

Application of Business Analytics in Improving Managerial Decisions: Evidence from Supermarket Retail Stores

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Abstract

The development of business analytics can be viewed as an essential tool for improving the quality and effectiveness of managerial decisions across companies operating in the retail sector. In particular, supermarkets can benefit significantly from business analytics because they generate considerable amounts of customer transaction data. Therefore, this study focuses on investigating the role and significance of business analytics in improving the quality of decisions made by managers working in retail supermarkets. The objective is to discuss the contributions of various types of analytics (descriptive, diagnostic, predictive, and prescriptive) to decision-making processes in inventory control, pricing, forecasting, sales, and other aspects of retail companies' operations.

To achieve this objective, it was decided to apply a quantitative method and obtain information from both primary and secondary sources. Primary data were gathered through a survey conducted among managers and employees of various supermarkets. The obtained results show that business analytics can improve managerial decision-making processes because of its ability to provide real-time analysis, identify customer behaviour patterns, and improve forecasting.

Keywords

Business Analytics, Managerial Decision-Making, Supermarket Retail, Data-Driven Decision Making, Predictive Analytics, Inventory Management, Customer Analytics, Retail Performance, Sales Forecasting, Operational Efficiency

1. Introduction

The retail sector has witnessed major changes due to technological innovation and the availability of data. Supermarkets store huge amounts of data from their billing system, customer transactions, inventory and supply chain, among other sources. It has become imperative for companies to utilise and manage this data effectively to enhance decision-making. In addition, effective management and use of data are crucial for gaining a competitive edge.

Definition of Business Analytics Business analytics involves the application of statistical methods, data analysis and information systems in transforming data into valuable insights that will help in decision-making. This concept has greatly assisted retailers in making better decisions as far as understanding customers, optimising stock and managing business activities are concerned. The information provided can help decision-makers in both strategic and tactical situations.

6 Steps of Data Analysis



Intuition played an important role in the history of managerial decisions made in the retail sector. However, nowadays intuition is not enough, especially when the competition becomes intense, and customer preferences tend to be unpredictable. Thanks to business analytics, managers can improve the quality and effectiveness of their decision-making. Predictive analytics will help to forecast demand for certain products and design marketing strategies to satisfy the needs of customers.

2. OBJECTIVES OF THE STUDY

- 1. Understanding business analytics and its significance for managerial decision-making:** Business analytics refers to the process of applying data, statistical tools, and analytics techniques to facilitate decision-making. In this objective, we aim to understand the role played by analytics in facilitating decision-making based on facts.
- 2. Investigating the application of business analytics in supermarket retail stores:** In this objective, our focus will be to study the use of analytics in retail areas like sales, inventory management, price setting, and customer relations.
- 3. Assessing the significance of data to enhance managerial decision-making:** The main emphasis in this objective is placed on the significance of using historical data and even real-time data in forecasting trends and patterns and facilitating good decisions.
- 4. Evaluate the benefits gained from business analytics:** Here, we will examine how the use of analytics enhances business operations, lowers costs, satisfies customers, and boosts the profit margins of supermarket retailing companies.
- 5. Studying the implementation of various forms of analytics in decision-making:** Our main interest here will be in evaluating the contribution made by descriptive, diagnostic, predictive, and prescriptive analytics in decision-making.

3. HYPOTHESIS OF THE STUDY

Null Hypothesis (H_0): There is no significant impact of business analytics on the quality of management decisions in supermarkets.

Alternative Hypothesis (H_1): There is a significant effect of business analytics on the quality of management decisions in supermarkets.

4. LITERATURE REVIEW

The idea of business analytics has become very important in recent years, especially in retail, where huge amounts of data are produced every day. Many researchers have looked at how analytics helps improve decision-making for managers and boosts organisational performance.

Thomas H. Davenport (2006) pointed out that business analytics allows organisations to shift from making decisions based on gut feelings to making data-informed choices. His study showed that companies using analytics can gain a competitive edge by becoming more efficient and improving their strategic planning.

Brynjolfsson Erik and Lorin Hitt (2011) discovered that organisations that base decisions on data tend to be more productive and profitable than those that use traditional approaches. Their research revealed that analytics greatly improves the quality of decisions and overall business performance.

