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Designing and Analyzing European Online Retail Sales Performance Using an Interactive Google Looker Studio Dashboard

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ABSTRACT
This study aims to design and implement a dashboard that displays sales data using Google Looker Studio as a tool for analyzing company performance. The data used includes 1000 sales transactions from 2019 to 2020, with a total revenue of EUR 112.677.165,64 and a profit of EUR 18,357,509.57. The approach used is Descriptive Analytics using interactive data visualization techniques. The analysis was conducted from three perspectives: product category, country region, and type of device used to access the data. The study shows that the Clothing category provides the largest revenue. Portugal makes the largest contribution to sales, accounting for 24.66%. Also, PC devices are the most used for transactions, with a share of 78.89%. The developed dashboard presents sales data an interactive format, thereby facilitating interactive data monitoring and exploration across product, regional, and access dimensions.

Keywords—Google Looker Studio, Sales Dashboard, Data Visualization, Business Intelligence, Performance Analysis.

1. INTRODUCTION

As more retail transactions move online, companies that sell to other businesses face a growing challenge: turning scattered transaction records into something decision-makers can act on. As the effective use of information systems is widely regarded as essential for accurate and responsive managerial decision-making [1]. However, many companies still struggle to manage big data effectively. Manual processes can lead to delays in reporting, potential errors in interpretation, and slow decision-making by management.

Business Intelligence (BI), utilising interactive dashboards, offers a solution. Google Looker Studio enables us to visualise data in real time without the need to pay additional licence fees. This approach is increasingly relevant given the rapid growth of digital commerce in Europe. In 2024, the total sales of goods and services online to individual customers in Europe reached 842 billion euros, which is a 7% rise compared to previous year [2]. Furthermore, official statistics show that online sales to other businesses and public authorities (B2B/B2G) already account for 4.34% of total enterprise turnover across the European Union [3], underscoring those digital transactions in Europe span both consumer and business contexts. As the volume of online retail transactions continues to grow, companies increasingly require affordable dashboard tools to

monitor sales performance without investing in costly enterprise BI infrastructure. This study utilises a dashboard created with Looker Studio, which analyses data from 1000 transactions across 15 European countries between 2019 and 2020. The analysis is based on product category, sales region, and the type of device used to access the data.

2. LITERATURE REVIEW

Turban, Sharda & Delen [4] describe Business Intelligence (BI) as a combination of tools and processes that turn raw business data into organized information, ultimately giving managers a stronger evidence base for their decisions. Few [5] classifies dashboards into three types based on their purpose: strategic, tactical, and operational. Despite their differences, all three share the same core function of consolidating KPIs into a single integrated view.

Formerly called Google Data Studio, Looker Studio runs entirely in the browser and lets users pull data from sources such as Google Sheets, BigQuery, or Google Analytics, then turn it into reports and dashboards that update interactively. Previous research by Khasanah et al. [6] and Ardian Ainy [7] has shown that Looker Studio is highly effective in accelerating performance monitoring and supporting data-driven decision-making.

Looker Studio's adaptability to diverse fields of study is further supported by other-research. Wicaksono and Paniran [8] used the platform to show public opinion data during the 2024 Indonesian presidential election, while Ariani, Aulia, and Arafat ([9] used it to show and predict commodity prices in East Java. In a billing situation, Putri Adisti and Nugraha [10] used a Looker Studio dashboard to track invoice payments as they happen, and Florencondia, Ladignon, and Muldong [11] showed how it can be used as a tool to manage Key Performance Indicators (KPIs) for a team working from offshore locations. These studies together show that Looker Studio is a versatile and affordable business intelligence tool that can be used in both government and company settings to track performance. This makes it a good choice for the current study, which looks at how well online retail sales are performing.

