

Role of Data Analytics in Business Decision Making

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Abstract: *Today, businesses collect a lot of data from their daily work, customers, sales records, and online systems. This data is very important for business growth, but managing and understanding it is not easy. Many businesses still take decisions without properly studying their data. Because of this, wrong decisions are taken, which can cause loss of money, time, and business opportunities. Data analytics helps businesses understand their data in a better and simple way. It helps to organize data and find useful information from it. With the help of data analytics, businesses can understand customer needs, sales performance, and market trends. This makes decision making easier and more accurate for managers.*

This paper explains the use of data analytics in business decision making. It describes basic types of data analytics, simple methods, and common tools used in business organizations. A small case study is included to explain how data analytics is used in real business situations. The study shows that decisions based on data are faster, more accurate, and more reliable than traditional methods. Data analytics helps businesses reduce risk, improve planning, and support overall business growth..

Keywords: Data Analytics, Business Decision Making, Data Analysis, Business Intelligence, Machine Learning, Decision Support System, Customer Data, Sales Analysis, Predictive Analytic

I. INTRODUCTION

Decision-making plays a very important role in every business. Every small or big decision related to sales, marketing, finance, production, and employees directly affects how a business performs. Good and timely decisions help a business grow, earn profits, and stay strong in the market. On the other hand, poor decisions can lead to losses, customer dissatisfaction, and even business failure. In earlier times, most business decisions were taken based on experience, personal judgement, and guesswork. Business owners and managers depended mainly on their past knowledge and instincts. During that period, very little data was available, and record-keeping was mostly done on paper. Because of limited information, decisions were often slow and sometimes incorrect.

Today, the situation has completely changed. Modern businesses generate a huge amount of data every day. This data comes from many sources such as sales transactions, customer feedback, websites, mobile apps, social media, and online payments. However, just collecting large amounts of data does not automatically improve decision-making. If this data is not properly analysed, it becomes confusing and useless. Data analytics helps businesses convert raw data into meaningful information. It helps in organizing, cleaning, and studying data in an easy way. With data analytics, businesses can identify patterns, trends, and hidden insights that are not visible through normal observation. For example, it can show which products are selling more, what customers prefer, and which areas need improvement.



II. LITERATURE SURVEY

2.1 Study of Past Business Data

Earlier studies mainly focused on studying past business data. Researchers used old sales records, profit details, and customer data to understand business performance. This type of study is called **descriptive analytics**. It helped businesses know what happened in the past, but it was mostly used only for reports and checking performance.

2.2 Predicting Future Business Results

Later, research moved towards predicting future business outcomes. This is known as **predictive analytics**. Researchers used data to predict future sales, customer demand, and market trends. These studies helped businesses plan their future work in a better way and avoid possible losses.

2.3 Suggesting Actions Using Data

Some studies also focused on giving suggestions or actions based on data results. This is called **prescriptive Analytics**. It helps managers decide what steps should be taken to improve business performance and reduce risks.

2.4 Use of Simple Machine Learning Methods

Many researchers used simple machine learning methods like **linear regression, decision trees, and clustering**. These methods help in finding patterns in data and making decisions more accurate. They also reduce human effort and save time.

2.5 Effect of Data Analytics on Business

Research clearly shows that businesses using data analytics perform better than others. Data analytics helps in faster decision-making, better planning, cost reduction, and improved customer Satisfaction. Overall, studies prove that data analytics is very useful for business decision-making.

III. EXISTING MODEL AND THEIR LIMITATIONS

3.1 Manual Data Handling

In earlier business systems, most of the data was handled manually. Businesses used Spreadsheets, registers, and basic software to store and Analyzedata. Managers had to check data themselves and make decisions based on limited Information. These methods were simple and required less technology, so they were useful for small businesses, but they were not very accurate for large data.

3.2 Dependence on Experience and Past Reports

Traditional decision-making mostly depended on managers' experience and past reports. Decisions were taken based on what worked earlier, not on deep data Analysis.This approach worked in stable environments but failed when market conditions changed quickly.

