



Exploring Customer Occupation Purchase Patterns at Adventure Works (2015 – 2017)

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Introduction

In today's data-driven business environment, understanding customer behavior is paramount. This data analysis project, titled "**Exploring Customer Occupation Purchase Patterns at Adventure Works**," delves into the intriguing relationship between customer occupations and their purchasing habits between 2015 and 2017.

By dissecting data and applying advanced analytical techniques, it seeks to provide the business with valuable insights to tailor their strategies and enhance customer experiences.



Background

Understanding customer behavior is paramount for businesses seeking to optimize their strategies and enhance customer satisfaction. At Adventure Works, a company renowned for its products and services, delving into the realm of customer occupation purchase patterns holds immense significance.

The rationale behind this exploration lies in the belief that different customer groups may exhibit distinct preferences, needs, and spending behaviors. Recognizing these patterns can empower Adventure Works and similar businesses to tailor their product offerings, marketing campaigns, and customer experiences more effectively.

Methodology



Data Collection and Preparation (Excel):

This includes identifying the data sources, collecting and cleaning the data.



Data Processing and Analysis:

This involves importing the cleaned data into SQL server, writing SQL queries to perform data analysis aggregation, filtering, and calculations.



Data Visualization:

The involves using Excel to create visualizations such as Line charts, column charts, waterfall charts and bar charts to explore relationships and patterns. An interactive Dashboard was also built to present the findings using Excel.



Presentation and Storytelling:

The result of the analysis were interpreted and communicated using PowerPoint.



Documentation:

All SQL queries, data sources, datasets have been documented.



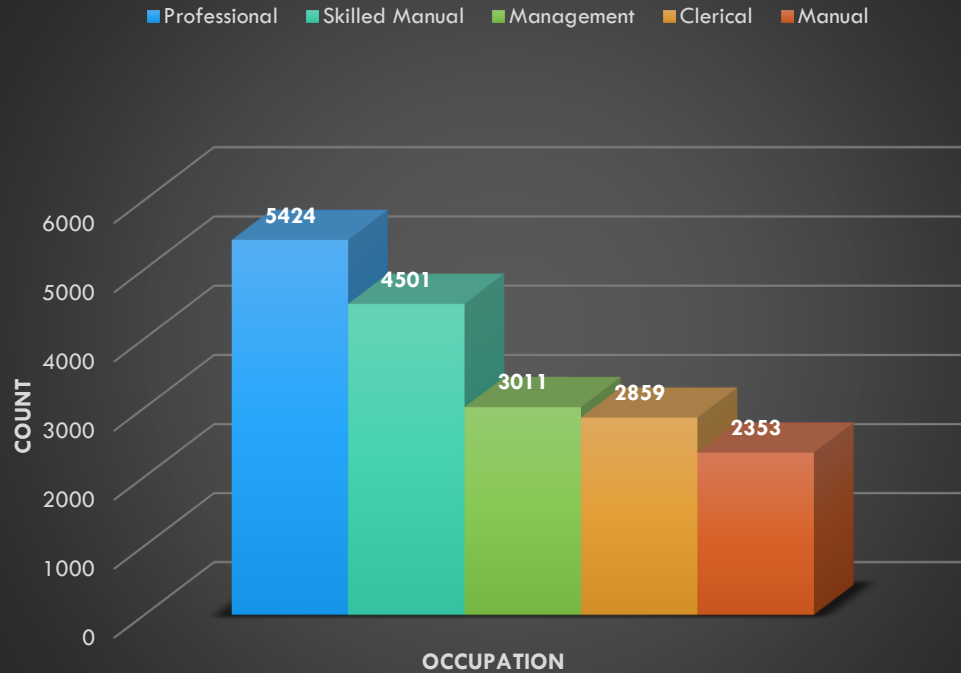
Results And Findings



Customer occupation demography

Customer Occupation Distribution And Average Age

Customer distribution across each occupation



Within the timeframe of 2015 to 2017, most of our customer base is composed of professionals (29%), while manual workers (12%) represent the minority. This observation strongly suggests that professionals constitute the largest segment of our customer demographic during this period.

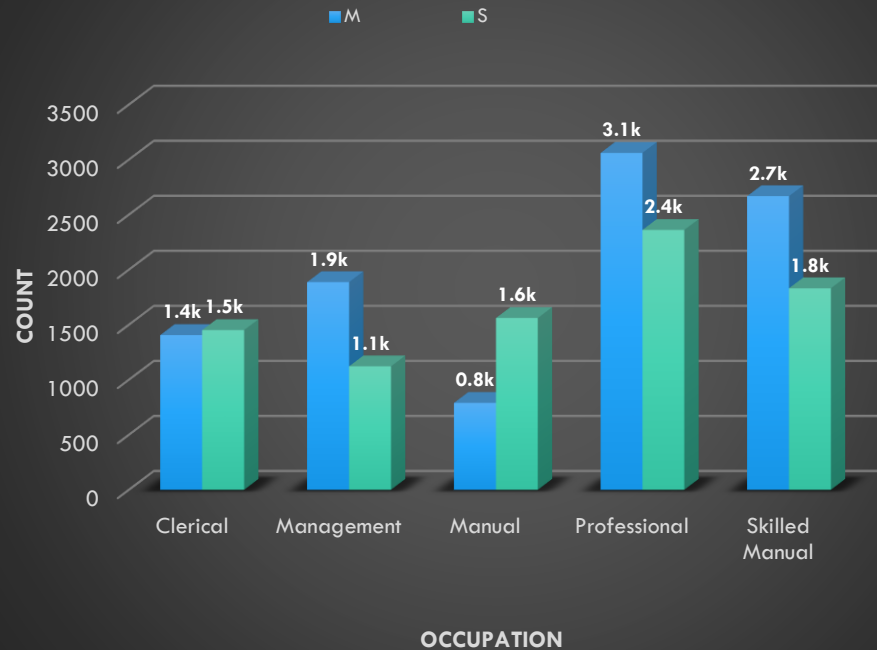
Average Age per customer Occupation



On average, among various occupations, Management workers tend to be the oldest in terms of age, while Manual workers tend to be the youngest.