Beyond platform-specific studies, a broader body of research explains why dashboard-based visualisation improve decision making in the first place. In a systematic literature review covering strategic management contexts, compared with reading raw tables, managers who work with visualised data tend to decide both faster and better a pattern Eberhard [12] confirmed across the strategic-management literature. Hjelle, Mikalef, Altwaijry & Parida [13] tested this experimentally and found a chain effect: a well-designed dashboard makes tasks feel less complex, which boosts user satisfaction, and that satisfaction eventually carries through to better organisational decisions. These findings reinforce the categorisation proposed by [5] and the design guidelines outlined by Martins, Martins & Brandão [14], who argue that effective dashboard must balance visual simplicity with sufficient contextual detail to avoid misinterpretation. Taken together, this body of literature provides the theoretical justification for adopting an interactive dashboard, rather than a static spreadsheet report, as the analytical tool in the present study.

3. RESEARCH METHODOLOGY

This study employs a descriptive analysis approach to the “Online Store Sales Data” dataset, a publicly available dataset published on Kaggle by Ronny Kimathi Kaimenyi (https://www.kaggle.com/datasets/ronnykym/online-sales-data). The raw file contains 1,001 order-level records stored in spreadsheet format, covering the period from January 2019 to December 2020 across 15 European countries. Each row represents a single sales order and is described by ten variables: country (the customer’s country), order_value_EUR (order revenue in

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euros), cost (cost associated with the order), date (order date), category (one of ten product categories), customer_name (the customer account that placed the order), sales_manager and sales_rep (the staff members assigned to the account), device_type (PC, Mobile, or Tablet), and order_id (a unique order identifier). After the data-quality checks described below, the working dataset used for analysis comprises 1,000 unique transactions.

The research process had several steps: first, gathering and looking through the original data, then cleaning it, next turning the cleaned data into Google Sheets so it could be linked to Looker Studio as a live data source, followed by making a dashboard in Looker Studio, and finally looking at and understanding the results from the visual charts. The cleaning process used standard steps to improve the data quality before starting the analysis [15], it fixed four specific problems in the original data. One record was exactly the same as another (order_id 27-3437546) and was removed, bringing the total number of unique transactions down from 1,001 to 1,000. Another record had an invalid cost value marked as "XXX," which was treated as missing instead of being filled in. Five records (0.5%) had no order_value_EUR, and five records (0.5%) had no device_type. Specifically, the five records with missing device_type attributes were excluded from device-level calculations rather than imputed, resulting in a valid analytical sample of 995 transactions for device distribution. Because of this, the baseline dataset maintains 1,000 unique transactions for general analysis. Outliers in the order value and cost were checked using the interquartile-range (IQR) method. The values that were marked (up to EUR 383,996.76 per order) were kept because high value order can happen in an online retail setting, and none of the marked values were negative or unreasonable.

The KPI scorecards, total revenue, total profit, and total transaction count were chosen because they show the most basic sign of how well sales are doing overall and directly cover the study's goal to describe this information. This is in line with the idea that a dashboard's main job is to bring together important indicators into one clear picture [5]. The dashboard was organized based on theree main categories: product type, country or region, and the device used to access it. There was also an interactive filter that let the report viewer select different time periods, product types, or countries/regions to show only the relevant data in all the charts at the same time. Profit is consistently defined in this study as the total revenue minus the total cost, and this calculation is done separately for each reporting scope, which includes overall, by category, by country, and by device. The profit margin for each category and device is also calculated the same way by dividing the total profit for that scope by its total revenue. This method gives a weighted average based on revenue rather than just averaging the margins from individual order.

This approach ensures that the profit margins shown in Table 2 add up correctly to the overall figures in the Table 1. Chart types were chosen to fit the way each category is structured: a bar chart was used for product categories since it works well for showing the order of separate items; a geomap was picked for country and region because it keeps the real geography of the European market in view; a pie chart was used for access devices since there are not many device types, making it easy to compare their shares; and a line chart was selected for the yearly trend because it's the usual way to show how something changes over time. To make sure the dashboard results are correct, each KPI value, table entry, and chart label from this study was checked against calculations done directly on the cleaned data. Any differences between the dashboard and the original data were found by looking back at the source records and fixed before the results were shared. The dashboard includes several parts like a KPI scorecard, bar charts showing product categories, a geomap displaying regions, pie charts for access devices, and line charts for tracking time trends.

