



Data-Driven Decisions: Unlocking Insights for Amazon Sales through Analytics

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ABSTRACT

In the retail industry, sales analysis is an important part related to supply chain management and operations between the retailer and manufacturers. Data analytics is the science of predicting future trends that support the study of gift information and past information that create inroads into the retail sector. Massive information analytics will offer insights into more than simply inventory levels and the quality of various products. The abundant growth of digital data has minimized the traditional system and approaches to do a specific task. Sales analysis is the most challenging task for inventory management, marketing, customer services, and Business financial planning for the retail industry. For this purpose, the use of Power BI, Online sales data is done to visualize the behavior of the sales data of a superstore (Amazon). The use of the Power BI tool has made sales analysis very easy to create the sales dashboard and understand the details of sales data. Data patterns and trends are observed to conclude the sales. As the major motto of retailers is to make profits by selling the products, there is a need for them to understand the data variations with the change in time, climate, regions, and customer interest. Hence, this paper provides efficient ways of analyzing the sales data of a superstore, finding the reasons for the increase and decrease in sales, controlling product imports, and attaining a profitable business.

Keywords: Analysis, Data Visualizations, Profit, Superstore, Sales, Power BI.

INTRODUCTION

In the case of data, a large amount of data is generated in the daily business process. When faced with big, random data, companies have a hard time understanding and applying them. In addition, responding quickly to the external environment of the business requires making timely decisions in the right way. Therefore, business intelligence has evolved into a very important solution for mining data, converting data from information to information, which contributes to decision-making. By simplifying smart business software, some parts of the business can rely heavily on support from the IT department. For example, to generally monitor the performance of sales in the sales department, employees may make reports that are easier to view information than to ask their technical colleagues to provide them. It can save time and improve job efficiency to create more value for sales performance. In other words, companies should use the right technical solution to solve business problems. Business analysis is significant to any business to make sure that the business's needs are decisive and helps embrace improvements and effective decision-making. This is expected to happen by bridging the gap between IT and business strategies confirming the core processes and delivering the required benefits to the businesses and their stakeholder. Business analysis enables data-driven decisions and communicating complex technical details more easily.

Power BI is the technical and procedural representation of data. It is an infrastructure that collects, stores, and analyzes the data procedure by a company's activity. Power BI parses all the data generated by a business and presents easy-to-digest reports, performance measures, and trends that inform management decisions. BI components and software come in a wide variety of power queries, power maps, power views, power Q&A, and Power BI desktops. There are many other parts of Power BI such as Power BI.com Websites, and Power BI Mobile Apps. Power BI is cloud-based data analysis, which can be used for reporting and data analysis from a wide range of data sources. Power BI is simple and user-friendly enough that business analysts and power users can work with it and get benefits from it. On the other hand, Power BI is powerful and mature enough that can be used in enterprise systems by BI developers for complex data mashups and modeling scenarios. Power BI interface is simple enough for end users to understand their reports and dashboards.

LITERATURE REVIEW

Table 1: Literature Review for Research Work

Sr. No	Year	Paper	Author	Technique	Key findings
1	2023	Analysis of Top-Selling Products Using Business Intelligence	Tanja Stefanova, Zoran Zdravev, Aleksandar velinov	Extract, Transform, Load.	Top Selling Products, ETL Process, Data Warehouse, Power BI
2	2023	Power BI Implementation and its Transformative Impact on Professional Business Intelligence.	Barbara Salgado	ETL Process, Data Modeling, Data Protection, and Ethical Integrity.	Decision-making, Business Performance, Business Intelligence.
3	2023	Data Visualization approach for business strategy recommendation using Power BI Dashboard.	Siddhartha Das, Dr. Kallal Banerjee, Soumen Nath, Sourav Chatterjee	Data Acquisition, Data Transformation, Visualization Design, DAX.	DAX, Visualization, Data Transformation, Finance view, Marketing view.
4	2023	Power BI components	Reza Rad	Power Query Editor	Power BI, connect, Query Editor.
5	2021	Business Intelligence Visualization Using Deep Learning-Based Sentiment Analysis on Amazon Review Data	Zeel Desai, Karishma Anklesaria, Harish	Extract, Transform, Load process.	Business Intelligence, deep learning, visualizations.
6	2021	Sentiment Analysis of Amazon Product Review.	Anjali Dadhich, Blessy Thankachan	Hybrid Rule-Based Approach	Amazon data, Analysis Techniques, valuable feedback.
7	2020	A Business Intelligence Dashboard Design Approach to improve Data Analytics and Decision making	Dmytro Orlovskiy, Andrii Kopp	Data Visualization tools.	Data Analytics, Business Intelligence, Data Visualization, Dashboard.
8	2018	Analysis and Design of visualization of Educational Institution Database using Power BI tool	Mandava Geetha Bhargava, K. Tara Phani Surya Kiran, Duvvada Rajeswara Rao	Power BI visuals (stacked bar chart, Pie chart, etc)	Visualization, Business Intelligence, insights, analytics

