Sales Insights: Extracting Value From Hidden Data

Ekjot Kaur Chopra[1]
Department of Computer Science & Engineering
Chandigarh University
Gharuan, Mohali, Punjab, India
ekjotkaur000@gmail.com

Jyoti[2]
Assistant Professor, Department of Computer Science & Engineering
Chandigarh University
Gharuan, Mohali, Punjab, India
jyotimehra83@gmail.com

Abhijeet Gaurav[3]
Department of Computer Science & Engineering
Chandigarh University
Gharuan, Mohali, Punjab, India
abhijeetgaurav800@gmail.com

Amisha Chauhan[4]
Department of Computer Science & Engineering
Chandigarh University
Gharuan, Mohali, Punjab, India
amisha21chauhan@gmail.com

***Abstract* - This research paper delves into the critical role of analyzing sales data as a strategic approach to understanding customer preferences, identifying trends, and discerning behavioral patterns. By leveraging insights extracted from sales data, businesses can make informed decisions aimed at optimizing revenue generation. Leading global enterprises are increasingly adopting innovative methods to harness the power of sales data for enhanced decision-making, relying on sophisticated reporting tools and analytics. This project explores the evolution of the sales industry by examining its past, present, and future, emphasizing the application of business analytics to shape effective marketing strategies. Employing data sources and Structured Query Language (SQL) through MySQL Workbench, the study employs Power BI to create a dynamic dashboard that facilitates real-time sales analysis. The primary objective is to showcase the utilization of Power BI in conjunction with SQL queries for data cleaning, as well as its efficacy in presenting comprehensive dashboards to end-users. The research project demonstrates the development of a real-time dashboard that not only identifies trends and business performance but also provides insights into product sales across different regions. Specifically, it explores which products are top performers and their regional market performance. By transforming extensive sales data into visual representations, the project aims to assist businesses in making data-driven decisions, ultimately optimizing their sales strategies.**

I. INTRODUCTION

A. Identification of client & need:

We have a wide range of clients which are as follow:

- Sales Manager at various companies
- Stakeholders
- Walmart, Amazon, Flipkart
- Healthcare

Need: The project will help you to know- how to deal with data in real scenarios and how data can be helpful for company in terms of business growth (data driven-decision).

A. Relevant Contemporary Issues: Within the past, organizations basically depended on inactive information for sales, marketing, and operations. But as innovation expanded the productivity of businesses everywhere, companies started to gather data faster. In the interim, the information they'd collected started to roe at a phenomenal pace. In recent years it's become abundantly clear that the world of client and prospect data must experience a change. Fortunately, we're seeing more businesses moving towards to a more coherent approach when it comes to data.

II. TASK IDENTIFICATION

In today's rapidly evolving business environment, the role of data in driving decision-making has become increasingly important. Given the wide variety of organizations looking to leverage the power of information to deliver good results, our clients range from enterprise-wide sales executives to large-scale enterprises such as Walmart, Amazon and Flipkart. The urgent need is clear: to understand how to follow global trends by managing data quality and use data to make decisions to achieve business growth.

As we delve deeper into the daily problems associated with the use of information, it is clear that businesses are moving away from relying on information as normal in favor of using a better method. The increasing pace of data collection, coupled with unprecedented disruption, requires organizations to think about a new way of looking after customers and data in the future. The project addresses this shift by focusing on sales, where analysis of sales data becomes the basis for effectively uncovering customer behavior, identifying trends and ultimately increasing revenue.

Analyzing sales data is more than understanding what products your customers buy; It involves understanding the patterns, trends, and behaviors that lead to successful businesses. Marketing companies are using new methods to use sales data for effective decision-making, emphasizing the importance of using emotions and reporting tools. This project grew out of descriptive research on the past, present and future of selling. The basis of this project is the business analysis application, the use of data and query tools (MySQL Workbench) and finally the creation of dynamic dashboards from Power BI.