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4. RESULTS AND DISCUSSION

4.1 Overview of the Looker Studio Dashboard

The developed Google Looker Studio dashboard server as a centralized visual interface designed to monitor and explore European online retail sales performance interactively. Figure 4.1 shows the full layout of the interactive dashboard, which integrates key KPI scorecards (Total Revenue, Total Profit, and Total Orders), product category performance, device distribution, sales trends over time, and geographical distribution across European countries.

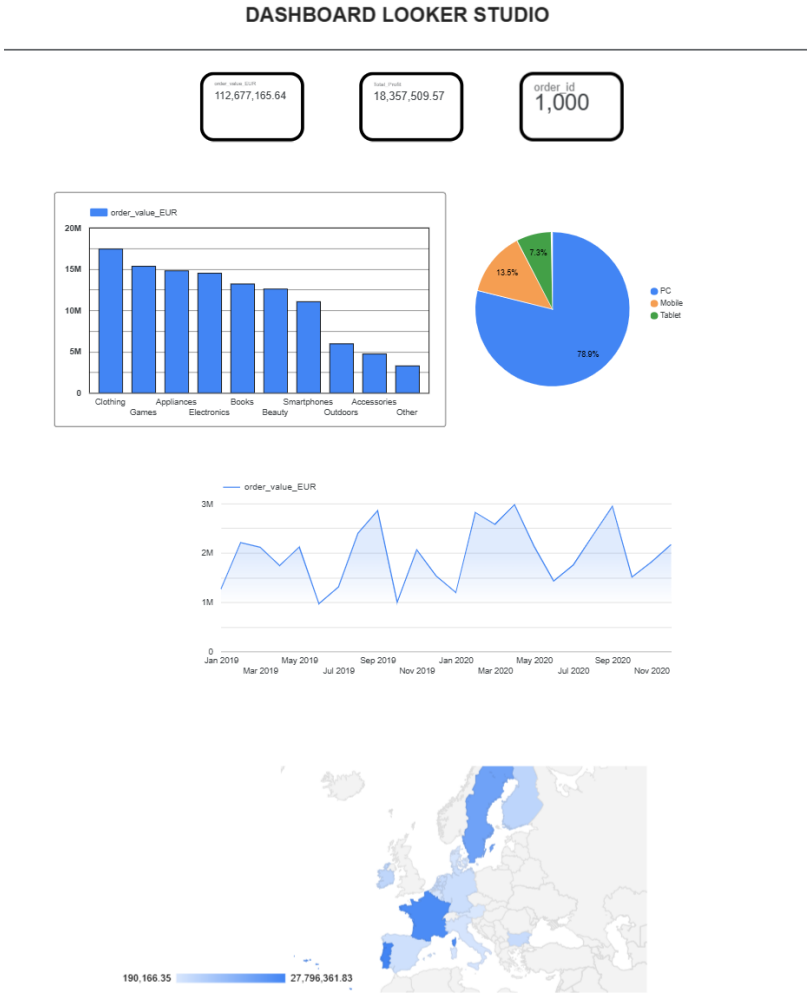

Figure 1. Interactive European Online Retail Sales Performance Dashboard in Google Looker Studio

4.2 Overview of the Dataset

This dataset comprises 1000 transactions with total revenue of EUR 112.677.165,64, total costs of EUR 94,375,688.91, and a net profit of EUR 18,357,509.57. The average transaction value of EUR 113,193.92 indicates that sales were of a high value.

