit with differing magnitudes. **Products like BYOR-4005 and BYOR-1500 experienced significant decreases.** However, there were also instances of positive growth, such as with BYOR-2640S and BYOR-3000, indicating potential opportunities for certain types of robot kits.

# IDENTIFIED TOP TOTAL SALES BY STATE



The data reveals mixed trends across top states, with increases in order quantity and customer count, but overall declines in total sales. Specifically, while customer engagement has improved, with more items sold and higher customer counts, sales figures have not correspondingly increased. This suggests issues such as pricing strategies, product value, or competitive pressures may be affecting revenue despite higher customer activity.

# TOP 10 STATE WITH HIGHEST DECREASE IN SALES

State	Sales 2020	Sales 2021	Gap Sales (\$)	Gap Sales (%)	Gap Qty (Items)	Gap Customer (transaction)
Illinois	\$37,886.36	\$16,761.93	-\$21,124.43	-126.03%	-87	-18
New York	\$55,782.81	\$37,236.38	-\$18,546.43	-49.81%	-52	-17
Virginia	\$36,432.30	\$21,879.91	-\$14,552.39	-66.51%	-19	-2
Alabama	\$25,702.06	\$11,959.34	-\$13,742.72	-114.91%	-57	-15
New Jersey	\$21,089.38	\$7,702.37	-\$13,387.01	-173.80%	-10	-5
District of Columbia	\$33,988.21	\$21,393.73	-\$12,594.48	-58.87%	-34	-9
Florida	\$65,915.92	\$55,102.39	-\$10,813.53	-19.62%	61	14
Wisconsin	\$19,195.52	\$9,443.40	-\$9,752.12	-103.27%	-36	-10
Tennessee	\$19,753.26	\$10,036.00	-\$9,717.26	-96.82%	15	3
Kansas	\$10,962.31	\$3,301.08	-\$7,661.23	-232.08%	-28	-8

Based on data, it's evident that significant variations exist in the extent of the decreases. While some states may exhibit low percentage declines, their actual sales decrease in dollar amounts can be substantial. **This suggests the presence of high-priced products that exert a considerable influence on the overall sales decline.**

Furthermore, there are cases where customer transactions and item sold have increased, yet sales still declined compared to the previous year. **This highlights shifts in consumer purchasing patterns, where increased transaction volume doesn't necessarily translate to proportional revenue growth** .Moreover, a lot of states experienced sales declines exceeding 100%, indicating a profound impact from changes in market. By this insight, companies can adapt their approaches to minimize losses and capitalize on potential revenue opportunities.