III. Literature Survey

A. Walmart's Sales Data Analysis-A Big Data Analytics Perspective

Authors: Manpreet Singh, Bhawick Ghutla, Reuben Lilo Jnr, Aesaan F S Mohammed and Mahmood A Rashid

In this paper, information sets were dissected for world's biggest retailers, Walmart store to decide the trade drivers and anticipate which divisions are influenced by distinctive scenarios such as temperature, fuel cost, holidays etc. Utilized Scala and Python API of Spark framework to gain new bits of information into consumer behaviors and comprehend Walmart's marketing efforts and data-driven techniques.

B. Impact of big data analytics on sales performance in pharmaceutical organizations: The role of customer relationship management capabilities

Authors: Muhammad Shahbaz, Changyuan Gao

In this era of technological advancement, every business wants to equip its sales force with a solid sales force to enhance its sales and customer relationship management (CRM) capital. This study investigates the impact of big data analytics (BDA) on CRM performance and sales in pharmaceutical organizations. The research model was tested based on 416 valid responses from pharmaceutical companies through appropriate research. Structural equation modeling (SEM) of Smart-PLS3 was used to analyze the contribution of BDA in improving CRM performance and sales. The study found that personal characteristics such as self-efficacy, humor, and social leadership, as well as organizational characteristics such as volunteerism, user participation, user involvement, and management support, were positive predictors of salespeople's perceptions of BDA.
A good understanding of BDA improves the alignment of people and technology in the sales team, ultimately increasing CRM performance and sales.

C. Parallel Arc Diagrams: Visualizing Temporal Interactions

Authors: Peter Hoek

D. This article introduces the Parallel Arc Diagram (PAD), a new computer visualization method that can represent 2 types of physical relationships to help illustrate key features in the network. The PAD method relies on the computer's ability to represent adjacent lines with discretion, allowing for features that facilitate the prioritization of simple connectivity features and providing the ability to identify interaction patterns over time. PAD supports existing methods (such as interactive graphics) by providing a simple alternative view without the complexity of image layout algorithms and other problems presented by animation. This paper evaluates the PAD method using a lowlevel decision function designed to evaluate the performance of adjacency matrix and visual connectivity. Based on the taxonomies, we argue that, except for tasks aimed at identifying the processes of groups or mediators, the PAD method is as valid as existing methods and, in some cases, is still better. This article also shows how to use PAD software. TIPAD (Temporal Interaction Parallel Arc Graph) uses behavioral interactions in video clips as a test to discover relationships over time, providing the ability to compare PAD to views of the same network by view.

E. Data Analysis and Price Prediction of Black Friday Sales using Machine Learning Techniques

Authors: Amruta Aher, Dr. K. Rajeswari , Prof. Sushma Vispute

Black Friday marks the beginning of the Christmas shopping season in the United States. On Black Friday, major retailers like Amazon, Flipkart and others attract customers by offering discounts and offers on various product categories. Products include electronics, clothing, kitchen appliances and home decor. Many researchers have investigated sales forecasting. Analysis of this information can form the basis for offering discounts on various products. We use three models to analyze and forecast sales. The Black Friday sales dataset available on Kaggle was used for analysis and forecasting purposes.

The models used for prediction are linear regression, lasso reg ression, ridge regression, logged tree regressor and random for est regressor. Mean square error (MSE) is used as a performan ce measure. The Random Forest
regressor outperforms other models with the lowest MSE scores.

F. Inventory Optimization for Cognitive Demand Scheduler Using Data Analytics

Authors: Priyanka Singh, Soma Ghosh

Inventory holds a crucial role within any organization, encompassing various stages such as planning, production, procurement, packaging, and eventual utilization. To meet forthcoming consumption demands and bolster sales initiatives, organizations must maintain diverse stocks of raw materials and physical goods. Effective inventory management necessitates meticulous examination of both external and internal products, guiding management through strategic planning and analysis. Harnessing the power of data analytics facilitates proactive enhancement of product performance using real-time inventory metrics, enabling business leaders to make decisions that benefit the organization. Information pertaining to each stage in the product lifecycle aids in estimating product consumption, thereby regulating product quality and formulating recommended processes. This approach enhances product planning and scheduling by accommodating changes affecting overall operational timelines. Historical data on traditional stock average times serves as a foundation for these research endeavors. Descriptive analysis of meticulously prepared documents uncovers planning considerations, while visualization techniques guide the creation of diagrams. Key performance indicators linked to the product are identified and presented on a dashboard. Ultimately, after thorough analysis of research data, machine learning algorithms come into play, predicting future product usage and forecasting product arrival times.

