

# Business Intelligence Using Data Mining Technique and Business Analytics

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**ABSTRACT:** - The objective of this paper is to present a review literature on what are impacts of Data Mining (DM) in Business Intelligence (BI). The paper highlights various features of DM. It involves three steps: explorations, pattern identification and deployment. BI is the hot topic among all industries aiming for relevance. BI emphasizes on detail integration and or organizing of data. DM and BI work together to process and analyse data to lighten workload for the user and organization and hence in understanding discovered materials. It also explains Business Analytics (BA) as a part of BI which is again dependent on BI. There are various sectors in business to which BA has proved to be a powerful tool to obtain effective results. Methods of Business Intelligence include retrieval of information, mining data, analysing statistical data and visualisation of data. Statistical analysis of digital data is very much fast. Large amount of data is accessed in different formats from heterogeneous sources. Collected data is consolidated and analysed that is key of business intelligence. Digital data can be correlated very easily within databases of companies. Management and processing of all kinds of documentations has been automated which has reduced paper work Data mining techniques in real are applicable on only digital data.

**Keywords :** Digitalization of Data, Business Intelligence, Data Mining, Business Analytics

## I. INTRODUCTION

The development of information technology has generated large amounts of data from various databases, data warehouses and other repository information. The research operations on databases give the approach for future use store and process information to make better business results. Data mining techniques give useful information from various database sources

The traditional method of turning data into knowledge relies on manual analysis and interpretation. For these applications this form of

manual probing of data set is slow, expensive, and highly subjective. In fact, as data volumes grow dramatically, this type of manual data analysis becoming completely impractical in many domains. The need to scale up human analysis capabilities to handling the large number of bytes that we can collect is both economic and scientific. Businesses use data to gain competitive advantage, increase efficiency, and provide more valuable services to customers. Data we capture about our environment are the basic evidence we use to build theories and models of the universe we live in. Because computers have enabled humans to gather more data than we can digest, it is only natural to turn to computational techniques to help us unearth meaningful patterns and structures from the massive volumes of data. Hence, Knowledge discovery Techniques is an attempt to address a problem that the digital information era made a fact of life for all of us. Data mining tools allows users to analyze large database to solve business decision making problems. This evolution began when business data was first stored on computers, continued with improvements in data access and more recently generated technologies that allow users to navigate through their data in real time<sup>[4][13]</sup>

- 61 % of managers believe that information overload at their own workplace,
- 80% believe the situation will get worse.
- Over 50% of managers ignore data in current decision-making process because of the information overload,
- 84% of managers store this information for the future use; it is not used for current analysis.
- 60% believe that the cost of gathering information outweighs its value.

In this [4], the research stated that the process which is designed and used for the purpose of exploring data is called as data mining, This process is very much similar to 84 the real life process of mining out nuggets of gold from the Earth. More specifically it is like taking out

nontrivial nuggets from the huge volumes of available data. This paper gives a view about how data mining assists business intelligence to find out patterns and gain knowledge from existing data.

In the research, it was explained that it is because of the intense competition that the companies are compelled to find out innovative ideas in which they can capture and enhance their market shares while reducing their costs too. Implementation of the data analysis techniques can help the companies to find such solutions like finding out some unexpected patterns from the large volumes of the data present in the database or data warehouse. These patterns can provide information which could help in predicting future outcomes<sup>[1]</sup>.

#### A. TECHNIQUES OF DATA MINING

Data mining is a process of mining the hidden patterns from large amount of domain specific data. It is a useful process of knowledge discovery. Various techniques [13] of data mining are classified as follows:<sup>[10]</sup>

- Classification: It is a process of classifying new tuples on the basis of training data into classes. It is a predictive technique [8][9]. Using known values of one variable, unknown value of many other identical variables can be Optimization of Business Intelligence using Data Digitalization and Various Data Mining Techniques 1993 predicted. It is a supervised technique. Various techniques available for classification are decision tree, Support Vector Machine (SVM), Bayesian classification, neural networks, induction rules etc.

- Clustering: It is an unsupervised technique to find outliers in a given set of values. It is helpful in finding noisy data. Various techniques of clustering are K-Means, Density-based clustering, Distribution based and Centroid-based clustering [10][9]. Clustering is a descriptive technique.

- Prediction: Prediction [9][8] is a technique to predict the value of continuous data. For smart analysis in Business Intelligence historical data can be combined with predicted data.

- Association: It is used to study relationships between different variables of a problem [10]. For example, to find the sales opportunities for a business retailer based on historical transaction and purchase.

- Regression: Regression can be simply called as the "predictive power". Assuming a linear or non-linear model of dependency, regression analysis can be used by us to predict the value of given (continuous) features based on the other features in the data. The data item is mapped into a real valued prediction variable. Here are some examples: The revenue of new products are predicted depending upon the complementary products. Based on the amount of food and cigarette consumed by a person and his age the prediction of cancer can be done. "Logistic regression" is such a term, which appears in almost every aspect of this field, and regression techniques are also found to be useful in this science. These techniques are especially used in the case of neural network which can be used to create such complex functions which help in imitating the functionalities of the brain.