Ramesh Sharda, Dursun Delen, and Efraim Turban (2014) described business analytics as including descriptive, predictive, and prescriptive methods that help managers understand past performance, predict future trends, and make the best decisions.

In retail, Marshall Fisher and Ananth Raman (2010) stressed the role of analytics in managing inventory and predicting demand. Their study showed that using data effectively can cut down on stockouts and enhance supply chain efficiency.

Sunil Gupta and Donald Lehmann (2005) concentrated on customer analytics and found that knowing customer behaviour helps in creating targeted marketing strategies, which leads to better customer satisfaction and increased sales.

Recent research also highlights the use of new technologies such as artificial intelligence and machine learning in retail analytics. These tools improve managers' ability to make quick decisions and adjust rapidly to changes in the market.

Research Gap:

Business analytics is really important for companies to make decisions. Lots of research has been done on this topic. Most of it looks at big companies or online stores. Not much attention has been paid to supermarkets, especially in countries that are still growing.

Most of the research so far has talked about the technical side of business analytics and how it affects the whole company. We do not know much about how business analytics helps the people in charge make decisions at the store level in supermarkets.

5. METHODOLOGY

This study looks at how business analytics helps managers make decisions in supermarket retail stores. It explains how the research was done, where the data came from, how the data was collected and what tools were used to see if analytics really improves decisions.

5.1 Research Design:

The research design used is descriptive. It helps to understand and explain how business analytics improves decision-making in supermarket retail stores. The study checks how business analytics supports decision-making in retail.

5.2 Population and Sample:

The people in this study are supermarket managers and supermarket employees who make decisions and do things like analyse data and work in retail. We picked around 50 to 100 of these supermarket managers and supermarket employees to ask them questions.

5.3 Sampling Technique:

We used a method to pick the supermarket managers and supermarket employees for this study. We chose these supermarket managers and employees because they were easy to reach and talk to in the supermarkets where they work. This way of picking people is called convenience sampling.

5.4 Data and Sources of Data:

This research uses both secondary data.

5.4.1 Primary Data:

We collect data through a simple questionnaire (Google Form) meant for supermarket managers and employees. The questions are about using business analytics to make decisions and how it affects performance.

5.4.2 Secondary Data:

Secondary data comes from sources like research papers, journals, industry reports, websites and books, on business analytics and retail management.

5.5 Data Collection:

We collect the information through a survey that we send to the people who work at supermarkets. We use Google Forms to do this. We want to know what these people think about business analytics and how they use it to make decisions.

5.6 Statistical Tools for Data Analysis

We look at the information we collect and use math tools to understand what it means. We do things like figure out what percentage of people answer questions in the same way. We also use something called the Chi-square test to see if there is a connection between things.

5.7 Data Visualization:

The data is shown using graphs and charts and tables to make it easier to understand. Data Visualization helps us see patterns and trends and how things are connected between business analytics and the decisions that managers make.

5.8 Scope of the Study

The scope of the study is about supermarket retail stores and how business analytics can help managers make better decisions. It looks at things like managing inventory, understanding customers and predicting sales and setting prices, and making operations more efficient.

6. DATA ANALYSIS & INTERPRETATION

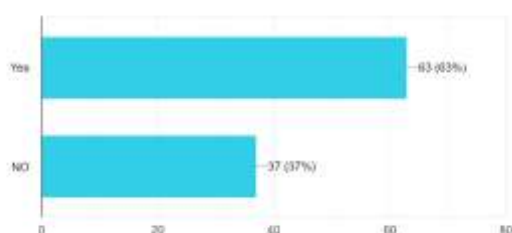
This chapter is about looking at the information we got from supermarket managers and employees. We want to see how they use business analytics to make decisions. We got this information from them. Now we are going to look at it closely. We used a way to look at the numbers, and we will tell you what we found out.

6.1 Analysis of Primary Data:

The main information for this study was gathered by giving a set of questions to the people in charge of supermarkets and the people who work there. We wanted to know what supermarket managers and employees think about business analytics and how they use it to make decisions. We looked at the answers we got. Used them to make tables and charts that make it easier to understand what supermarket managers and employees think about business analytics.