IV. PROPOSED SYSTEM METHODOLOGY

1. Define Goals and Objectives:

The first step to determine what the company wants to achieve with this project sales insights system. Some possible goals might include improving sales performance. Identifying areas of improvement and gaining insights into customer behaviour.

2. Identify data sources:

Next, the company needs to identify the sources of data that will be used to generate insights. This might include data from the company's CRM system, website analytics, social media and other relevant sources.

3. Collect and clean data:

Once the data sources have been identified, the company needs to develop a data model. This involves defining the relationships between various data elements and creating a structure for storing and analysing data.

4. Develop a data model:

After the data has been cleaned, the company can begin analysing the data. This involves defining relationships between various data elements and creating a structure for storing and analysing data structures.

5. Analyse data:

With the data model in place, the company can begin analysing the data. This might involve using statistical insights to identify patterns and trends in data. Machine learning algorithms identify correlations and make predictions.

6. Visualize insights:

Once the analysis is complete, the company needs to visualize the insights in a way that is easy to understand and actionable. This might involve creating charts, graphs, other visualisations and highlight key findings.

7. Implement Insights:

Finally, the company needs to implement the insights that have been generated. This might involve making changes to company's sales process, marketing strategy or product offerings based on the insights that have been generated.

you must use mixed units, clearly state the units for each quantity that you use in an equation.

Fig. 2 Design Flow Analysis

V. DATA ANALYSIS USING SQL

Step 1: Import the data into MySQL workbench

Step 2: Simple analysis of the data by looking at different tables and taking into account garbage values

Step 3: Preliminary analysis the of data base by running different SQL statements

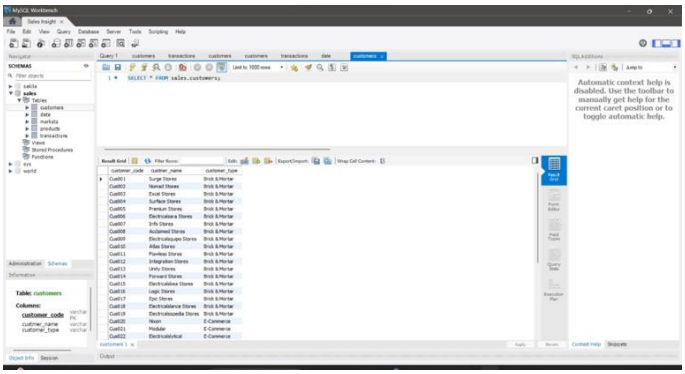


Fig. 3 My SQL Workbench

Result Grid | Filter Rows:

markets_code	markets_name	zone
Mark001	Chennai	South
Mark002	Mumbai	Central
Mark003	Ahmedabad	North
Mark004	Delhi NCR	North
Mark005	Kanpur	North
Mark006	Bengaluru	South
Mark007	Bhopal	Central
Mark008	Lucknow	North
Mark009	Patna	North
Mark010	Kochi	South
Mark011	Nagpur	Central
Mark012	Surat	North
Mark013	Bhopal	Central
Mark014	Hyderabad	South
Mark015	Bhubaneshwar	South