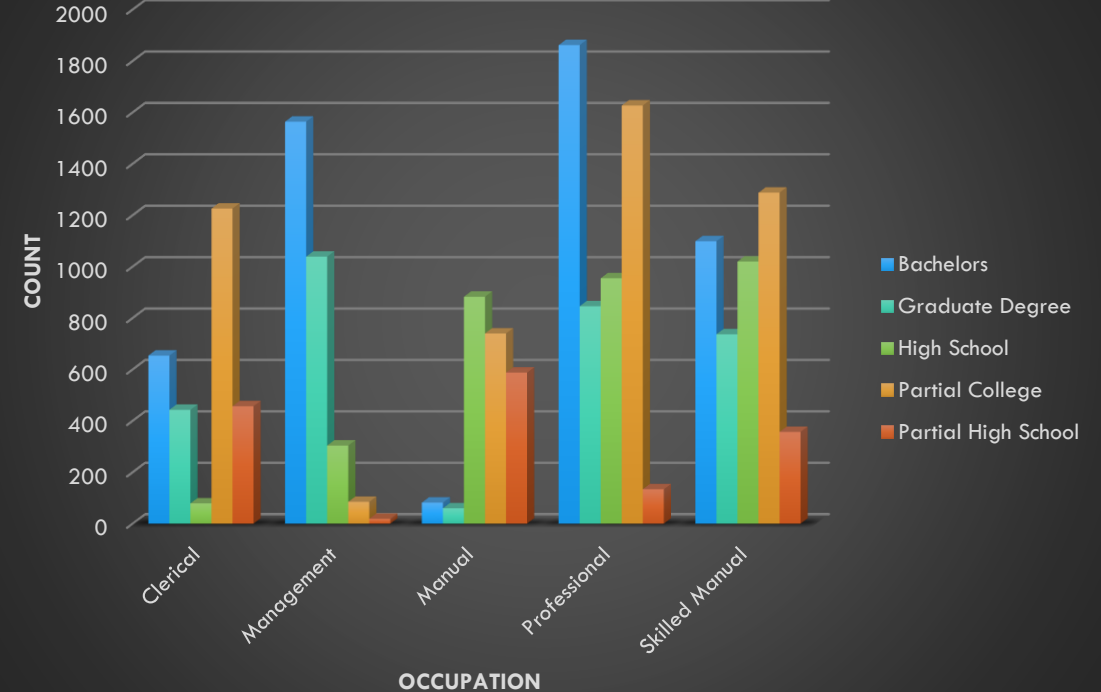
Customer Occupation Distribution By Marital Status And Education

Marital Status of each occupation



In the Professional, Skilled Manual, and Management occupations, there is a higher number of married customers. In contrast, the Clerical and Manual occupations have a larger number of single customers.

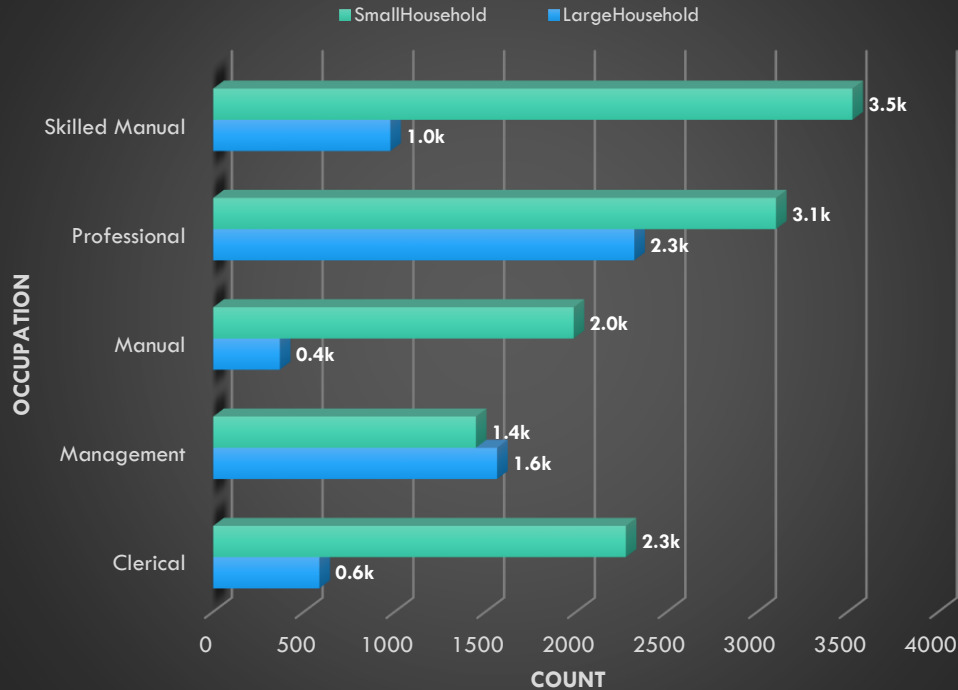
Educational level of each occupation



Professionals and Management workers predominantly hold Bachelor's degrees. Clerical and Skilled Manual workers, on the other hand, tend to have more partial college educational qualifications, while most Manual workers have high school as their highest level of education.

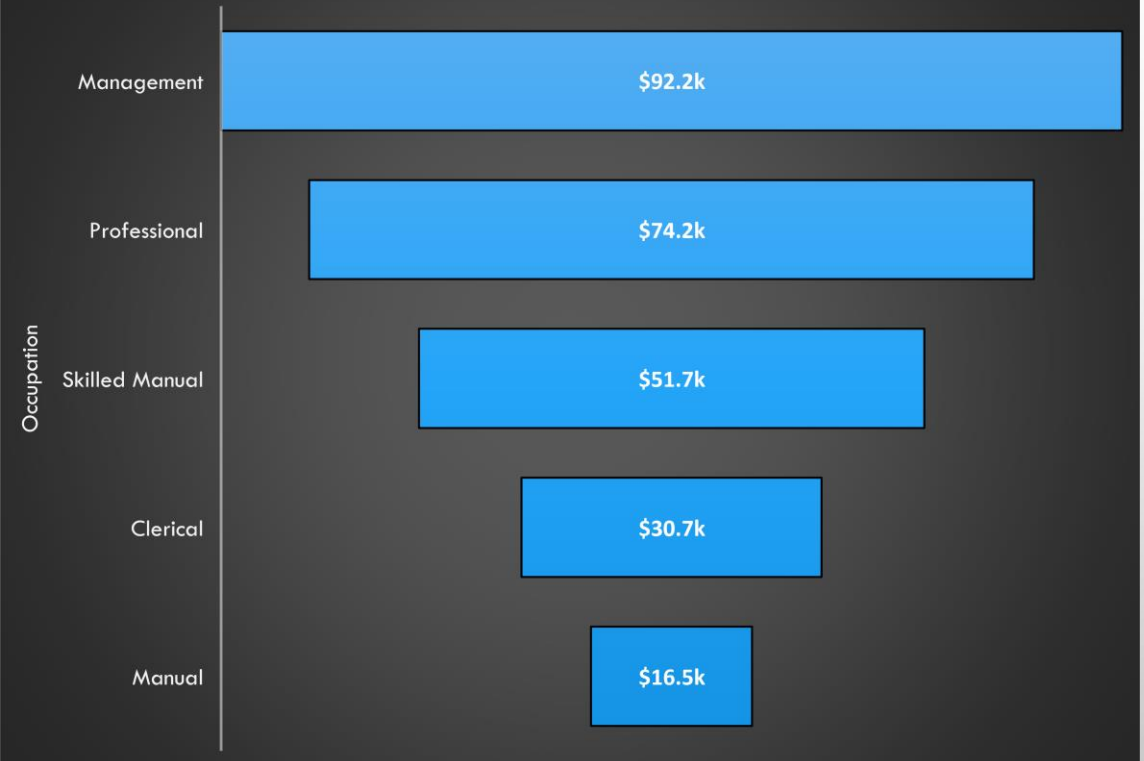
Customer Occupation Distribution By Household Size And Average Annual Salary

Household Size of each occupation



Skilled Manual workers, Professionals, Manual workers, and Clerical workers typically have smaller households with 0-2 children, while Management workers tend to have larger households with 3 or more children.

