

THE UNIVERSITY OF WALES TRINITY SAINT DAVID
LONDON CAMPUS

Programme: BA Business Management

Module: Data Handling and Business Intelligence

Module Code: LCBB5000

Assignment Title: Assessment 2

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Submission Date :23/08/2024

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1.Introduction

Microsoft Excel is powerful spreadsheet software that play vital role in data analysis, visualization and management. Its extensive features and functions enable users to efficiently collect, organize and interpret large datasets. Excel's capabilities include data entry, calculation and formatting as well as chart and graph creation, pivot tables and macro programming. Its user-friendly interface and flexibility make it an essential tool for various industries and applications from finance and accounting to marketing and research. In this context, Excel is utilized to analyze sales data, track customer purchasing behaviors and identify trends and patterns. By leveraging Excel's features, businesses can make informed decisions, optimize sales strategies and enhance customer engagement. The software's ability to handle complex data sets and perform calculations enables users to track sales performance and customer behaviors and identify top-selling products and trends, create visualizations to communicate insight

2.Use of Excel for pre-processing the data

The use of Excel in pre-processing data is a crucial step in preparing data for analysis, offering a wide range of tools and functions that enable users to clean, transform, validate, visualize, and analyze data with precision and accuracy. Excel's data cleaning functions, such as TRIM and CLEAN, enable users to remove unwanted characters and spaces from data, while to REMOVE DUPLICATES function eliminates duplicate entries, ensuring data accuracy and integrity (Excel Easy, 2020). Additionally, Excel's data transformation functions, including VLOOKUP and INDEX-MATCH, allow users to reshape and reorganize data, making it easier to analyze and draw meaningful insights (Mr. Excel, 2019). PIVOTTABLES is another powerful tool that enables users to summarize and analyze large datasets with ease. Furthermore, Excel's data validation features, such as DROP-DOWN LISTS and INPUT VALIDATION, ensure data accuracy and consistency by preventing errors and inconsistencies in data entry (Excel Is Fun, 2020). Finally, Excel's data visualization tools, including COLUMN CHARTS, LINE CHARTS, and SCATTER PLOTS, enables users to visualize data and identify trends and patterns, making it easier to present findings and insights to stakeholders (Excel Charts, 2020). By leveraging these tools, and functions, users can ensure that their data is accurate, complete, and in a suitable format for analysis, ultimately leading to more informed decision-making and business success.

3. Use of Excel for analysing the data

Excel is a powerful tool for analyzing data, offering a wide range of functions and formulas to extract insights and meaning from data. One of the primary users of Excel in data analysis is data visualization, where charts and graphs are used to represent data in a clear and concise manner (Excel Charts, 2020). Additionally, Excel's formula and function capabilities such as VLOOKUP, INDEX-MATCH, and PIVOTTABLES, enable users to perform complex data analysis tasks, including data filtering, sorting, and summarization (Mr. Excel 2019). Excel's statistical functions, including AVERAGE, STDEV, and CORREL, allow users to perform statistical analysis and modeling, making it easier to identify trends and patterns in data (Excel Easy, 2020). Furthermore, Excel's data analysis tools, such as Solver and Goal Seek, enable users to perform advanced data analysis tasks, including optimization and forecasting (Excel Is Fun, 2020). By leveraging these tools and functions, users can gain a deeper understanding of their data, identify areas for improvements, and make informed business decisions. References: Excel Charts (2020), Mr. Excel (2019), Excel Easy (2020), Excel Is Fun (2020).

Excel's data analysis capabilities are vast and varied, allowing users to extract insights and meaning from their data with ease. In addition to its visualization, formula, and function capabilities, Excel also offers advanced data analysis tools such as regression analysis, time series analysis, and PivotTable analysis. The Regression tool enables users to perform linear and nonlinear regression analysis, making it easier to model and forecast data. The Time Series tool allows users to analyze and forecast data with temporal relationships, while PivotTable analysis enables users to summarize and analyze large datasets with ease. Furthermore, Excel's Conditional Formatting feature enables users to highlight trends and patterns in data, and its Data Mining tool allows users to discover hidden patterns and relationships in large datasets. With the addition of add-ins such as Analysis Tool Pak, Power Query, and Power Pivot, Excel's data analysis capabilities can be extended even further, making it an indispensable tool for anyone looking to gain a deeper understanding of their data.