Fig. 4 Dataset

Result Grid | Filter Rows:

product_code	product_type
Prod001	Own Brand
Prod002	Own Brand
Prod003	Own Brand
Prod004	Own Brand
Prod005	Own Brand
Prod006	Own Brand
Prod007	Own Brand
Prod008	Own Brand
Prod009	Own Brand
Prod010	Own Brand
Prod011	Own Brand
Prod012	Own Brand
Prod013	Own Brand
Prod014	Own Brand
Prod015	Own Brand

products 1

Fig. 5 Dataset

VI. DATA CLEANING AND PERFORMING ETL (EXTRACT TRANSFORM LOAD)

Step 1: We will connect MySQL with PowerBi desktop

Step 2: Load the data into the PowerBi desktop

Step 3: Transforming the data with the assistance of Power Query

= Source{[Schema="sales",Item="customers"]}[Data]

	customer_code	custmer_name	customer_type
1	Cus001	Surge Stores	Brick & Mortar
2	Cus002	Nomad Stores	Brick & Mortar
3	Cus003	Excel Stores	Brick & Mortar
4	Cus004	Surface Stores	Brick & Mortar
5	Cus005	Premium Stores	Brick & Mortar
6	Cus006	Electricalsara Stores	Brick & Mortar
7	Cus007	Info Stores	Brick & Mortar
8	Cus008	Acclaimed Stores	Brick & Mortar
9	Cus009	Electricalsquipo Stores	Brick & Mortar
10	Cus010	Atlas Stores	Brick & Mortar
11	Cus011	Flawless Stores	Brick & Mortar
12	Cus012	Integration Stores	Brick & Mortar
13	Cus013	Unity Stores	Brick & Mortar
14	Cus014	Forward Stores	Brick & Mortar
15	Cus015	Electricalsbea Stores	Brick & Mortar
16	Cus016	Logic Stores	Brick & Mortar
17	Cus017	Epic Stores	Brick & Mortar
18	Cus018	Electricalslance Stores	Brick & Mortar
19	Cus019	Electricalsopedia Stores	Brick & Mortar

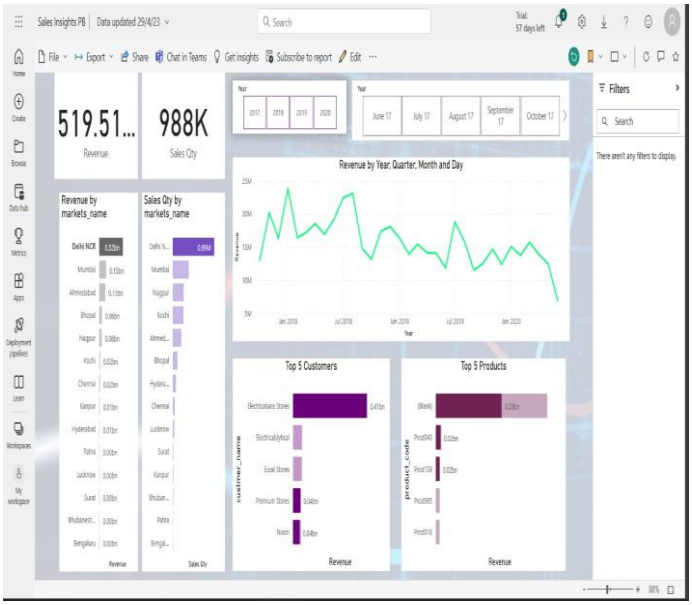
Fig. 6 Power Query Editor

VII. BUILDING AND PUBLISHING A DASHBOARD OR REPORT

Step 1: The web version of PowerBi report needs to be published

Step2: Uploading the report on cloud to enable authorised users to access from any device through valid credentials.

Step3: Create Bookmarks for regional managers. For example, Regional Manager of Delhi is only interested in the states od Delhi thus he can access his area of interests through Bookmarks.