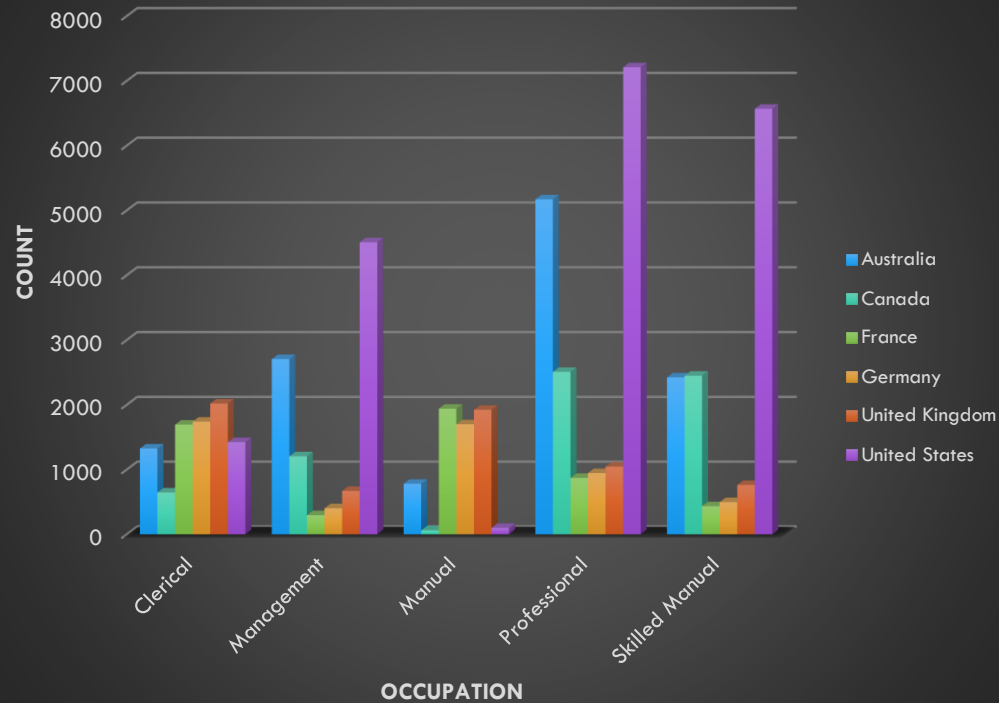
Average Annual Salary of each occupation



Management workers have the highest average annual salary, which amounts to \$92.2k, while Manual workers earn the lowest with an average annual salary of \$16.5k.

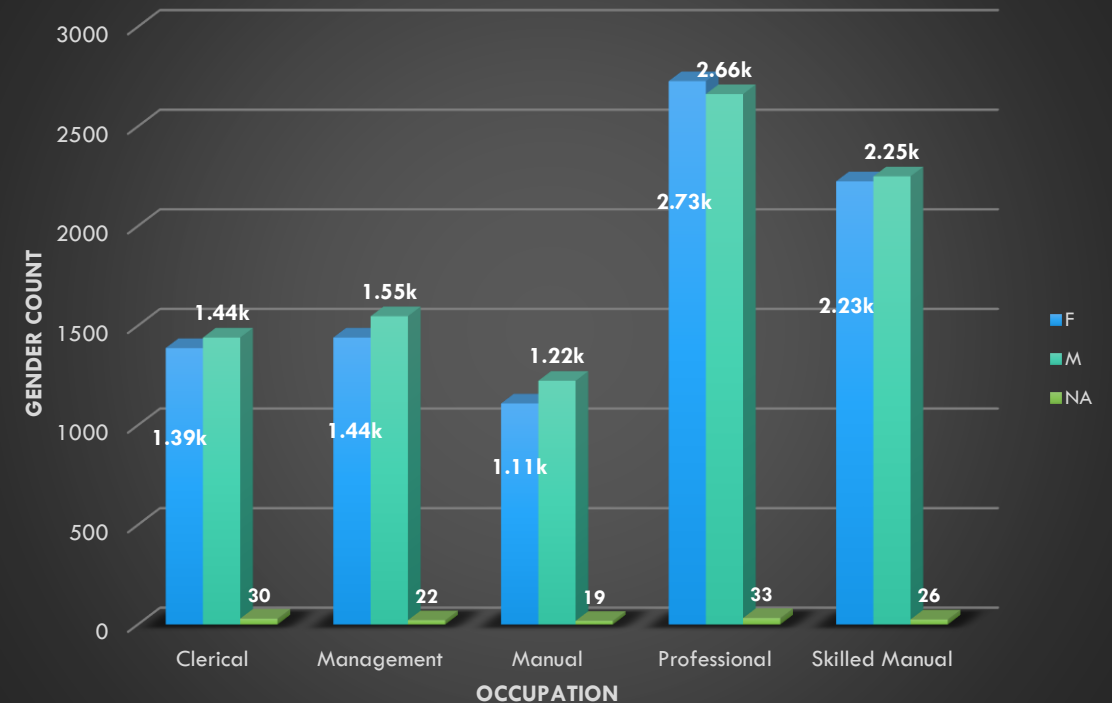
Customer Occupation Distribution By Country And Gender

Customer Occupation distribution by Country



In the United States, Professionals, Skilled Manual workers, and Management workers are more prominently represented, whereas in the United Kingdom, there is a higher concentration of Clerical and Manual workers.

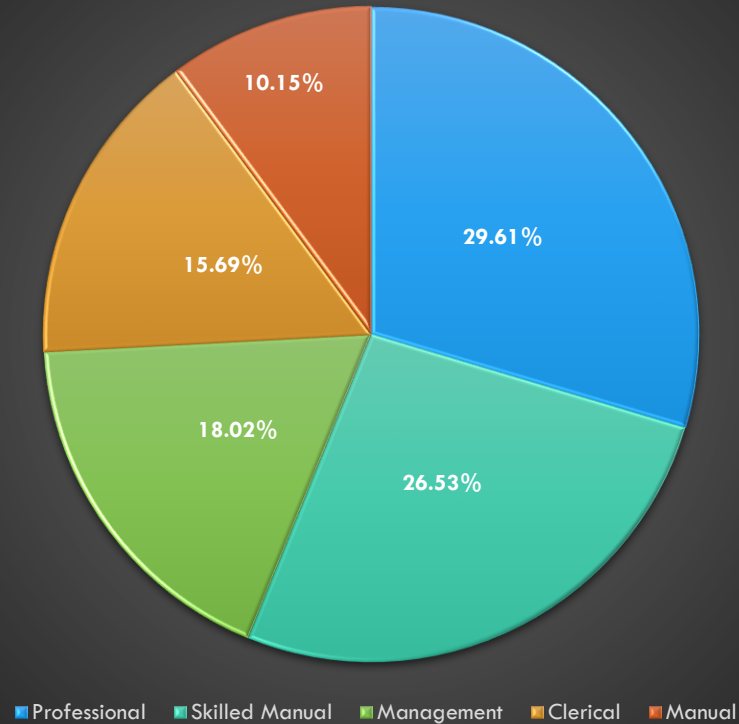
Gender Distribution per Customer Occupation



Within the Clerical, Management, Manual, and Skilled Manual occupations, there is a greater presence of male customers. Conversely, in the Professional occupation, there is a higher proportion of female customers.