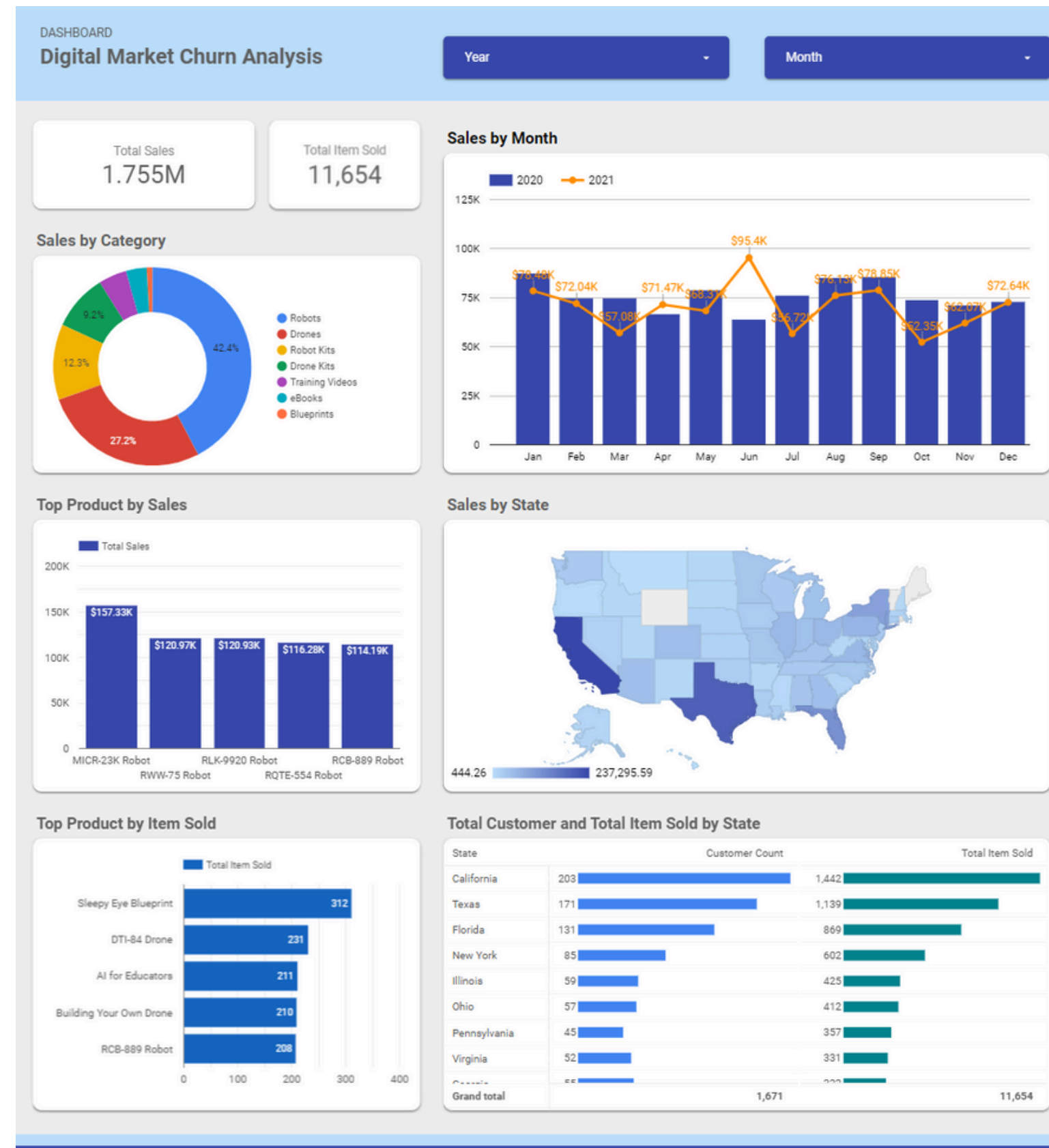
# TOP 10 STATE WITH HIGHEST CATEGORY DECREASE IN SALES

State	Gap Sales (\$)	Gap (%)	Gap Qty (items)	Gap Customer (transaction)	Highest Category Decrease
Illinois	-\$14,779.00	-1057.15%	-4	-21	Robots
New York	-\$13,208.00	-134.41%	-4	-22	Robots
Virginia	-\$18,032.00	-510.53%	-6	-23	Robots
Alabama	-\$5,729.00	-205.64%	-3	-15	Drones
New Jersey	-\$10,384.00	-495.18%	-4	-16	Robots
District of Columbia	-\$8,541.00	-66.95%	-3	-13	Robots
Florida	-\$7,895.00	-34.53%	-3	-10	Robots
Wisconsin	-\$4,442.00	-167.69%	-2	-6	Robots
Tennessee	-\$9,287.00	0.00%	-3	-13	Robots
Kansas	-\$5,844.00	0.00%	-3	-8	Robots

The data underscores **the significant impact of the Robots category on sales declines across various states**. This consistent trend highlights the necessity for targeted strategies to address the issues within the Robots category. Whether it's through product improvements, pricing adjustments, or enhanced marketing efforts, addressing the challenges in this category could be crucial for reversing the sales decline and driving future growth. **Additionally, state-specific strategies should be considered to tackle unique issues, such as the Drones category decline in Alabama.**

# DASHBOARD

[Link Dashborad](#)