AIM & OBJECTIVE

The purpose of this Research Paper is to design a sales dashboard for the Dale department using Power BI to demonstrate monthly sales performance which will provide data and user-related information. The content displayed should be fully visualized and appealing. In addition, as information is no longer relevant to decision-makers, the overall construction process should be transparent within the department. The final dashboard can be considered as a customized version. Users can still follow the design process or modify it if a new need arises. This Research Paper aims to seek ways to improve overall sales by analyzing the data and generating sales performance dashboards for better decision-making. This was done by identifying the highest & lowest selling product while drilling down into different dimensions to understand the hidden

patterns, thus the objective is to build the most effective predictive model with optimum accuracy and evaluation measures to predict future sales and to draft valid analysis by evaluating the customers buying behavior to improve their future sales. The objective of a business sales analysis dashboard in Power BI is to analyze and present comprehensive insights into various sales-related metrics. These dashboards empower organizations to make data-driven decisions, optimize sales strategies, and drive business success.

- [1] Total sales calculations: The dashboard calculates and displays the total sales value for a selected period, allowing users to understand the overall revenue generated.
- [2] Profit Analysis: It visualizes the total profit achieved based on sales data, providing insights into the financial performance.
- [3] Profit Margin: Analyzing profit margins helps identify areas where adjustments are needed to improve profitability.

RESEARCH METHODOLOGY

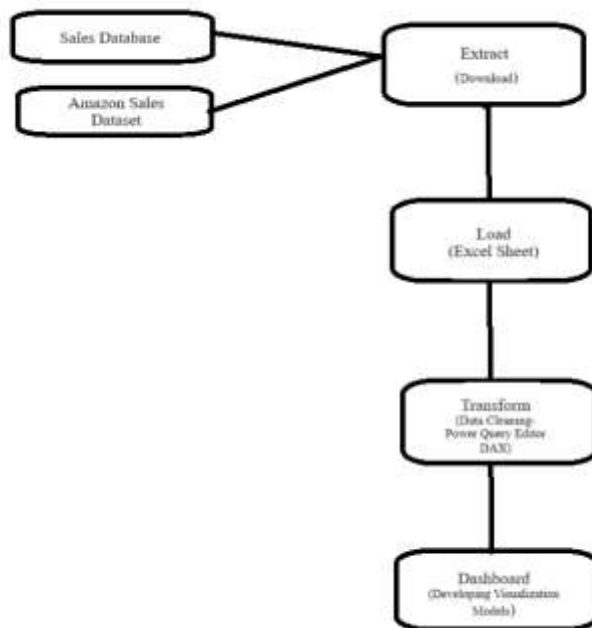


Figure 1: Process of creating a Dashboard on Power BI

- **The following steps define the above methodology in short.**
 1. First create a File in Power BI with a specific nameso all the work done can be saved.
 2. Extract the Data (Download Amazon Sales Data Set).
 3. Load the Data in Power BI.
 4. Transform the Data which includes, Data Cleaning with the help of Power Query Editor DAX.
 5. Dashboard Creation with the help of Data Visualization Tools (Slicers, Cards, Pie Chart, Donut Chart, Stacked Column).
- **Detailed Explanation of Methodology.**

1. Extract Data

Extracting Data is the process of collecting or retrieving disparate types of data from a variety of sources. Data Extraction is the first step of the ELT (Extract Load Transform) process.ELT process is used by Companies and organizations in virtually every industry for, many purposes. The dataset of Amazon Sales for sales Analysis contains Customer Data such as (Order Date, Shipping Date, Customer ID, Customer Name, City, State, Country, Region, Market Product,etc.) which is used in it.

This Data set is downloaded from Google.(link: <https://docs.google.com/spreadsheets/d/1Zk7O-NUWbASBKE949knkmFvMh--4U4GR/edit#gid=1634348971>).Once the Data set is downloaded the file is stored in the file created for the power BI.

2. Load Data

Data Loading is the process of copying and loading data sets from a source file, folder, or application to a database or similar application. It is usually implemented by copying or downloading digital data from a source and pasting or loading the data to a data storage. For the sales analysis dashboard, Amazon Sales data was loaded in Power BI which consisted of Amazon sales details, Customer ID, Order date, Shipping date, etc. Refer to Figure 2.