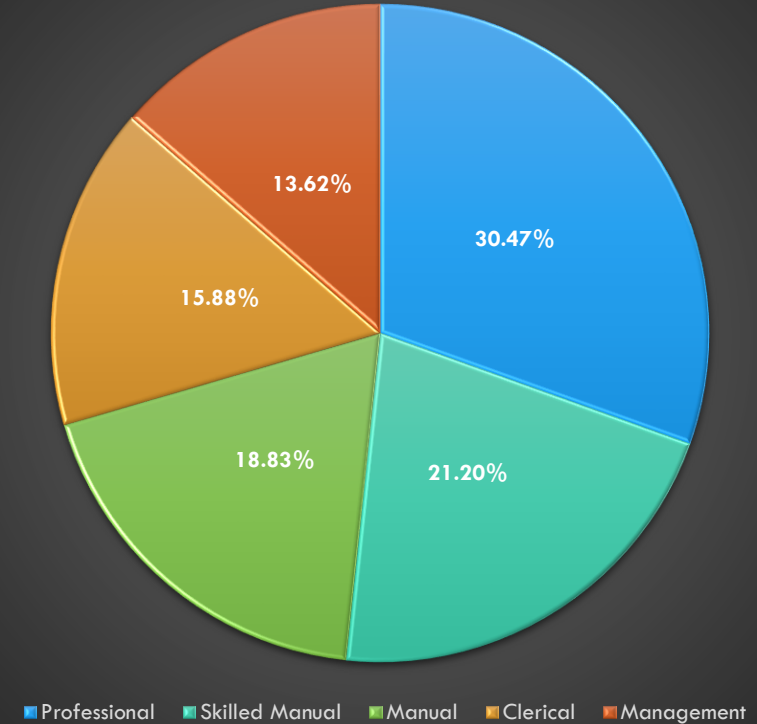
Customer Occupation Distribution By Homeowners And Non-homeowners

Percentage of occupation that are home owners



Among the different occupations, Professionals have the highest percentage of homeowners, accounting for 29.61%, while Manual workers have the lowest homeownership rate at only 10.15%.

Percentage of occupation that are not home owners

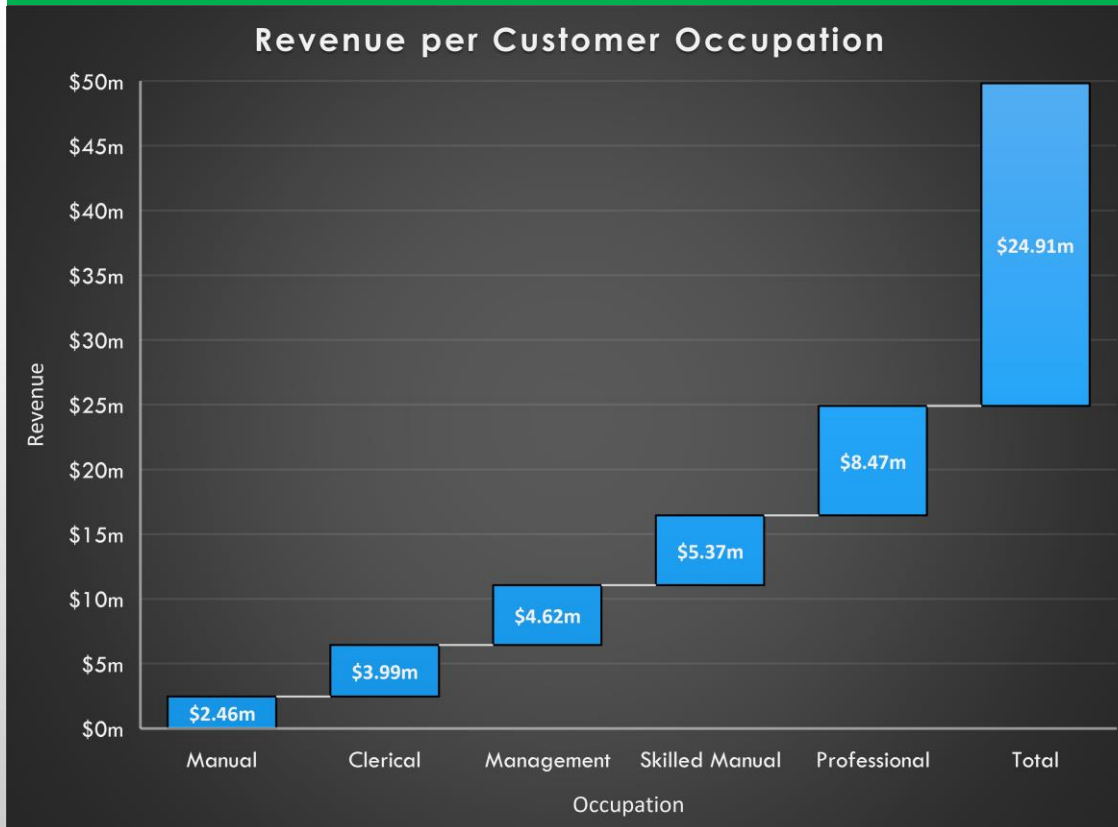


Professionals have the highest percentage of non-homeowners at 30.47%, while Management workers have the lowest percentage of non-homeowners at 13.62%.



Customer Occupation Purchase Behavior

Customer Occupation Summary By Revenue, Orders And Quantity Ordered



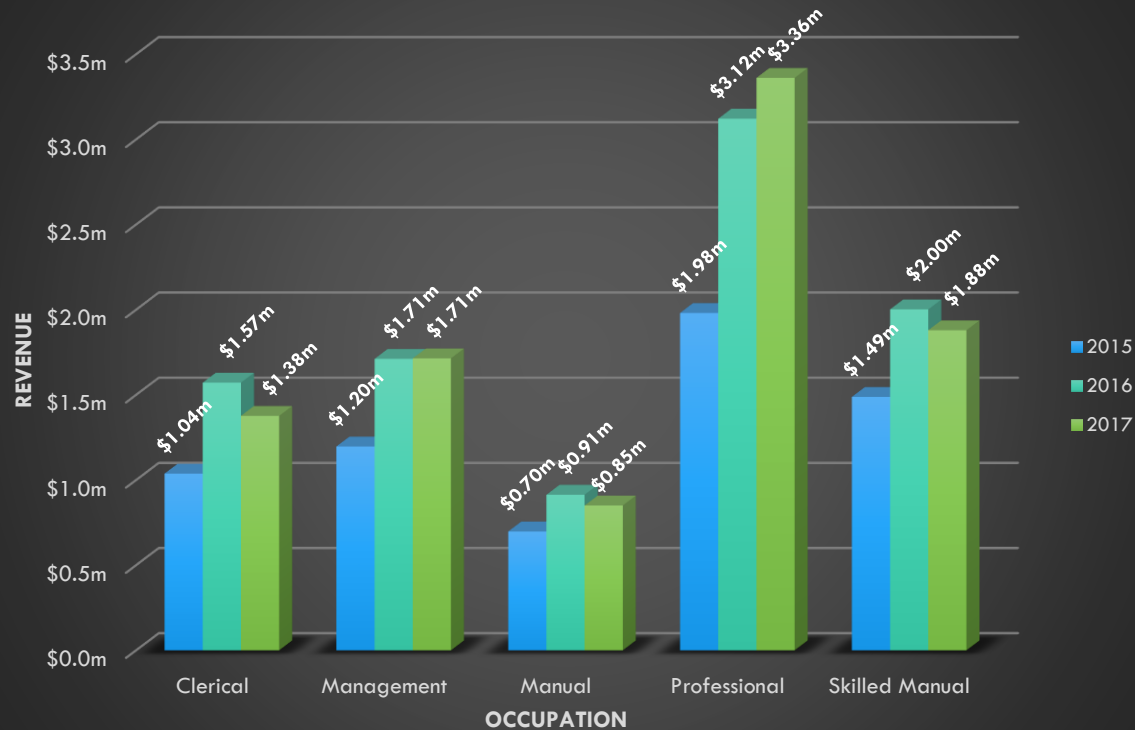
During the period from 2015 to 2017, a total revenue of \$24.91 million was generated. Among this revenue, Professionals accounted for \$8.47 million, representing 34% of the total revenue. In contrast, Manual workers contributed only \$2.6 million, making up 10% of the total revenue.