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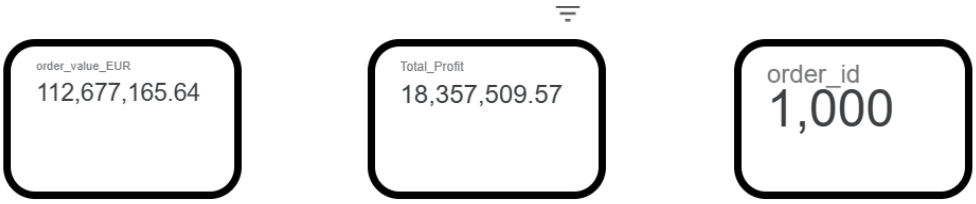

Figure 2. Revenue in euros, profit and number of transactions

Table 1. General Summary of Sales Data

Indicator	Value
Total Transactions	1000 Transactions
Total Revenue	EUR 112.677.165,64
Total Costs	EUR 94.375.688,91
Total Profit	EUR 18.357.509,57
Average Transaction Value	EUR 113.193,92
Geographical Coverage	15 Countries in Europe
Data Period	January 2019 – December 2020

4.3 Analysis by Product Category

There are 10 product categories in the dataset. Clothing is the largest contributor to revenue, totalling EUR 17,408,191.64, followed by the Games and Equipment categories. Interestingly, the Outdoors category has the highest profit margin at 17.79 percent, despite ranking eighth in terms of revenue. This suggests that they are more efficient at managing costs.

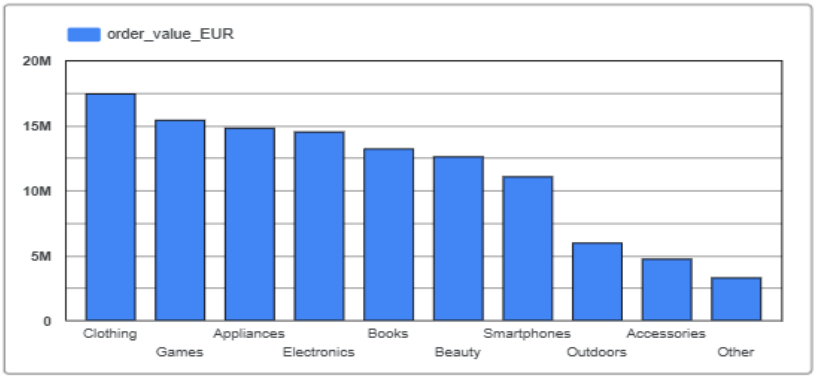

Figure 3. Revenue by Product Category

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Table 2. Sales Performance by Product Category (Top 5)

Category	Revenue (EUR)	Profit (EUR)	Margin (%)
Clothing	17.408.191,64	2.688.447,60	15,44%
Games	15.321.623,45	2.609.450,69	17,03%
Appliances	14.775.259,34	2.170.469,95	14,69%
Electronics	14.482.077,62	2.401.133,00	16,58%
Books	13.179.978,90	2.225.913,88	16,89%

4.4 Analysis by Region

Portugal is the country that contributes the highest revenue, amounting to EUR 27,796,361.83 (24.67%), followed by France with 22.99% and Sweden with 17.30%. Overall, the top three countries account for 64.96% of total revenue, indicating a significant concentration in the market. Countries such as the Netherlands and Luxembourg still have market opportunities that could be further developed. This concentration is broadly consistent with regional e-commerce reports, which note that market maturity and online retail penetration vary considerably across European countries rather than growing uniformly [2]. Within the scope of this dataset, Portugal, France, and Sweden's leading position may plausibly be associated with the factors such as a larger active customer base, more consistent order frequency, or a higher average order value recorded for those countries rather than reflecting the size of the national economy as a whole; a large economy does not automatically translate into a large share of this particular online store's revenue. Conversely, the lower revenue share recorded for the Netherlands and Luxembourg should not, by itself, be interpreted as unclaimed market opportunity, since it may instead reflect a smaller customer base already served by more established local competitors, or simply fewer recorded transactions within the observation period; confirming an actual growth opportunity would require additional data beyond this dataset, such as market size, competitor presence, or online penetration rates in each country.