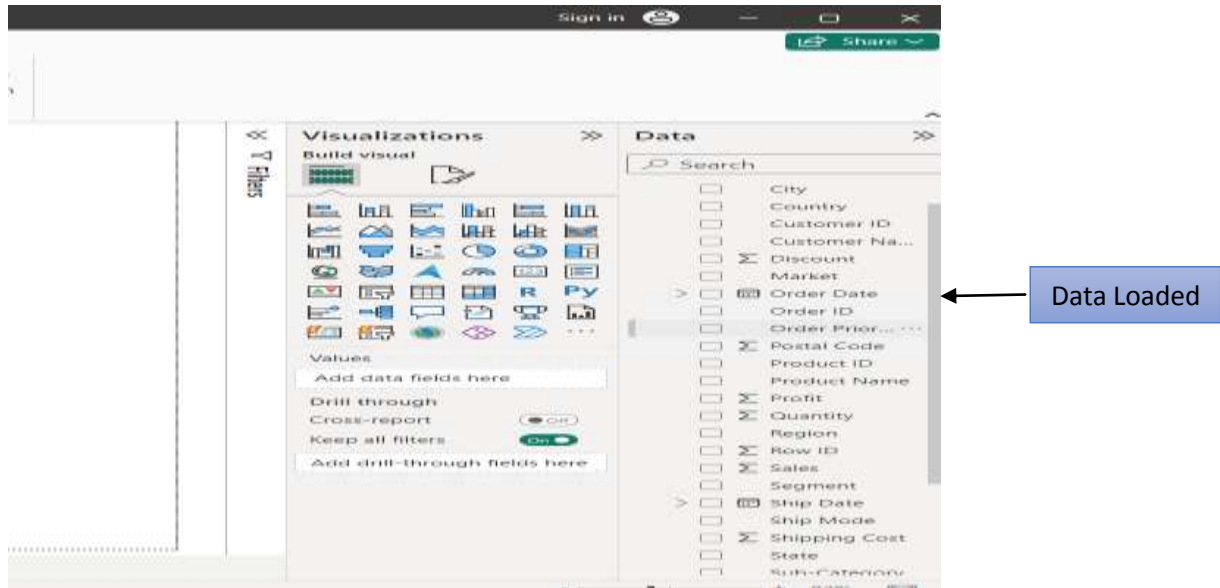


Figure 2: Data Successfully loaded in Power BI

3. Transform Data

Data Transformation is the process of converting, cleansing, and structuring data into a usable format that can be analyzed to support decision-making processes, and for the growth of an organization. Transformation is an essential step in many processes. Power BI dashboard is a single page, often called a canvas, that tells a story through visualizations. Because it's limited to one page, a well-designed dashboard contains the highlights of that story. Data transformation is vital for preparing and shaping your data into a usable format for analysis and visualization. These transformations can range from simple text to more complex conditional operations.

Power BI is a powerful tool for transforming raw data into meaningful insight. There are two methods for transforming data in Power BI: 1) using the Power Query Editor DAX and utilizing the Power Query Formula Language (M). In the following, we will focus on Power Query Editor DAX. DAX (Data Analysis Expression) language. DAX is the formula language used in Power BI to create custom calculations and aggregations in data models. It is a key feature of the platform and is used to build calculated measures, columns, tables, and relationships in power BI models. Let's see it in below figure 3.

	Order Date	Ship Date	Ship Mode
10015140-41954	11-11-2014	13-11-2014	First Class
62107-41675	05-02-2014	07-02-2014	Second C
27307-41929	17-10-2014	18-10-2014	First Clas
1637548-41667	28-01-2014	30-01-2014	First Clas
9495111-41948	05-11-2014	06-11-2014	Same Day
156557-41818	28-06-2014	01-07-2014	Second C
134092-41219	06-11-2012	08-11-2012	First Clas
1808592-41378	14-04-2013	18-04-2013	Standard
10015140-41954	11-11-2014	13-11-2014	First Clas
10015140-40974	06-03-2012	07-03-2012	First Clas
10015140-40974	06-03-2012	07-03-2012	First Clas
07801-41383	19-04-2013	22-04-2013	First Clas
47260110-41269	26-12-2012	28-12-2012	Second C
2171518-41591	13-11-2013	13-11-2013	Same Day
912027-41796	06-06-2014	08-06-2014	Second C
118545-42216	31-07-2015	03-08-2015	Second C
10015140-40958	19-02-2012	25-02-2012	Standard
883564-42255	08-09-2015	14-09-2015	Standard
56857-42035	31-01-2015	01-02-2015	First Clas
9585138-41343	05-11-2014	07-11-2014	Second C

Figure 3: Delivery Date Column missing.