Professionals accounted for the highest number of orders, totaling 26.6k orders, and the largest quantity ordered, amounting to 7.9k units. In contrast, Manual workers recorded the lowest number of orders, with a total of 10k orders, and the smallest quantity ordered, which was 2.9k units.

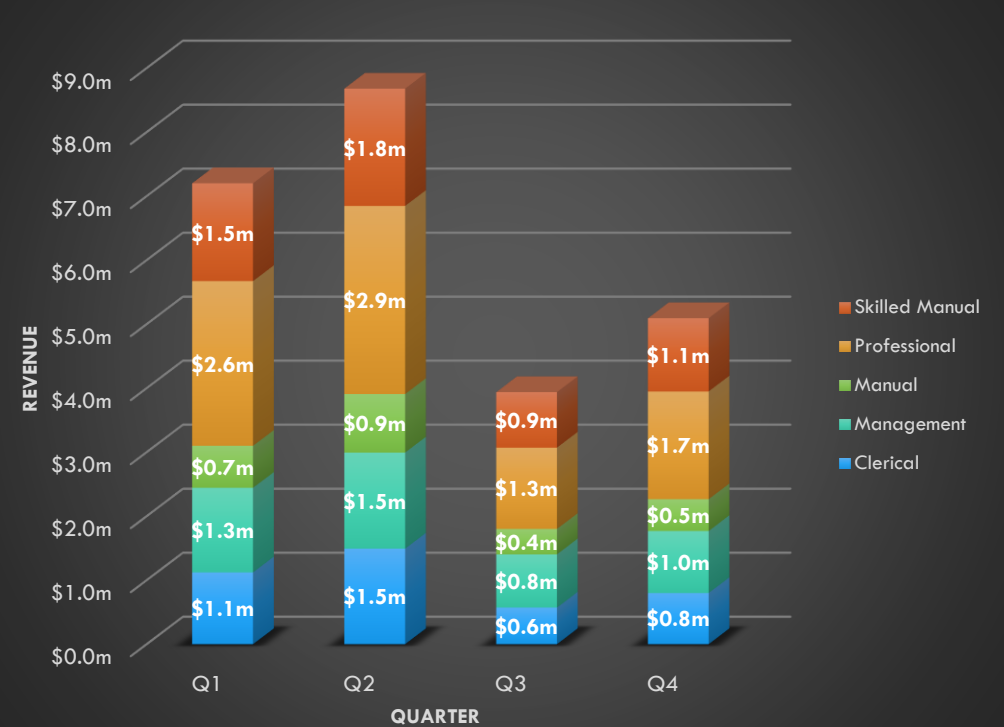
Customer Occupation Purchase Behavior By Year And Quarter

Revenue by Year per Customer Occupation



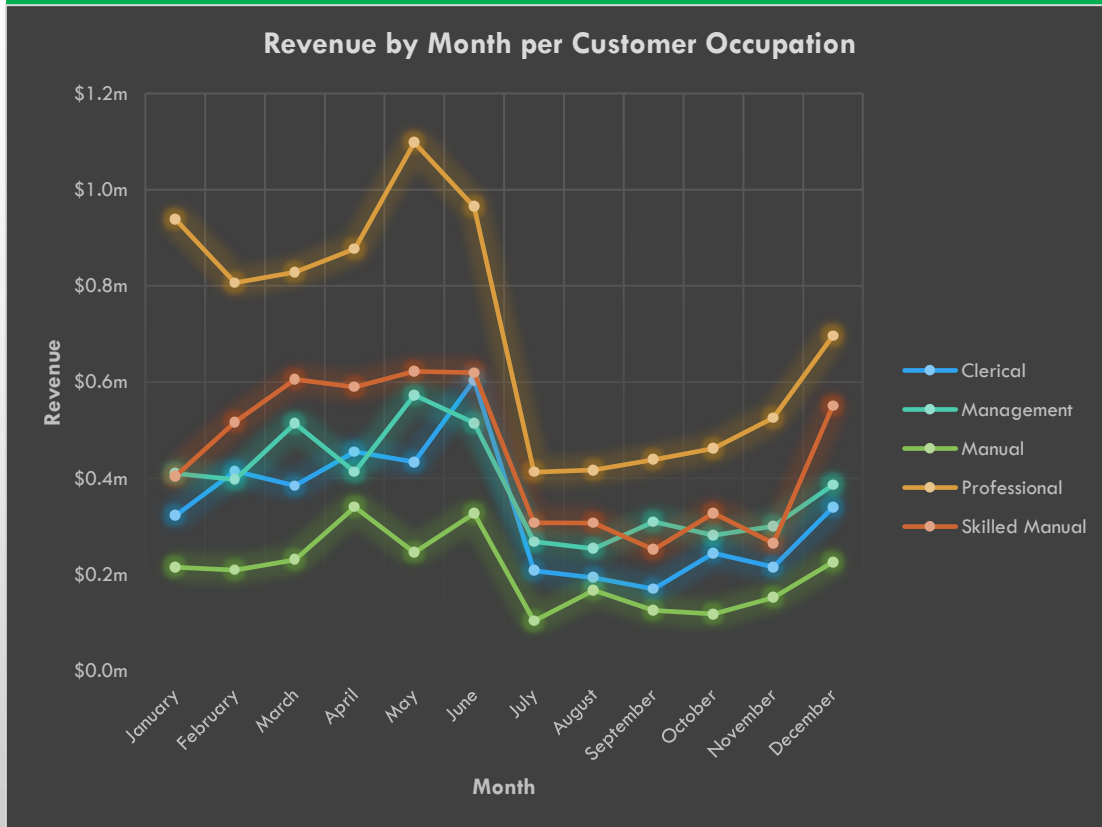
The revenue generated for each customer occupation followed a distinct trend over the three-year period. In 2015, it was at its lowest point. It then reached its peak in 2016 before experiencing a decline in 2017. However, it's important to note that there was an exception to this pattern: Professionals saw their revenue consistently increase from 2015, reaching its highest point in 2017.