6.1.1 Are you aware of the concept of Business Analytics?

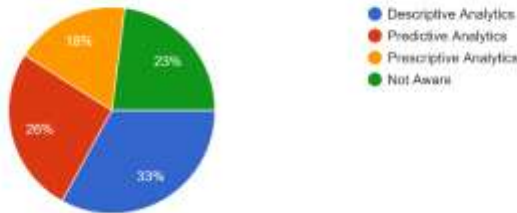
6) Are you aware of the concept of Business Analytics?
102 responses



Analysis: The data shows that **63% of respondents are aware** of business analytics, while **37% are not aware**. This indicates a moderate level of awareness among supermarket employees. However, a significant portion still lacks knowledge, highlighting the need for training and awareness programs.

6.1.2 Which type of analytics is mostly used in your store?

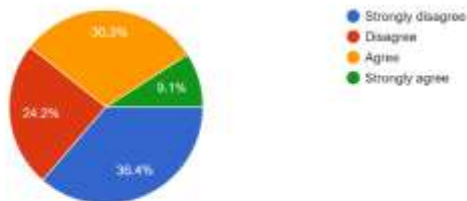
8) Which type of analytics is mostly used in your store?
100 responses



Analysis: The data shows that **Descriptive Analytics (33%)** is the most commonly used type in supermarkets, followed by **Predictive Analytics (26%)** and **Prescriptive Analytics (18%)**. Additionally, **23% of respondents are not aware** of analytics types. This indicates that while basic analytics is widely used, advanced analytics adoption is still developing.

6.1.3 Business Analytics helps in improving sales forecasting.

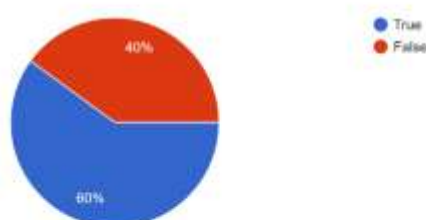
9) Business Analytics helps in improving sale forecasting.
90 responses



Analysis: The data shows mixed opinions on whether business analytics improves sales forecasting. While 30.3% agree and 9.1% strongly agree, a larger portion 36.4% strongly disagree, and 24.2% disagree. This indicates that many respondents are not fully convinced about the effectiveness of analytics in sales forecasting, suggesting a need for better implementation and awareness.

6.1.4 Business Analytics helps managers make faster decisions.

14) Business Analytics helps managers make faster decisions.
100 responses

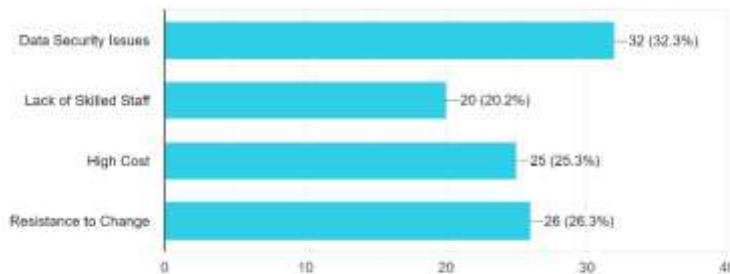


Analysis: The data shows that 60% of respondents agree that business analytics helps managers make faster decisions, while 40% disagree. This indicates that a majority perceive analytics as a useful tool for speeding up decision-making. However, a significant portion still does not experience this benefit, suggesting scope for better implementation and training.

6.1.5 What is the biggest challenge in implementing Business Analytics in your store?

18) What is the biggest challenge in implementing Business Analytics in your store?

99 responses



Analysis: The data shows that data security issues (32.3%) are the biggest challenge in implementing business analytics in supermarket stores. This is followed by resistance to change (26.3%) and high cost (25.3%), while lack of skilled staff (20.2%) is the least reported issue. This indicates that security concerns and organisational resistance are major barriers to analytics adoption.

6.2. Analysis of Secondary Data:

Business analytics is really helpful for people who make decisions in companies. When we look at what other people have written in journals and reports, we can see that business analytics helps them make choices.

6.2.1. Adoption of predictive analytics: Secondary data shows that supermarkets are using analytics more and more for predicting demand, planning inventory and forecasting sales. This helps managers to know what might happen in the future and make decisions ahead of time.

6.2.2. Impact on decision-making speed and accuracy: This way, managers can react fast when the market changes and make decisions that are more accurate and informed because they are based on business analytics and its insights. Business analytics provides these real-time insights, which are crucial for making managerial decisions

6.2.3. Role in business performance: Secondary data shows that business analytics helps managers make decisions faster and more accurately. This is because it provides insights and forecasts based on data. Business analytics plays a role in improving how well a business does overall.