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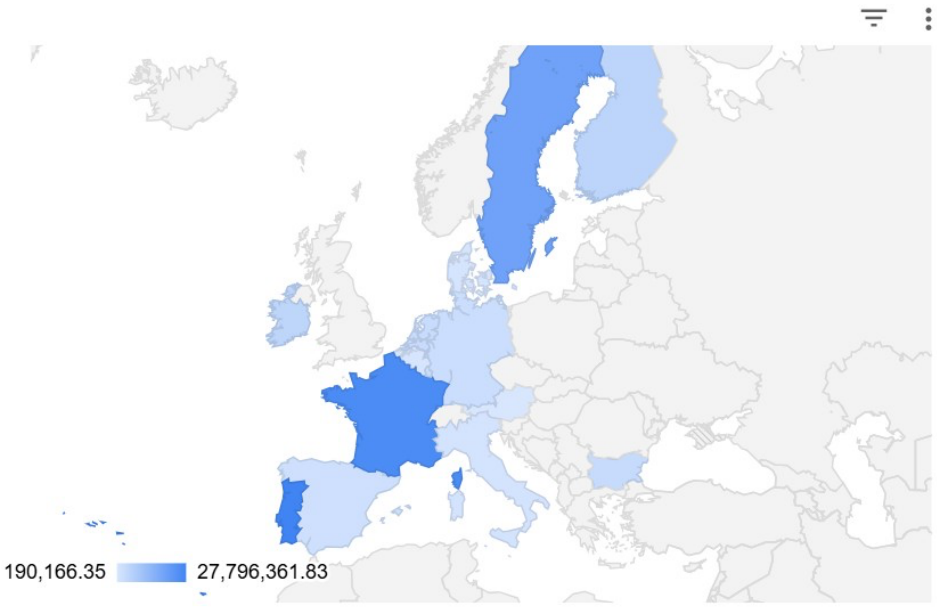

Figure 4. Geo 5 Map of the Highest-Income Countries

Table 3. Sales Performance by Country (Top 5)

Country	Revenue (EUR)	Transactions	Contributions (%)
Portugal	27.796.361,83	239	24,67%
France	25.900.678,42	232	22,99%
Sweden	19.494.540,11	182	17,30%
UK	12.112.923,09	102	10,69%
Finland	5.311.572,75	44	4,71%

4.5 Access Devices

PCs dominated transactions by a wide margin, accounting for 78.89% of revenue (EUR 88,944,134.52; 780 of 1,000 orders). Mobile devices accounted for 13.51% indicating a trend towards digitalisation on more flexible platforms, while tablets recorded 7.33%. The remaining 0.27% of revenue (5orders) had no device recorded and is reported separately as “Unknown/Not Recorded” rather than merged into one of the there known categories, since misclassifying it would misrepresent the actual distribution shown in Figure 4.5. This PC dominance could reflect several factors, such as higher-value or more complex purchases being completed on a larger screen, but the dataset does not include a field confirming the business or personal context of each transaction, so it should not be read as evidence of B2B purchasing behaviour.

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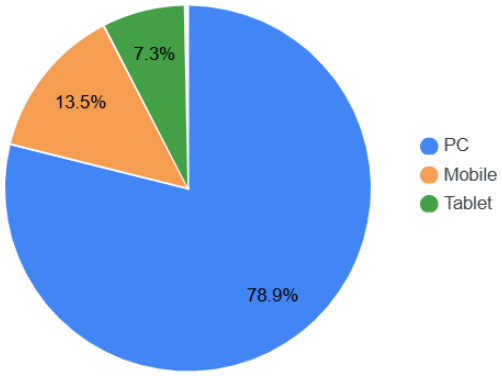

Figure 5. Pie Chart of Access Devices

Table 4. Sales Distribution by Device

Devices	Revenue (EUR)	Transactions	Proportion (%)
PC	88.880.155,48	780	78,89%
Mobile	15.225.649,34	142	13,51%
Tablet	8.267.060,53	73	7,33%

4.6 Annual Sales Trends

Revenue for 2019 stood at EUR 56,250,420.86, rising slightly to EUR 56,490,723.82 in 2020, reflecting steady growth of 0.43 percent year-on-year amidst various external challenges in 2020.