Revenue by Quarter per Customer Occupation

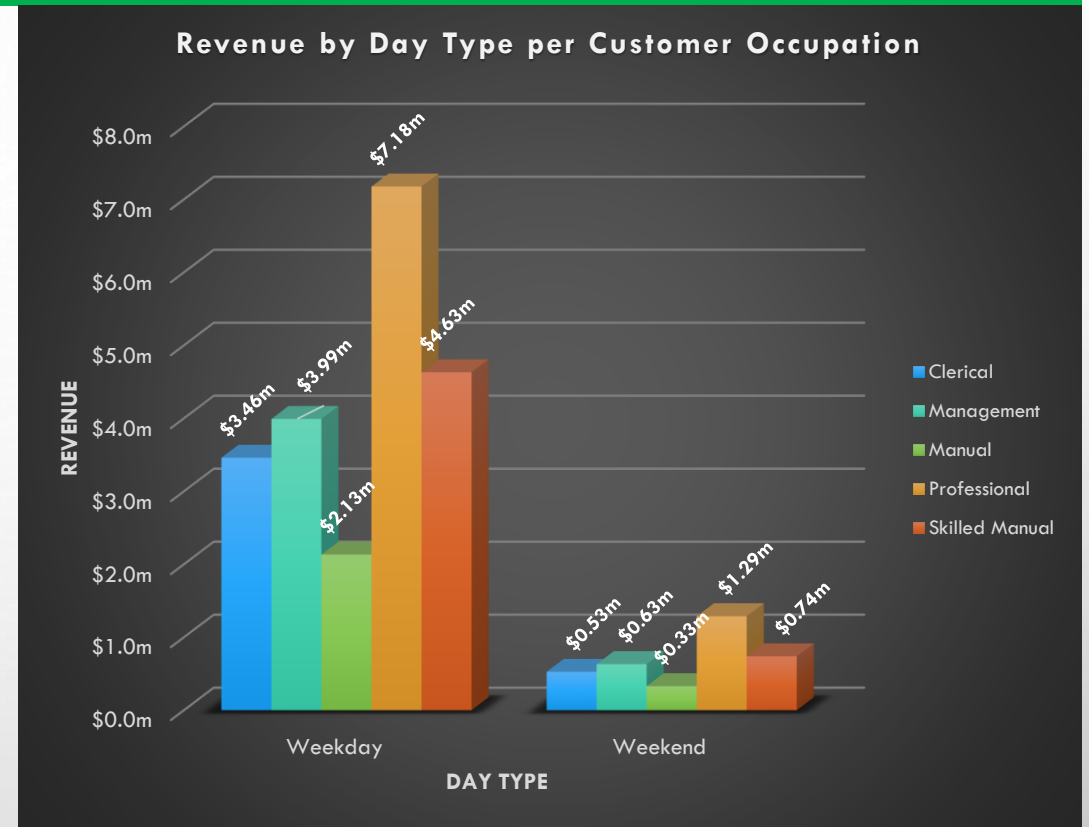


The peak revenue for each occupation occurred during Q2, signaling robust sales activity during that quarter. This suggests that Q2 is the busiest period of the year in terms of sales across all occupations.

Customer Occupation Purchase Behavior By Month And Day Type



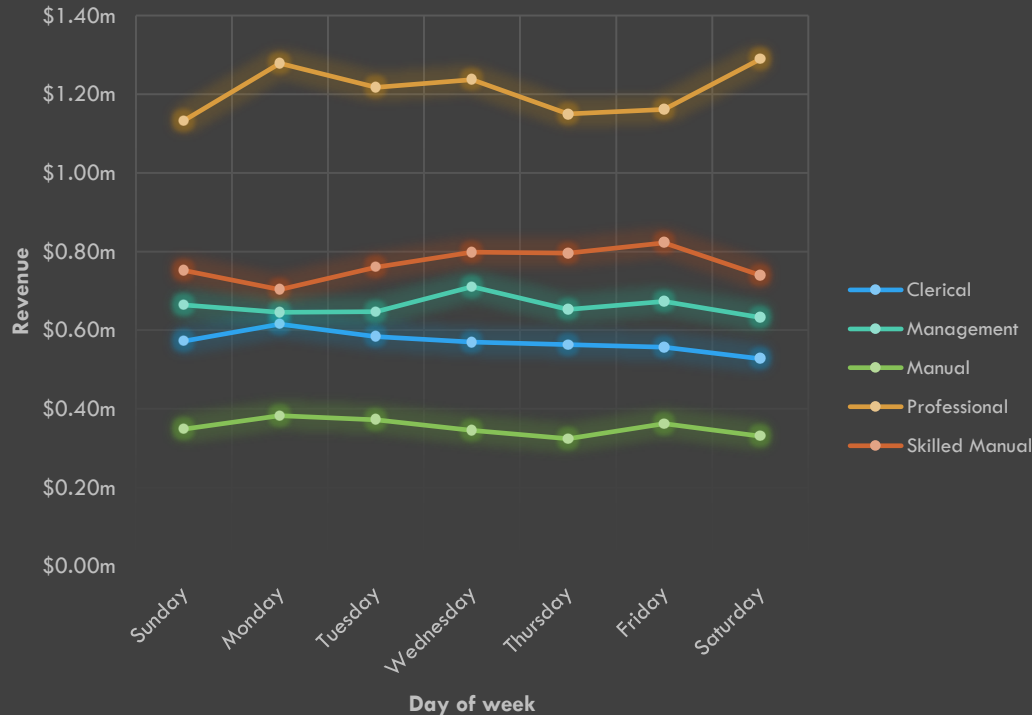
Professionals, Skilled Manual workers, and Management workers achieved their highest revenue figures in the month of May. In contrast, Clerical workers recorded their peak revenue in June, while Manual workers reached their highest revenue in April.



Across all occupations, higher sales activity was observed on weekdays compared to weekends. Professionals consistently generated the highest revenue during both weekdays and weekends. On the other hand, Manual workers consistently recorded the lowest revenue for both weekdays and weekends.

Customer Occupation Purchase Behavior By Day And Average Revenue

Revenue by Day of Week per Customer Occupation



The busiest day for professionals in terms of sales is Saturdays, for Skilled manual workers it is Fridays, for Management workers, it is Wednesdays while it is Mondays for Clerical and Manual workers.