As you can see in Figure 3 there is one column missing which is delivery data so we need to create delivery date column, for which we will use power Query Editor DAX to transform the data refer figure 4

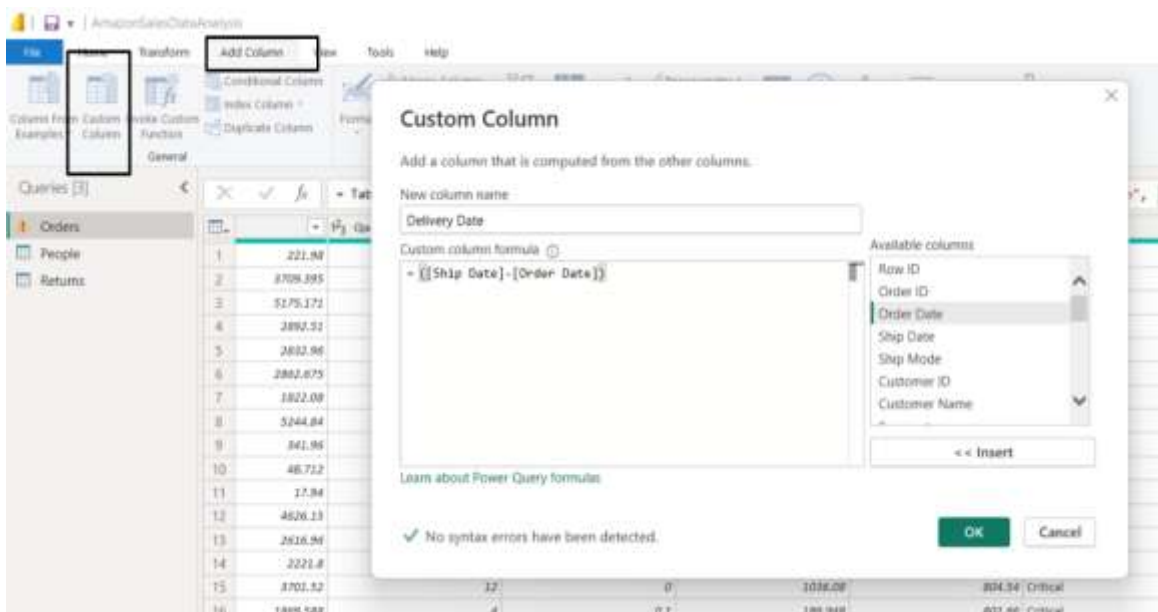


Figure 4: Process of Transformation

So, in Power BI, you will get an option to transform data click on that option the Add column option then the Custom column option a small screen will pop up where you can write DAX formulas as shown in Figure 4, then click on ok and then Apply and close option. A new column is created as shown in Figure 5.

Shipping Cost	Order Priority	Delivery Date
62.1544	40.77 High	2
-288.765	923.63 Critical	2
919.971	915.49 Medium	1
-96.54	910.16 Medium	2
311.52	903.04 Critical	1
763.275	897.35 Critical	3
564.84	894.77 Critical	2
996.48	878.38 High	4
54.7136	25.27 High	2
5.4801	11.13 High	1
4.6644	4.29 High	1
647.55	835.57 High	3
1151.4	832.41 Critical	2
622.02	810.25 Critical	0
1036.08	804.54 Critical	2
186.948	801.66 Critical	3
-2.5248	1.97 Low	6
3979.08	778.32 Low	6
28.404	766.93 Critical	1
010.70	762.90 High	1

Figure 5: Delivery Date Column created.

This is an example of transforming data in Power BI using Power Query Editor.

RESULT AND DISCUSSION



Figure 6: Output of Amazon Sales Analysis Dashboard

In Figure 6, we can see the final output in the dashboard which contains four slicers displaying four-year-wise sales, below that we have four cards that show Sales Projection, Product Unit, KPI, and Returned product. The next visualization tool is a Pie chart which here is showing sales by Segment (Consumer, Corporate, Home office), followed by a Bar Chart

showing Sales by market and the stacked chart shows Profit by customer name. These visualization tools help to understand huge data in a very effective and simple way. With one click on any visual, it gives all the information that the dashboard contains.

CONCLUSION

A dashboard is used for presenting a real-time status of business and monitoring business performance in organizations. An effective dashboard can facilitate the decision-making process and quickly trigger actions by delivering information to end users. In this, a sales department, facing a large amount of data every day, requires visual communication from data to information. To achieve better data visualization, Microsoft Power BI is integrated to visualize and display sales data through the dashboard.

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