3.3 Limited Data Analysis Tools

Earlier systems used basic tools like Excel and simple reports. These tools could only Analyze small amounts of data and did not support advanced Analysis.Because of this, businesses could not find hidden patterns or future trends properly.

3.4 Controlled and Fixed Data Usage

Existing models usually worked on fixed and structured data collected at specific times, such as monthly or yearly Reports. They did not support real-time data or data from online platforms like social media and websites.



3.5 Use of Simple Algorithms

Some traditional systems used simple algorithms like averages, basic regression, and rule-based methods. These were easy to use and required less computing power, but they were not suitable for complex business Problems. Today, these methods are slowly being replaced by advanced analytics techniques for better accuracy and better decisions.

IV. WORKING MODEL AND METHODOLOGY (SYSTEM ARCHITECTURE)

A. Proposed System Architecture (Working Model)

The proposed system is designed to help businesses make better decisions using data analytics. The model works in simple steps and is suitable for real business situations.

Stage 1: Data Collection and Pre-processing

In this stage, data is collected from different business sources such as sales records, customer data, websites, and online Platforms. Since raw data may contain errors, missing values, or duplicate entries, it is cleaned and Corrected. This step ensures that the data is accurate and ready for analysis.

Stage 2: Data Analysis (Finding Useful Information)

After cleaning, the data is Analyzed to understand business Activities. Simple analytics techniques are used to study sales trends, customer Behavior, and business Performance. This stage helps in finding patterns and relationships in data.

Stage 3: Trend and Pattern Identification (Understanding Changes)

In this stage, the system studies how business data changes over Time. It helps in understanding growth, decline, seasonal trends, and customer demand patterns. This step is useful for forecasting future business performance.

Stage 4: Visualization and Decision Support

The analysed results are shown using charts, graphs, and dashboards. These visuals make it easy for managers to understand data quickly. Based on these insights, managers can take better and faster business decisions.

B. Working Model

1. Data Collection

Business related data is collected from sales records, customer details, bills, and online systems.

2. Data Cleaning

The collected data is checked. Wrong data, missing information, and repeated data are removed so the data becomes correct.

3. Data Arrangement

Clean data is arranged properly. This makes the data easy to understand and ready for use.

4. Data Analysis

Simple analysis methods are used to study the data. This helps in understanding business performance and finding useful information.

5. Data Display

Results are shown using simple charts and graphs. This makes it easy for managers to understand the data.

6. Decision Making

Managers use these results to take better and faster business decisions.

C. Methodology

The project follows the below simple methodology:

1. Data Collection

Collect data from sales systems, customer databases, and online sources.

2. Data Cleaning

Remove incorrect, missing, and duplicate data. Make the data consistent and usable.



3. Data Analysis

Apply simple analytical techniques to study data. Identify trends and useful information.

4. Decision Support

Show results using graphs and dashboards. Use insights to support business decisions.

ALGORITHM USED IN EXISTING SYSTEM

Category	Existing System Algorithms / Techniques	Limitations in Existing System	Proposed System Algorithms / Techniques
Data Collection	Manual data entry, paper records, Spreadsheets, simple databases	Takes more time, chances of mistakes, data is limited	Automated data collection, online systems, sales software, customer databases
Data Storage	Excel files, local systems	Data can be lost, not secure, hard to manage	Centralized databases, cloud storage
Data Processing	Manual filtering, sorting, basic Excel formulas	Slow processing, not suitable for large data	Automated data cleaning, data Preprocessing tools
Data Analysis	Simple statistics, averages, manager's experience	Low accuracy, hidden patterns not found	Linear Regression, Decision Tree, K-Means, Naive Bayes
Customer Analysis	Manual customer grouping	Not accurate, time-consuming	Customer segmentation using clustering
Prediction	Guesswork based on past experience	Future results may be wrong	Sales and demand prediction using regression
Decision Making	Manager experience, fixed rules	Slow decisions, human bias	Data-driven decisions based on analytics results