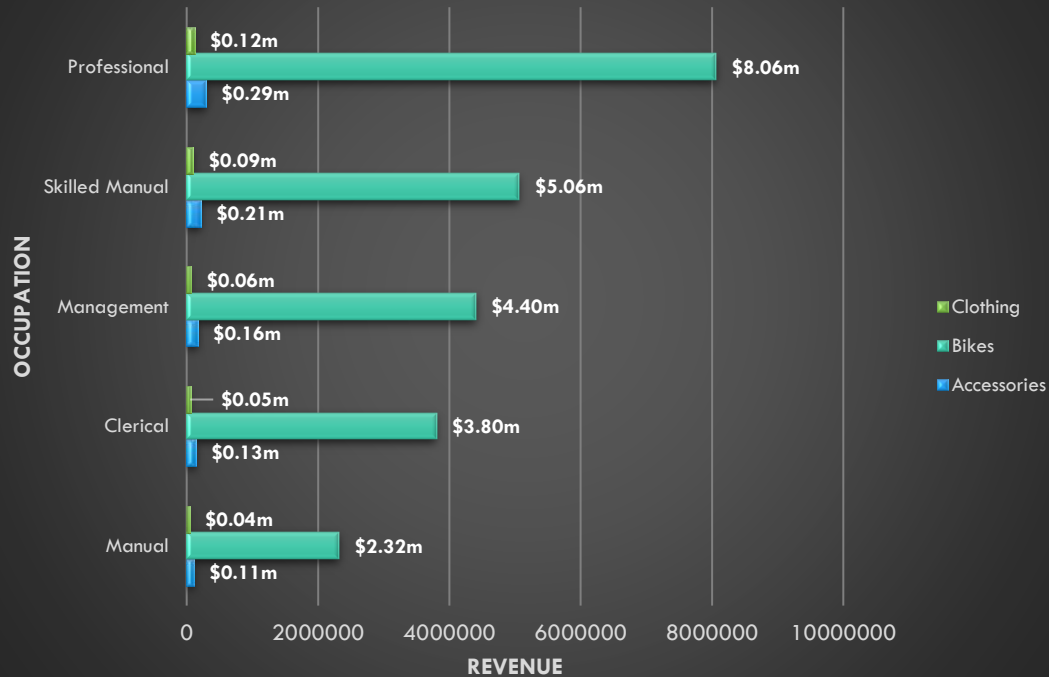
Average Revenue per Customer Occupation



Professionals recorded the highest average revenue per occupation, indicating strong purchasing power among customers in this category. Conversely, Manual workers recorded the lowest average revenue, suggesting comparatively lower purchasing power among Manual workers.

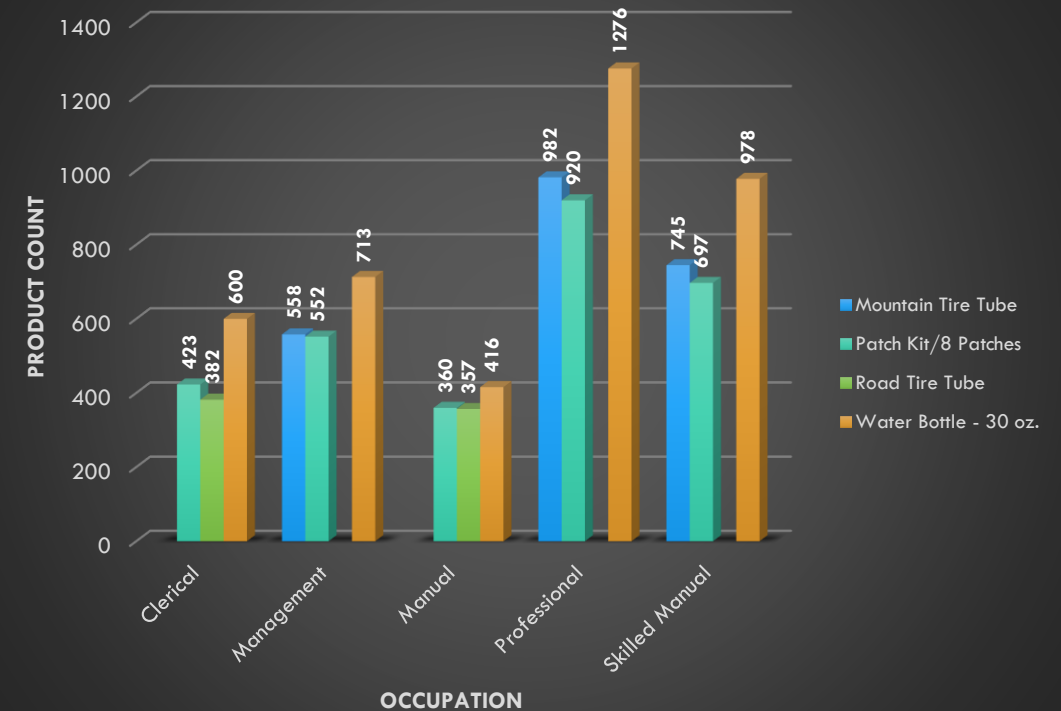
Revenue By Product Category And Product Preference Per Customer Occupation

Category revenue Performance per Customer Occupation



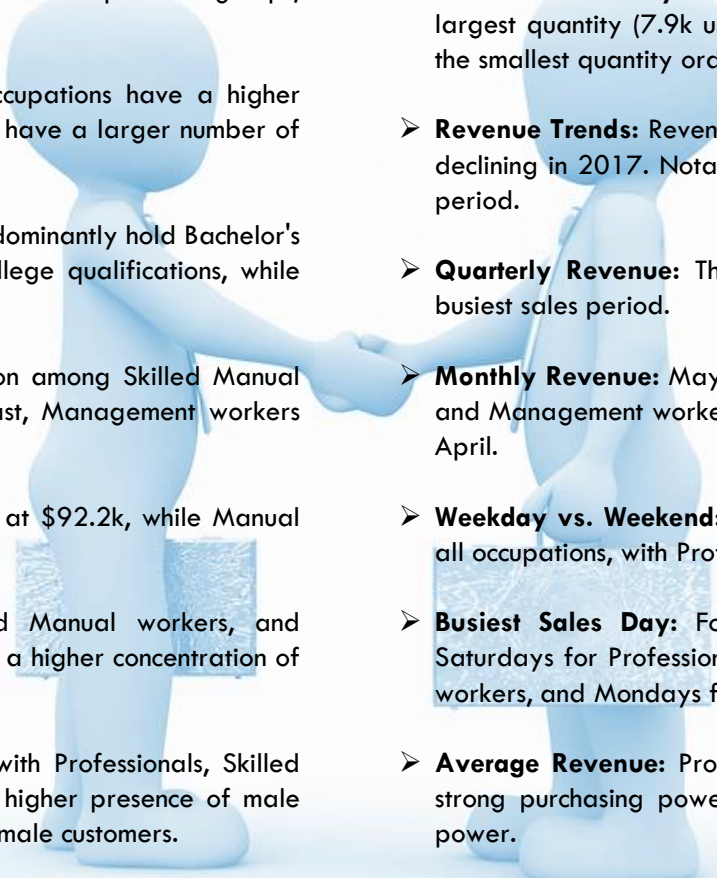
All occupations exhibit a notable preference for products within the Bikes category, as evidenced by their high purchase activity. This suggests that Bikes are a popular choice among customers across various occupational groups.

Top 3 Products Ordered per Customer Occupation



The Water bottle - 30 oz stands out as the most preferred product among all customer occupations, as it recorded the highest number of orders across all occupational groups. This indicates its universal appeal and popularity across a diverse customer base.