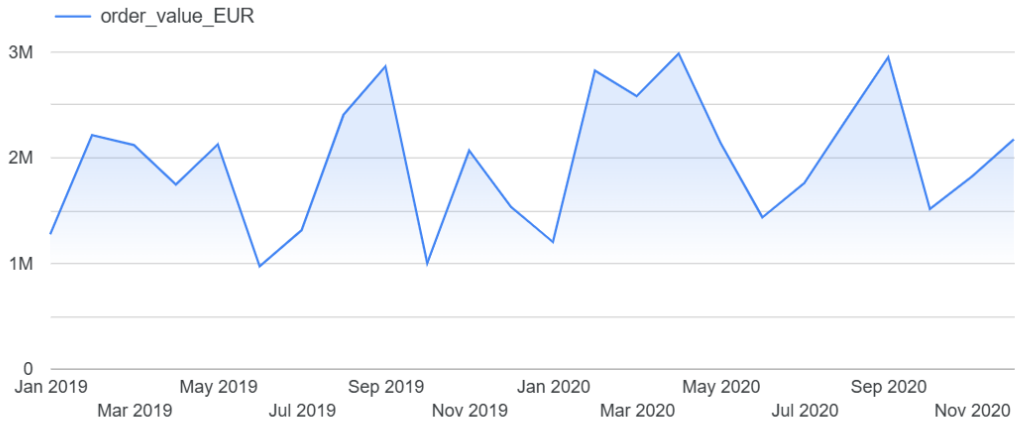

Figure 6. Timeline Trend Graph

5. CONCLUSION

Google Looker Studio has proven to be a viable platform for building interactive sales data visualisation dashboards, facilitating the monitoring and exploration of data. The three-dimensional analysis yielded the following key findings: (1) Clothing is the category with the highest revenue, while Outdoors leads in profit margin (17.79%); (2) Portugal and France account for 47.66% of total revenue, indicating a market concentration that requires strategic management; (3) PC remains the dominant access device (78.89% of revenue), although this study did not verify the business or personal context of individual transactions, so this finding should not be read as confirmation of B2B purchasing behaviour, although the mobile trend is beginning to show growth. These results suggest that a dashboard-based visualisation approach offers a more accessible way of exploring sales data than conventional text-based reports, although this study did not empirically test decision-making outcomes or user performance, so this potential should be confirmed through future user evaluation.

This study is not without limitations, First, the analysis is descriptive in nature and relies on a single static data set covering 2019-2020, so it does not capture more recent shifts in online purchasing behaviour or test causal relationships between the variables observed. Second, the dataset does not contain an explicit field distinguishing business (B2B) from individual consumer (B2C) transactions; for this reason, this study does not classify the transactions by buyer type and instead reports the results as general online retail sales performance. Establishing whether these transactions are B2B, B2C, or a mixture of both would require a dataset with a verified transaction-type or customer-type field. Third, as with many free BI tools, Looker Studio has limited capabilities for advanced statistical modeling compared with paid platforms such as Tableau or Power BI, which constrains the depth of predictive analysis than can be performed. These limitations are consistent with broader findings on analytics adoption among smaller organisations, where limited budgets and technical expertise often restrict the use of more sophisticated tools [16]. Future research could address these gaps by incorporating more recent transaction data, applying inferential or predictive analytics techniques such as regression or time-series forecasting, and, should a verified transaction-type field become available, classifying transactions by business versus consumer buyer type.

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