All techniques discussed above are helpful in data analysis and decision making. They are also important from business point of view.

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#### B. BUSINESS INTELLIGENCE

Business Intelligence also called BI [6] is process that is derived by technology for data analysis and presents some actionable information. This information help corporate and business managers and executives to make business related decisions. Organizations can run queries using data and view useful information for their business. Reports can be generated in various suitable visualised forms. Figure 1 shows the trends for BI in India.

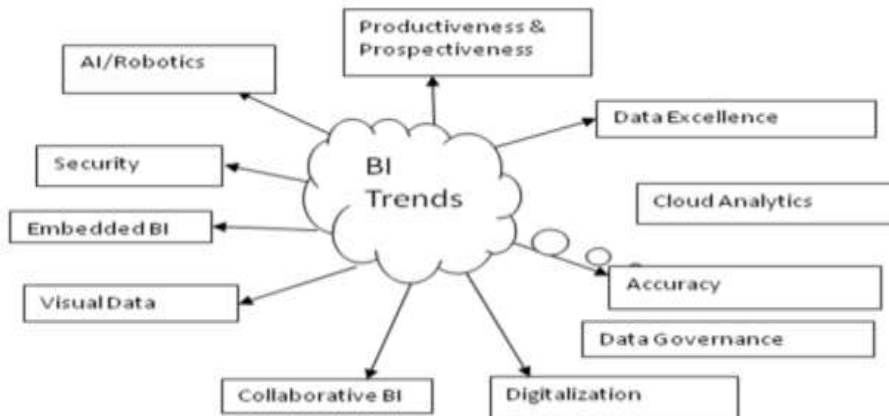


Figure 1:- Business Intelligence Trends

C. BUSINESS INTELLIGENCE USING DATA MINING

➤ Business intelligence includes many relative activity such as data mining, OLAP (online analytical processing), query and data visualization (reporting). Figure 2 shows how

digital innovation improved productivity of data mining. Today miner’s focus is to improve the productivity. A Breakthrough is coming in the potential to achieve the productivity performance of mining due to digital technology.

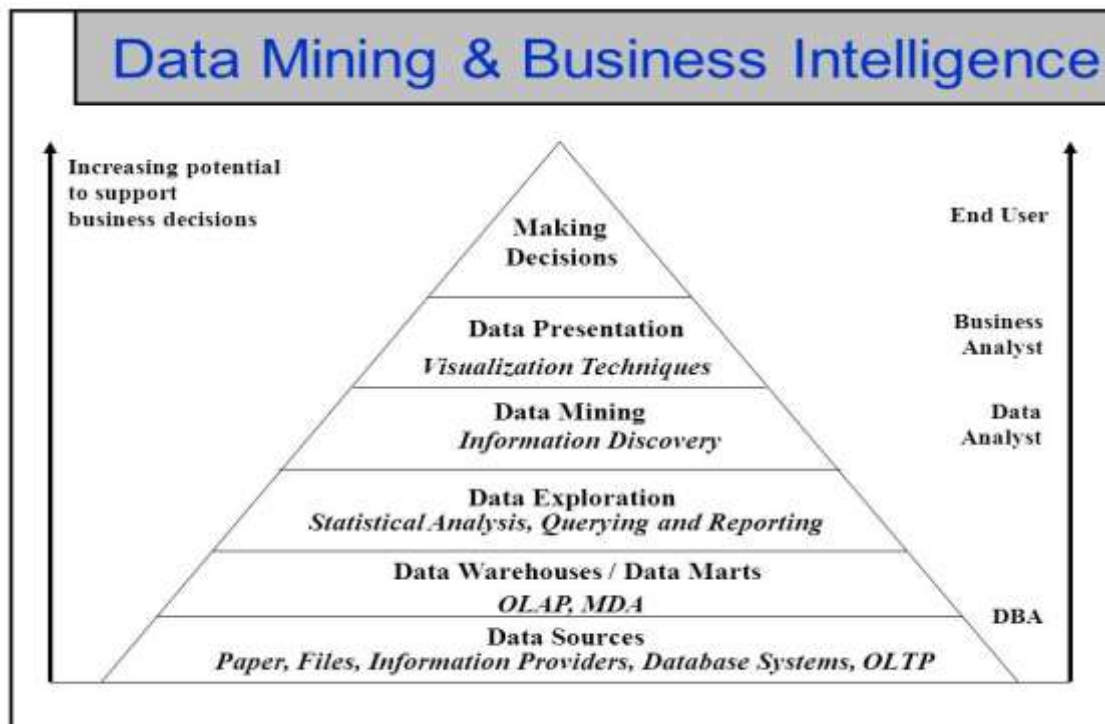


Figure 2 Data mining and business Intelligence<sup>[3]</sup>

➤ Data digitalization provides many innovative technologies for data mining. Artificial Intelligence has increased and made advancement in data mining. These applications provide optimization in BI [4].

- Improve connectivity.
- Easy and comprehensive resource understanding of materials and equipment’s
- Improvement in failure anticipation
- Optimized mechanization via automation
- Improved performance of monitoring in real time

• Improved data computational power.