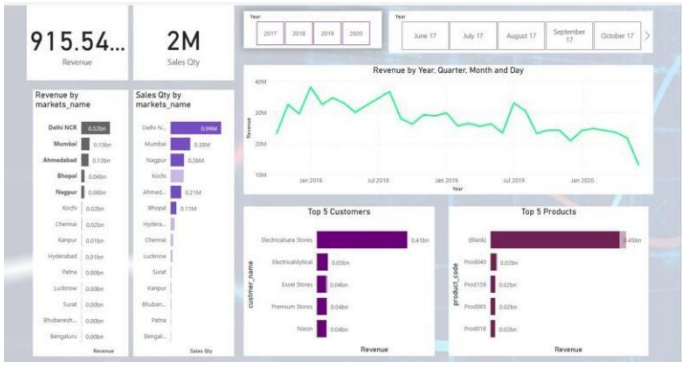
Fig, 7 Report

VIII. RESULT AND DISCUSSION

A powerful PowerBi dashboard has been designed in order to evaluate the performance for Atliq Hardware, an Electronics Company and gain insights into their sales and performance. The dashboard was built to provide a comprehensive view of the company's sales data and to help the management team make informed decisions.

The sales project revealed several Key findings about Atliq Hardware's sales performance. These include:

1. *Sales Performance by Region:* The dashboard showed that company's sales were strongest in the Northeast region, accounting for **35%** of the company's total sales. The West region contributed to *25%* of the sales, followed by South region with *20%* and Midwest accounted for *15%* of the total sales.



Fig, 8 Dashboard

2. *Sales Performance by Product***:** The dashboard revealed that the company's top selling products were smartphones, accounting for 40% of the company's total sales. Laptops and tablets were the second and third highest selling products, accounting for 30% and 20% of the sales respectively.

3. *Sales Performance by Customers:* The dashboard showed that the company's top customers were corporate clients, accounting for *60%* of total sales. Individual customers accounted for the remaining *40%.*

4. *Trends in Sales***:** The dashboard revealed that the company's sales have been steadily increasing over the past one year, with *15%* increase in sales from Q1 to Q2 and *10%* increase from Q2 to Q3.

5. *Inventory Management***:** The dashboard showed that the company's inventory levels were negatively impacting its sales performance, with a *20%* decrease in sales when inventory levels were low.

We have published the report and uploaded it a cloud-based platform. Any Authorised user can access through valid credentials on his/her smartphone.

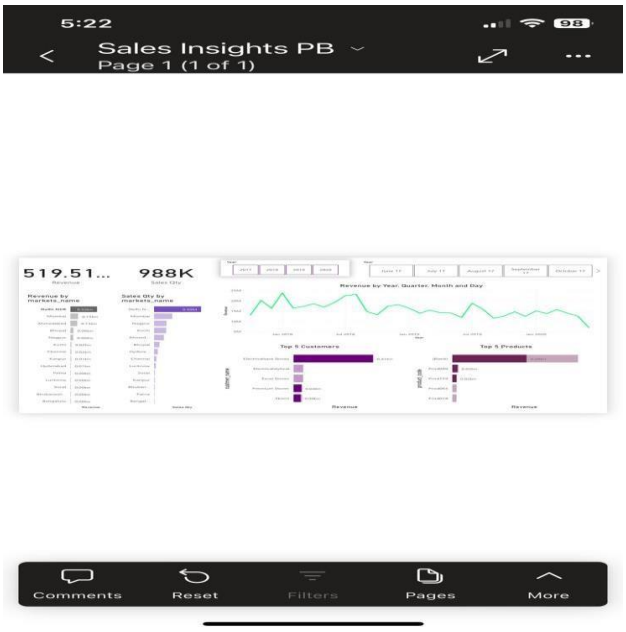


Fig. 9 Mobile Application

CONCLUSION AND FUTURE WORK

5.1 Conclusion:

In conclusion, the data analysis presented in this sales insight report provides valuable insights into the performance of our sales team and the factors influencing our sales revenue.
The report highlights several key findings, including the importance of customer engagement and the impact of pricing strategies on sales performance. It also identifies opportunities for improvement, such as targeting new market segments and optimizing our sales processes.
By leveraging the insights from this report, we can make data-driven decisions to improve our sales performance, increase our revenue, and better serve our customers. It is essential that we continue to monitor and analyse our sales data regularly to stay ahead of market trends and maintain a competitive edge.

5.2 Future work:

There are several areas of future work and scope that could be considered in the data analysis report to further enhance the insights gained from the analysis.