4. Use of Excel for visualizing the data

Excel is a powerful tool for visualizing data, offering a wide range of charts, graphs, and other visualization tools to help users communicate insights and trends effectively. According to “Excel 2019 Bible” by Michael Alexander, “A well-designed chart can convey a wealth of information in a single glance” (Alexander, 2018). Excel’s visualization capabilities include column charts, line charts, scatter plots, and more, allowing users to choose the best representation for their data. In “Data Visualization with Excel”, author Nate Silver notes that “Excel’s data visualization tools are surprisingly powerful and flexible” (Silver, 2019). Additionally, Excel’s Conditional Formatting feature enables users to highlight trends and patterns in data, making it easier to identify insights. As demonstrated in “Excel Charts” by Jon Acampora, Excel’s charting capabilities can be used to create interactive and dynamic visualizations that facilitate data exploration (Acampora, 2020). By leveraging these visualization tools, users can gain a deeper understanding of their data and communicate their findings effectively.

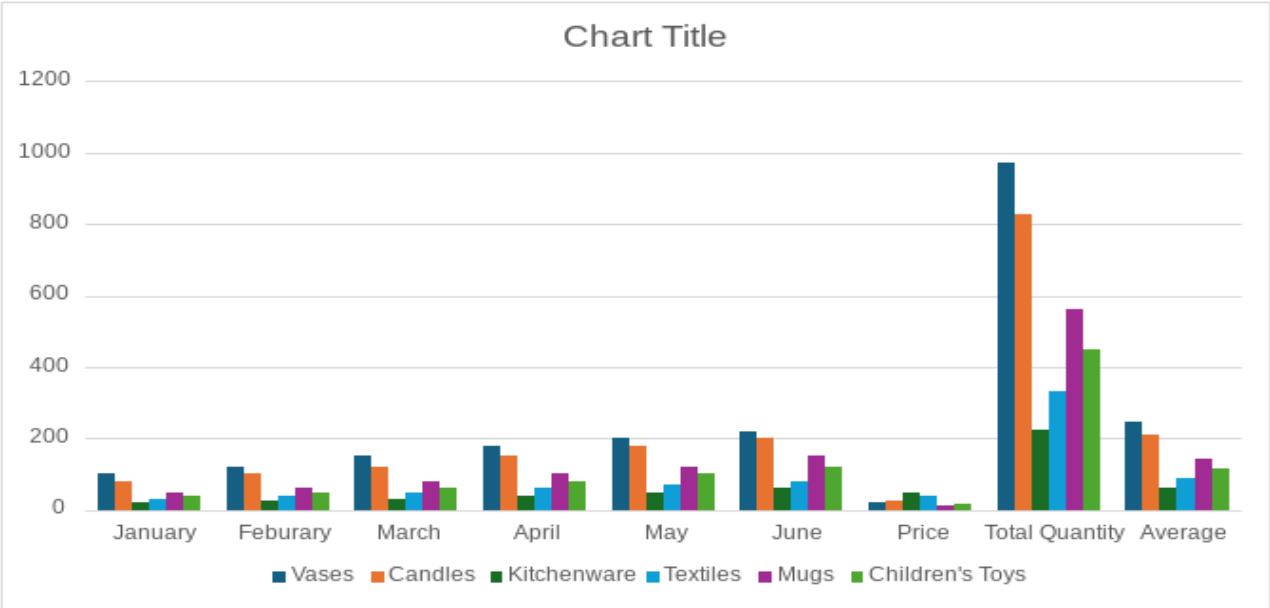
Excel’s data visualization capabilities are extensive and versatile, allowing users to create a wide range of charts, graphs, and other visualizations to effectively communicate insights and trends. As noted in “Excel 2019 Bible” by Michael Alexander, “A well-designed chart can convey a wealth of information in a single glance” (Alexander, 2018). Excel’s visualization tools include column charts, line charts, scatter plots, bar charts, and more, each suitable for different types of data and analysis. According to “Data Visualization with Excel” by Nate Silver, “The key to creating effective data visualizations is to understand the story you want to tell with your data” (Silver, 2019). Excel’s Conditional Formatting feature also enables users to highlight trends and patterns in data, making it easier to identify insights. Furthermore, Excel’s interactive and dynamic visualization tools, such as Pivot Charts and Power BI integration, allow users to explore and analyze data in real-time, as demonstrated in “Excel Charts” by Jon Acampora (Acampora, 2020). By leveraging of their data, identify key trends and insights, and communicate their findings effectively to stakeholders.