- Improved time consumption of data analysis
- Improved accessibility
- Maximised human machine interaction

These all are opportunities which have really potential outcomes. Digitalized data of global level industries can be mined for analysis, knowledge discovery and decision making.

#### D. BUSINESS ANALYTICS

- Business analytics is a major part of business intelligence. Data mining and business intelligence directly aid business analytics. Business intelligence is mainly analysing data and collection of knowledge and applying them to various different methods.
- Business analytics is a term used in context with the entire process which involves application of skills, technology and different algorithms of data mining. Business analysis produce valuable information to help managers make better decisions regarding their business and have proper control on their business operations. There are two main faces of business analytics function, the back-end where the main application of data mining takes place and the front-end is a collation of diverse information and executive reporting metrics. If we can effectively execute the business analytics function, it may result in becoming the core competence for an organization containing valuable business intelligence, which can support an organization in taking strategic and efficient actions in business.<sup>[4]</sup>
- Although there are different role definitions, depending upon the organization, there does seem to be an area of common ground where most business analysts work. The responsibilities appear to be:
- To investigate business systems, taking a holistic view of the situation. This may include examining elements of the organisation structures and staff development issues as well as current processes and IT systems.
- To evaluate actions to improve the operation of a business system. Again, this may require an examination of organisational structure and staff development needs, to ensure that they are in line with any proposed process redesign and IT system development.
- To document the business requirements for the IT system support using appropriate documentation standards.<sup>[1]</sup>

#### E. CASE STUDY

Some more business leading sectors use data mining techniques and get results

**1. Insurance Companies:-** Insurance companies are facing problems of mailing costs, increase marketing campaigns, cross selling to existing customers.

**Results:** Effectiveness of its campaigns, optimization and execution, decreased mailing costs and increase conversion rates.

**2. Telecomm Services** Fraudulent activities in services and call intrusion.

**Results** Reduced fraud activities in services and save resources time and money.

**3. Financial Companies** Client attracted to their offers, cross sell standard products to clients.

**Results:** Discover key drivers for purchasing remortgage products, get greater response and worth of mortgage application revenue.

**4. Software sales companies:-** Facing difficulty customer purchasing hardware and software decisions for online sales.

**Results:** Recommendation engine went live pages viewed per month more than 67 percent, profits increased than previous years

#### F. APPLICATION OF DATA MINING BUSINESS

There are number of industries that are using data mining applications. Some of these organizations include retail stores, hospitals, banks, insurance companies, manufacturing combining with data mining such things as statistics, pattern recognition and other important tools used to find patterns and connections that would otherwise difficult to find. This technology used in smart making decisions and business problems and solutions using data mining technology.

##### 1. RETAIL MARKETING

Through the use of store-branded credit cards and point-of-sale systems, retailers can keep detailed records of every shopping transaction. This enables them to better understand their various customer segments.

Some retail applications include:

Performing basket analysis—Also known as affinity analysis, basket analysis reveals which items customers tend to purchase together. This knowledge can improve stocking, store layout strategies, and promotions.

Sales forecasting— examining time-based patterns helps retailers make stocking decisions. If a customer purchases an item today, when are they likely to purchase a complementary item?

Database marketing—Retailers can develop profiles of customers with certain behaviours, for example, those who purchase designer labels clothing or those who attend sales. This information can be used to focus cost-effective promotions.

## 2. BANKING

Banks can utilize knowledge discovery for various applications, including

Card marketing—By identifying customer segments, card issuers and acquirers can improve profitability with more effective acquisition and retention programs, targeted product development, and customized pricing.

Cardholder pricing and profitability—Card issuers can take advantage of data mining technology to price their products so as to maximize profit and minimize loss of customers. Includes risk-based pricing.

Fraud detection—Fraud is enormously costly. By analyzing past transactions that were later determined to be fraudulent, banks can identify patterns.

Predictive life-cycle management—Data mining helps banks predict each customer's lifetime value and to service each segment appropriately (for example, offering special deals and discounts).<sup>[11]</sup>

3. **Telecommunications:** Telecommunication companies around the world face escalating competition which is forcing them to aggressively market special pricing programs aimed at retaining existing customers and attracting new ones. Knowledge discovery in telecommunications include the following

Call detail record analysis—Telecommunication companies accumulate detailed call records. By identifying customer segments with similar use patterns, the companies can develop attractive pricing and feature promotions.

## II. CONCLUSION

This paper discusses the till date effect of data mining technique in business intelligence. Two powerful tools determine the growth in business sector. The primary is data mining which is used to deal with large amount of data to find useful result, whereas the secondary is business intelligence which helps in making business related decisions. The paper shows business analytics with a wide application domain almost in every industry where the data is generated that's why data mining is considered one of

the most important outwork in databases and information systems and business intelligence as an interface of the organization. Also Above discussion evident that digitalization of data has really improved tasks of data mining and business intelligence. But now data mining is being optimized using digitalization that is also improving the business analytics [5] and business benefits. There are very minor differences in BI and BA. Business analytics is an umbrella like structure, business intelligence comes as a part under it. Both Business Intelligence and Business Analytics can't be achieved without Knowledge Discovery<sup>[6]</sup>

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