CONCLUSION

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- **Occupational Distribution:** Professionals constitute the largest segment of our customer base during this period, accounting for 29%, while manual workers represent the minority at 12%.
 - **Age Distribution:** Management workers tend to be the oldest among the occupational groups, while Manual workers are typically the youngest.
 - **Marital Status:** The Professional, Skilled Manual, and Management occupations have a higher number of married customers, while the Clerical and Manual occupations have a larger number of single customers.
 - **Educational Qualifications:** Professionals and Management workers predominantly hold Bachelor's degrees. Clerical and Skilled Manual workers tend to have partial college qualifications, while most Manual workers have high school as their highest level of education.
 - **Household Size:** Smaller households with 0-2 children are more common among Skilled Manual workers, Professionals, Manual workers, and Clerical workers. In contrast, Management workers tend to have larger households with 3 or more children.
 - **Income:** Management workers have the highest average annual salary at \$92.2k, while Manual workers have the lowest at \$16.5k.
 - **Geographical Variation:** In the United States, Professionals, Skilled Manual workers, and Management workers are more prominent, while the United Kingdom has a higher concentration of Clerical and Manual workers.
 - **Gender Distribution:** There is a gender variation across occupations, with Professionals, Skilled Manual workers, Management workers, and Manual workers having a higher presence of male customers, while the Professional occupation has a higher proportion of female customers.
 - **Homeownership:** Professionals have the highest percentage of homeowners at 29.61%, while Manual workers have the lowest homeownership rate at 10.15%. Conversely, Professionals have the highest percentage of non-homeowners (30.47%), and Management workers have the lowest (13.62%).
 - **Revenue Analysis:** Total revenue for the period was \$24.91 million, with Professionals contributing the most at 34% and Manual workers contributing the least at 10%.
 - **Order and Quantity:** Professionals placed the highest number of orders (26.6k) and ordered the largest quantity (7.9k units), while Manual workers had the lowest number of orders (10k) and the smallest quantity ordered (2.9k units).
 - **Revenue Trends:** Revenue followed a general pattern of increasing from 2015 to 2016 before declining in 2017. Notably, Professionals experienced consistent revenue growth throughout this period.
 - **Quarterly Revenue:** The highest revenue for all occupations occurred in Q2, indicating the busiest sales period.
 - **Monthly Revenue:** May was the peak revenue month for Professionals, Skilled Manual workers, and Management workers, while Clerical workers had their peak in June, and Manual workers in April.
 - **Weekday vs. Weekend:** Weekdays consistently had higher sales activity than weekends across all occupations, with Professionals generating the highest revenue in both categories.
 - **Busiest Sales Day:** For different occupational groups, the busiest sales day varies, with Saturdays for Professionals, Fridays for Skilled Manual workers, Wednesdays for Management workers, and Mondays for Clerical and Manual workers.
 - **Average Revenue:** Professionals had the highest average revenue per occupation, indicating strong purchasing power, while Manual workers had the lowest, suggesting lower purchasing power.
 - **Product Preferences:** All occupations showed a high preference for products in the Bikes category, suggesting a universal appeal. The Water bottle - 30 oz was the most preferred product across all occupational groups, recording the highest number of orders.

RECOMMENDATION

Here are the recommendations based on the findings:

- **Target Professional Segment:** Given that Professionals constitute the largest customer base and have a higher average income, it's essential to continue catering to their needs. Develop exclusive offers, loyalty programs, and premium services to enhance their experience.
- **Education-Centric Content:** Professionals and Management workers typically hold Bachelor's degrees. Create content such as industry reports, whitepapers, or webinars that align with their educational backgrounds and career interests. This can establish you as an authority in their field.
- **Diversify Product Line:** Recognizing that Professionals have a higher homeownership rate, introduce high-end home products and exclusive bundles to appeal to their demographic.
- **Seasonal Sales Strategies:** May emerges as the peak revenue month for several occupational groups. Consider launching special promotions, new product releases, or limited-time offers during this period to capitalize on the increased spending.
- **Geographic Targeting:** In the United States, where Professionals are more prominent, invest in localized marketing efforts, partnerships, and events to strengthen your presence. In the United Kingdom, focus on strategies to capture the market share of Clerical and Manual workers.
- **Homeownership Incentives:** To tap into the homeownership trends, we can develop incentives or loyalty programs aimed at homeowners, especially targeting Professionals who have a high homeownership rate. These incentives could include exclusive discounts or offers for home-related product.
- **Gender-Specific Marketing:** Tailor marketing campaigns to the gender distribution within each occupation. For example, for the Professional occupation with a higher proportion of females, create product lines and content catering to their preferences.
- **Customer Education Initiatives:** Professionals and Management workers are more likely to have higher levels of education. Consider offering advanced training or certification programs in collaboration with relevant educational institutions.
- **Inventory Management:** Since Q2 consistently yields the highest revenue, optimize inventory levels and logistics to meet the increased demand during this period. Ensure product availability and quick shipping to enhance customer satisfaction.
- **Weekday vs. Weekend Strategies:** Focus marketing efforts during weekdays, when most sales occur. However, consider weekend-specific promotions to boost revenue during the weekends, especially for occupations like Manual workers.
- **Product Development:** Given the strong preference for Bikes across all occupational groups, consider expanding the range of bike-related products or accessories to capitalize on this trend.

APPENDIX

❑ Data Sources

- **Adventure Works Database:** The primary source of data for this analysis is the Adventure Works database, a fictional dataset commonly used for educational and demonstration purposes. It includes tables related to customers, products, sales, and more, providing a comprehensive dataset for our analysis.

❑ Data Cleaning and Preprocessing

- **Data Extraction:** The data was extracted from the Adventure Works database using SQL queries. Various tables, including Aw_Customers, AW_sales, and Aw_Products, were queried to obtain the necessary information.
- **Data Cleaning:** The Data was already clean and consistent.

❑ Data Analysis Tools

- **SQL Server:** SQL Server Management Studio (SSMS) was used to extract and preprocess the data. SQL queries were also utilized to perform data analysis and generate insights.
- **Microsoft Excel:** Excel was employed for further data analysis, including the pivot tables, and the creation of visualizations such as charts and graphs.

❑ Data Analysis Methodology

- **Descriptive Analysis:** Descriptive statistics, such as averages, percentages, and counts, were computed to summarize the dataset and derive initial insights.
- **Grouping and Aggregation:** SQL queries were used to group data by customer occupation, year, quarter, month, and day of the week. Aggregation functions were applied to calculate sums, averages, and percentages.
- **Data Visualization:** Visualizations, including bar charts, line charts, and pie charts, were created using Excel to present the findings effectively.

❑ Limitations

- **Data Quality:** The analysis heavily relies on the Adventure Works database, which is a fictional dataset. While it provides a rich source of data for demonstration purposes, it may not accurately reflect real-world scenarios.
- **Data Completeness:** There may be missing or incomplete data in the Adventure Works database, which could affect the accuracy of the analysis.

❑ References

- **Adventure Works Dataset**
[https://drive.google.com/drive/folders/155_Wt1mWI9hOKiC0d4Rqlg7IfYfJlqrF?usp=sharing]
- **Microsoft SQL Server Documentation.** [<https://github.com/Ernest-30/Adworks-Customer-Purchase-Behavior-EDA/blob/main/Analysis%20of%20Customer%20Occupation.sql>]
- **Microsoft Excel Analysis.** [https://github.com/Ernest-30/Adworks-Customer-Purchase-Behavior-EDA/blob/main/ADWorks_Customer%20Occupation%20Analysis.xlsx]