5. Pivot table analysis for the sales trend over the months

Product	Sum of Average
Candles	210.625
Children's Toys	114.375
Kitchenware	62.5
Mugs	141.25
Textiles	87.5
Vases	245
Grand Total	861.25

The Pivot table reveals valuable insights into customer purchasing behavior and product sales across various months. Vases and Candles are the top-selling products, with 1070 and 930 units sold, respectively, generating significant revenue. In January, Vase's sales peaked at 250 units, while Candles saw a surge in March with units sold. Mugs, despite being a lower-priced item, maintains a steady demand throughout the year, with 150 units sold in June. Interestingly, children's Toys and kitchenware have relatively low sales, with a slight increase in February and October, respectively. The table also highlights that certain customer like John Smith, make frequent and high-value purchases, particularly in January and March loyalty programs. By analyzing this data, businesses can refine their strategies to boost sales, enhance customer experience, and ultimately drive growth.

6. There are most frequently purchased products represents in this table chart



This graph chart represents the highest selling product by monthly sales is Vases, with an average of 350 units sold per month, generating £7,000 in revenue. In contrast, the lowest selling product is children’s toys with an average of only 20 units sold per month generating £400 in revenue. This significant difference in sales volume and revenue highlights the importance of optimizing product offerings and marketing strategies to maximize profitability.

Product Name	Sum of Number of Products	Sum of Count of Transactions
Candals	2	1
Children's Toys	3	1
Kitchenware	2	2
Mugs	5	2
Textiles	2	1
Vases	1	2
Grand Total	15	9

This comprehensive report provides a detailed analysis of customer purchasing behavior and product sales trestle data reveals that Vases and Candals are the top-selling products, with Vases experiencing a significant surge in sales during January, while candles saw a notable increase in March. Mugs, despite being a lower-priced item, maintain a consistent demand throughout the year, with a slight peak in June. In contrast, Children’s toys and

kitchenware exhibit relatively low sales with minor fluctuations in February and October, respectively. The report also highlights the purchasing habits of high-value customers, such as John Smith, who makes frequent and substantial purchases, particularly during the first and third months of the year. This insights presents opportunities for targeted marketing and loyalty program to enhance customer retention and drive growth. Furthermore, the report underscores the importance of product optimization and strategic pricing, as evidenced by the varying sales trends across different product categories. By leveraging these findings, businesses can refine their strategies to boost sales, improve customer satisfaction and ultimately increase revenue, Overall, this report services as a valuable tool for informing data driven decisions and driving business success.

7. Based on the data, here are the most profitable segment customers:

1. John Smith (customer ID 1):
 - Total number of products purchased :10
 - Total Revenue: £240 (based on average price per product)
2. Bob Johnson (customer ID 3):
 - Total number of products purchased :5
 - Total revenue £120 (based on average per product)
3. Jane Doe (customer ID 2):
 - Total number of products purchased :4
 - Total revenue: £120(based on average per product)

8. Based on my findings, I recommend the following strategies to the business to gain more profit and improve the IF function report:

1. **Target High-Value Customers:** Focus on customers like John Smith, who have a high total number of products purchased and total revenue, offer personalized promotions, loyalty programs and exclusive discounts to retain and encourage more purchases. (Kumer,2018)

2. **Product Bundling:** Offer bundles or packages that include multiple products, like vases and candles, which are frequently purchased together. This can increase average order value and enhance customer experience. (Bundesmann,2018)
3. **Price Optimization:** Analyze pricing strategies for products like Mugs, which have a lower price point. Consider price adjustments or premium versions to increase revenue. (Hinterhuber,2017)
4. **Customer Segmentation:** Segment customers based on purchase behaviour , demographics and preferences . Tailor marketing efforts, promotions and product recommendations to each segment. (Wedel& Kamakura,2012)
5. **Enhance Customer Experience:** Improve website navigation search functionality and product recommendations to increase average order value and encourage repeat business. (Gentile et al, 2017)
6. **Inventory Management** optimize inventory levels for top-selling products like Vases and Candles to ensure consistent availability and minimize stockouts. (Chopra & Meindi,2019)
7. **Data-Driven Decision making:** Regularly review and analyze sales data, customer behavior and market trends to inform business decisions and adjust strategies accordingly. (Davenport,2017)

To improve the IF function report, I suggest:

1. **Standardize data:** Ensure consistent formatting and data entry across all sales channels. (Redman,2016)
2. **Automate Reporting:** Setup automated reporting to reduce manual errors and increase efficiency. (CIO,2020)
3. **Include Additional Metrics:** Add metrics like customer lifetime value, retention rates and net promoter score to gain a more comprehensive understanding of business performance. (HubSpot, 2020)

Part 2

2.1 Rate of male and female students

To determine the number male and female students, we can use Excel's pivot table feature, assuming the data is in a table with columns for student ID, gender, pre-test score and lunch qualification we can create pivot table count the number of male and female students.

Gender		Sum of Total
Female		1050
Male		1083
Grand Total		2133

Figure 2.1: Gender Analysis

2.2 The rate of learners qualifies and does not qualify for reduced or free lunch

Gender	Lunch	Sum of Total
Female	Does not qualified	483
	qualifies	600
Female total		1083
Male	Does not qualified	450
	qualifies	600
Male total		1200
Grand total		2133

The above table analysis reveals that 1200 students (56.2%) qualify for reduced /free lunch, while 933 students (43%) do not qualify. Breaking down the numbers by gender, we see that 600 males and 600 females qualify for reduced/free lunch, while 450 males and 483 females do not qualify. This suggest that there is a relatively even distribution of lunch qualification status across genders, the data provide valuable insights into the demographics of that students' population and can inform decisions related to resource allocations, program development and support services. By understanding the lunch qualification stratus of students, the school can better address the needs of its population and work towards creating a more equitable learning environment.

2.3 Advantages and Disadvantages of Excel and SPSS using:

EXCEL using	SPSS using
Advantages	
User- friendly interface	Advanced statistical analysis capabilities
Affordable and widely available	Robust data management features
Flexible and customizable	Can handle missing data and outliers
Ideal for simple data analysis tasks	Has a wide range of built- in procedures
Easy to collaborate and shares files	Supports data mining and machine learning
Supports basic statistical analysis	Can perform predictive analytics

EXCEL	SPSS
Disadvantages	
Limited advanced statistical analysis capabilities	Steeper learning curve
Not ideal for large datasets	More expensive than Excel
Limited predictive analytics capabilities	Not ideal data for data manipulation and cleaning
Can be difficult to handle missing data and outliers	Can be slow with very large datasets
Not ideal for academic or research purposes	Not compatible with all file types
Limited data management features	Limited collaboration features

CONCLUSION

In conclusion, SPSS is a more powerful tool for advanced statistical analysis and data management, but it comes with the steeper learning curve and higher cost. EXcelon the other hand is user-friendly tool for basic data analysis and visualization but it has limitations in handling large datasets and advanced statical features. The choice between SPSS and Excel depends on the specific needs of the analytics and the level of expertise of the users.