# CONCLUSION

- **Sales Declines Over Two Years:** There has been a noticeable decline in sales and the number of items sold over the past two years, indicating potential challenges faced by the business.
- **Dominance of Robots Category:** The Robots category contributes significantly to total sales, indicating its importance in revenue generation. This underscores the need to understand both sales volume and revenue contribution when evaluating product categories.
- **Product Performance:** The top-selling product, the "Sleep Eye Blueprint," demonstrates high demand in the market. Additionally, despite lower sales volumes, robotic products maintain positions within the top 5, suggesting their significant market presence driven by higher price points.
- **Regional Sales Disparity:** States like California and Texas stand out with substantial proportions of total sales, indicating significant market potential in these regions. However, despite high sales volumes, other states may sell more units, suggesting differences in average item values and customer engagement.
- **Identifying Sales Trends:** Notably, sales declines in certain months, particularly in the Robots category, heavily impact overall monthly sales performance. Understanding these trends is crucial for improving future sales strategies.
- **Product Category Performance:** While some categories like Drones, eBooks, and Training Videos show slight increases, others like Robots, Robot Kits, and Blueprints experience significant declines. This highlights the need to address challenges within high-sales categories to prevent further revenue loss.
- **Pricing and Market Dynamics:** The significant declines in high-priced products like robots and drones suggest potential barriers to maintaining consistent purchase volumes. Understanding pricing strategies and consumer purchasing behavior is essential for addressing these challenges.

Overall, the analysis emphasizes the importance of understanding sales trends, regional disparities, and product category performance to develop targeted strategies for revenue growth and market expansion. By addressing challenges and capitalizing on opportunities identified through data analysis, the company can enhance its competitiveness and drive sustainable business growth.

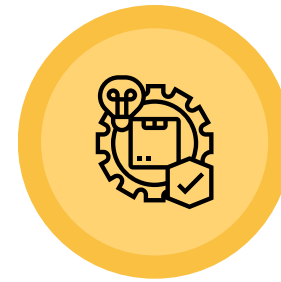


# RECOMMENDATION



## Optimize Pricing Strategies

Reassess pricing strategies for high-priced products based on sales data insights. Adjust prices to align with customer expectations and offer targeted discounts to stimulate demand.



## Diversify Product Offerings

Reduce dependency on high-priced products like robots and drones by introducing new products or expanding existing lines to capture a broader market segment. Utilize sales data to identify emerging trends and cater to changing consumer preferences.

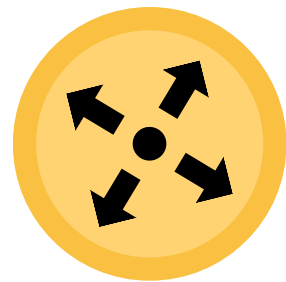


## Enhance Product Quality

Address the declines in sales by improving product quality. Gather customer feedback to identify areas for improvement and ensure that products meet high standards. This will help build a strong reputation and increase customer satisfaction and buying items.



# RECOMMENDATION



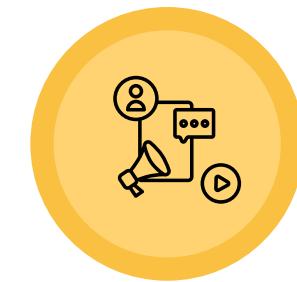
## Expand Market Reach

Identify untapped markets and demographics using sales data. Explore partnerships with retailers or distributors and expand online sales channels to diversify the customer base and mitigate regional sales disparities.



## Improve Customer Engagement

Enhance engagement and build brand loyalty through personalized communication, proactive customer support, and after-sales services. Use customer feedback to guide product and service improvements, encouraging repeat purchases and generating word-of-mouth referrals.



## Enhance Marketing Efforts

Strengthen marketing efforts for high-value products, particularly in the Robots category. Invest in targeted digital marketing campaigns, leverage social media, and collaborate with influencers to increase brand visibility and attract more customers.

**Thank You!**