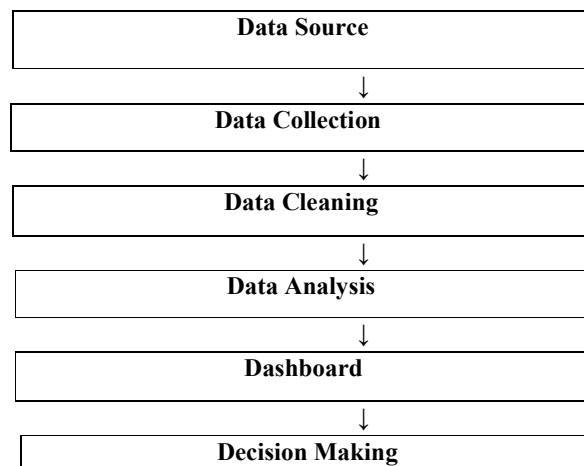


Fig.1 System Architecture



Flow:

Data Source → Data Cleaning → Data Analysis → Dashboard → Decision

Explanation:

Data is collected and cleaned first. After analysis, results are shown on dashboards. Business managers use these results to take decisions

V. OUTPUT/RESULT AND DISCUSSION

The results of this study show that data analytics gives better results than traditional business methods. By using data analytics, businesses can understand their data clearly and take decisions faster. Decisions based on data are more accurate and reliable. Data analytics also helps businesses reduce unnecessary costs. It helps in better planning and proper use of resources. Businesses can understand customer needs and improve their products and services. This leads to better customer Satisfaction. Overall, the study shows that data analytics helps businesses improve performance, reduce risk, and make better decisions. It plays an important role in the growth and success of modern businesses.

Parameter	Traditional System Output	Traditional System Output
Decision Speed	Decisions take more time due to manual analysis	Decisions are taken faster using automated data analysis
Accuracy	Results are less accurate	Results are more accurate and reliable
Data Handling	Can handle only small amounts of data	Can handle large and complex data easily
Cost Control	Difficult to identify and reduce costs	Helps reduce unnecessary costs
Customer Understanding	Limited information about customers	Better understanding of customer needs
Business Performance	Average business performance	Improved overall business performance

VI. CONCLUSION

Data analytics is very useful for business decision-making. It helps businesses study large amounts of data and find useful information from it. By using data analytics, managers can take better, faster, and more accurate decisions. This helps the business grow and work more efficiently. Businesses that use data analytics can understand their customers better, improve sales, and reduce costs. It also helps in planning for the future and handling risks in a smart way.

In the future, analytics tools and techniques will become more advanced. With new technology like AI and real-time analytics, businesses will be able to make decisions even faster and smarter. Overall, data analytics is an important tool for modern businesses and helps them stay successful and competitive.

REFERENCES

[1] J. Han, M. Kamber, and J. Pei, Data Mining: Concepts and Techniques, 3rd ed. San Francisco, CA, USA: Morgan Kaufmann, 2012.
 [2] T. H. Davenport and J. G. Harris, Competing on Analytics: The New Science of Winning. Boston, MA, USA: Harvard Business School Press, 2007.
 [3] E. Turban, R. Sharda, and D. Delen, Business Intelligence and Analytics: Systems for Decision Support, 10th ed. Upper Saddle River, NJ, USA: Pearson Education, 2015.
 [4] V. Dhar, "Data science and prediction," Communications of the ACM, vol. 56, no. 12, pp. 64–73, Dec. 2013.



- [5] W. Chen, K. Chiang, and T. Storey, "Business intelligence and analytics: From big data to big impact," *MIS Quarterly*, vol. 36, no. 4, pp. 1165–1188, Dec. 2012.
- [6] R. Kimball and M. Ross, *The Data Warehouse Toolkit: The Definitive Guide to Dimensional Modeling*, 2nd ed. New York, NY, USA: Wiley, 2013.
- [7] S. LaVallee *et al.*, "Big data, analytics and the path from insights to value," *MIT Sloan Management Review*, vol. 52, no. 2, pp. 21–32, 2011.
- [8] IEEE, "Data analytics for business applications," *IEEE Xplore Digital Library*, 2020.