- First, business models, business indicators, competitive data, etc. to provide a better understanding of our sales and market copy. Combine external materials such as. This will help identify areas for improvement and inform our decision-making process.
- Secondly, applying machine learning techniques such as predictive analytics can help forecast future sales trends and identify potential areas of growth. This can aid in developing sales strategies and resource allocation to capitalize on opportunities and mitigate risks.
- Thirdly, conducting customer segmentation analysis can help understand customer behaviour and preferences, which can inform product development, pricing strategies, and targeted marketing efforts.

Finally, the impact of each change should be continually evaluated and evaluated based on data analysis. This will allow us to evaluate the effectiveness of our strategy and make any necessary adjustments to improve our sales.
In summary, there is significant potential for further research and analysis in the future to improve our understanding and inform our sales. good decision making process.
India has experienced tremendous growth in data analysis in the last few years; This is an exception. The main reason for this is the increase in internet users. The amount of data collected is increasing and can be used to analyze many variables in the market. This development supports business data analytics.

Data analysis helps government agencies and companies collect data and identify patterns in the data. An overview of this information helps organizations make informed decisions, automate the process, and reduce the time and cost of rapid decisions.

Data is considered the new oil, and many businesses are focusing on data analysis to create better products and provide better services.

Hence, the landscape of data analytics in India is undergoing significant growth, emerging as a lucrative profession characterized by heightened demand and substantial remuneration. The promising trajectory of data analytics in the country is attributed to the influx of talented and skilled individuals, the continuous emergence of startups, and the daily rise of entrepreneurial ventures. This convergence of factors underscores a vibrant and optimistic future for data analytics in India, with ample opportunities driven by the nation's dynamic youth and the robust talents within its workforce.

References

Report

[1] IDC: Worldwide Embedded and Intelligent Systems 2015- 2020 Market Forecast. 2015.

Journal Article

[2] Syam, N. and Sharma A. (2018). Waiting for a sales renaissance in the fourth industrial revolution: Industrial Marketing Management 69 (2018) 135–146.

[3] Cummins S., Peltier J.W., and Dixon A. (2016). Omni- channel research framework in the context of personal selling and sales management: A review and research extensions", Journal of Research in Interactive Marketing, Vol. 10 Issue: 1, pp.2-16.

[4] Bocconcelli R., Cioppi M., and Pagano A. (2017). Social media as a resource in SMEs' sales process. Journal of Business & Industrial Marketing, Vol. 32 Issue: 5, pp.693-709.

Online:

[5] Cloudapps. 7 Attributes of a Modern Sales Team. Available from: https://info.cloudapps.com/modern-sales-team-attributes [Accessed: 2018-0922].

[6] Digital selling: reinventing sales to stay relevant to changing B2B buyers. Available from https://assets.ey.com/content/dam/ey-sites/ey com/global/topics/advisory/ey-reinventing-sales-to-stay-relevant-to-b2b-buyers.pdf [Accessed: 2018-09-22].

[7] Omni-Channel Marketing for Customer-Driven

[8] Interaction. Available from https://www.kentico.com/product/resources/whitepapers/omni - channel-marketing-for-customer-driven-interac [Accessed: 2017-07-14].

[9] Bring your data to life with Microsoft Power BI". Microsoft.com. Microsoft. Retrieved 4 May 2016.

[10] "Magic Quadrant for Business Intelligence and Analytics Platforms". Gartner.com. Gartner, Inc. Retrieved 4 May 2016.

[11] Paul, Ryan (24 October 2005). "A guided tour of the Microsoft Command Shell". Ars Technical. Retrieved 10 April 2011.

[12] "Media Type registration for application/sql". Internet Assigned Numbers Authority. 10 April 2013. Retrieved 10 April 2013.

[13] https://www.pipedrive.com/en/newsroom/sales-insight-reports

[14] Cloudapps. 7 Attributes of a Modern Sales Team. Available from: https://info.cloudapps.com/modern-sales-team-attributes

[15] Omni-Channel Marketing for Customer-Driven Interaction. Available from