- making operations more efficient
- managing inventory better
- increasing sales.

6.2.4 Importance in Business Strategy:

- Business analytics plays a role in creating effective business plans.
- It gives managers data-driven insights. Helps them spot market trends.
- With this information, they can make choices about pricing, finding the right customers and using resources wisely.

6.2.5 Profitability and Competitive Advantage

Business analytics is really good for business because it helps with making money. It does this by figuring out the prices, cutting costs and making sales better. Business analytics also gives companies an advantage. This means companies can make decisions faster and understand what customers want better than companies. Business analytics helps with this by using data to make decisions. This is very important for business because it helps companies stay ahead of competitors.

7. HYPOTHESIS TESTING

Null Hypothesis (H₀): There is no significant impact of business analytics on the quality of management decisions in supermarkets.

Alternative Hypothesis (H₁): There is a significant effect of business analytics on the quality of management decisions in supermarkets.

Respond level	Frequency (n=100)	Percentage
Strongly Agree	65	65%
Agree	25	25%
Naturally / Agree	10	10%
Total	100	100%

Finding:

Most people think that business analytics is really helpful for making decisions in supermarket retail stores. 90% of the people who answered the question think this way. 65% of them really believe it, and 25% think it is true. This means that people generally think business analytics is a thing. Business analytics gets a positive reaction from people.

7.1 Expected Frequencies (E):

$$E = \frac{100}{3} = 33.33$$

7.2 Chi-Square Calculation:

Category	O	E	(O-E)	(O-E) ²	(O-E) ² / E
Strongly	65	33.33	31.67	1003.89	30.12
Agree	25	33.33	-8.33	69.39	2.08
Naturally/Disagree	10	33.33	-23.33	544.29	16.33

7.3 Final Chi-Square Value:

$$\chi^2 = 30.12 + 2.08 + 16.33 = 48.53$$

7.4 Degree of Freedom (df):

$$Df = 3 - 1 = 2$$

7.5 Result: The calculated Chi-square value ($\chi^2 = 48.53$) is greater than the critical value at 5% level of significance with 2 degrees of freedom. Therefore, the null hypothesis (H_0) is rejected, and the alternative hypothesis (H_1) is accepted.

This indicates that the application of business analytics has a significant positive impact on managerial decision-making in supermarket retail stores.

8. RESULTS AND FINDINGS:

The study shows that business analytics helps a lot in making decisions for supermarket retail stores. Most people who took the study know about business analytics. Use it every day. They mostly use analytics, but predictive and prescriptive analytics are becoming more important.

The study found that business analytics makes decision-making more accurate and faster for things like managing inventory, predicting sales, setting prices and understanding customers. Most people agreed that analytics helps get the amount of stock, reduces waste and makes customers happier by understanding what they want.

However, the study also found some problems with using business analytics, like high data costs, people not wanting to change, and not having enough skilled workers. With these problems, the study shows that business analytics helps make operations more efficient, increases profit and gives stores an edge over competitors.

The study tests also showed that business analytics and decision-making are closely linked, which means using data to make decisions is crucial for managing supermarket stores effectively. Business analytics plays a role in this. Business analytics is essential for making decisions.

9. CONCLUSIONS

Business analytics is really important for making decisions in supermarket retail stores. It helps managers make decisions that are based on facts and data rather than just guessing. Business analytics is used for things like managing inventory, predicting sales, setting prices and understanding customers. This makes the store run smoothly and helps the business do better overall.

Most people who were asked about business analytics think it is a thing, and it helps them make better decisions. Business analytics helps people make decisions faster. It makes the decisions more effective. It also makes customers happier, helps stores use their resources wisely, and makes money. This gives stores an edge over their competitors. Business analytics is a part of running a successful retail store, and it helps with business analytics and decision-making.

10. ACKNOWLEDGEMENT

I want to say thank you to everyone who helped me with my research project called "Application of Business Analytics in Improving Managerial Decisions: Evidence from Supermarket Retail Stores."

My project guide was really great. I am very thankful to them. They gave me advice and supported me all the time. They also gave me suggestions that helped me do a job. What they. The way they encouraged me really helped shape this research project about Business Analytics in Improving Managerial Decisions.

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