Business Analytics & It's Impact on Business & Industry

Mr. Kuldeep D. Ghorapade
Assistant Professor, Department of Fashion Design, CNCVCW, CSIBER, Kolhapur
Affiliated to Shivaji University, Kolhapur, Maharashtra, India

INTRODUCTION

Business Analytics became the most effective thing for business in the last decade. Different multinational corporate companies like Google, IBM, Face book, Yahoo and eBay are the frontrunners in big data and business analytics in their respective business domains [1].Business Analytics uses big data which is higher and richer data that shows more details about behaviors, activities, and events that happened all around. Business Analytics access this different variety of the data from huge resources with less response time.[2].Companies that collect data might be used to produce different income generation possibilities. So they need to find out what sort of data they need and how it will be collected, sorted and analyzed.

The sources of the data may be internal or external. The internal data constitutes different business reports, minutes of meetings, proceedings, etc. The external sources are customer feedback, responses, reaction of competitors etc. One of the rich source of data is social media now a days. Millions of users use social media websites daily. Social media are computer-facilitated tools that enable the faster exchange of information in virtual networks [3].The most widely used social media websites are face book, whatsapp, twitter, instagram and you tube. Millions of videos, data, files are daily uploaded and downloaded.

There is no single definition of business Analytics in literature. In fact each author stresses different aspects. BA or BI is defined as the method of converting data into information and subsequently to knowledge [4]. The types of knowledge obtained are about the customer requirements and decisions, organizational performance in the industry and the global trends. Another definition of BI, particularly the BA systems is, BA systems put together the gathering and storage of data and knowledge management with analytical tools to present a ready-for action and complicated information to the planners and decision makers [5].

This is to assist them to obtain the right information at the right time, location and form. The data is mined, extracted, and put to use by means of framing different models. These models are framed using different algorithms, operational research techniques and behavioral sciences. This information predicts a lot of things and provides guidelines in the formulation of the strategies in different business domains. So it is a combination of tools aiming to enhance the decision making in an organization by transforming data into beneficial information and knowledge which is extracted by utilizing data mining tools and analytical techniques. [6]

KEYWORD: *Business Analytics, Business Intelligence, Big Data, Predictive Analytics*

Scope of Business Analytics

Business analytics can be used as a solution provider in all walks of life and not only in business. It helps in taking strategic decisions for all business domains. Business Analytics in general are used to detect the relationships and patterns in data in order to predict the future by analyzing the past and taking better preventive decisions. Thus, the business analytics aim of use differ from one industry to another, for instance a marketer can use the business analytics to predict the customers' response to an advertising campaign,

or a product seller can use it to predict the movement of product prices, or it can be used to detect trends such as in banks if a manager wish to recognize the most profitable customers, or alert a credit card customer to a probable fraudulent charge. Thus the business analytics help in answering many questions such as what will happen if the demands of products decrease. Or if suppliers' prices increase, what is the risk to lose money in a new business?

Structure of Business Analytics

The organization has to understand the business need thoroughly so that the state of the art solution can be found out. BA is not a common solution to a business problem but varies according to the individual business need. Data mining is part of Business intelligence functionalities as defined by Gartner who described BI as a software platform delivering 14 capabilities divided into three groups of functionalities including integration, information delivery and analysis functionality which contain the data mining and predictive modeling.

While data mining is considered as the automated process to detect the un known patterns in the structured data of the organization (7) (8). The other scientists also describe data mining as the process to collect, filter, prepare, analyze, and store data that will be used to create useful knowledge and supporting the business analytics and predictive modeling.

The generalized structure of data analytics is divided into different elements

1. **Data Source/Data Layer**
   The internal source of data is generated from ERP, CRM, or SCM systems or other soft ware's, spreadsheets, HTML & XML documents, other files and spreadsheets. The external data sources are statistical public reports. The other inputs of data are discussions, videos, graphics and other user generated content.(9)

2. **ETL Process/Integration layer**
   Extract, Transform, Load This layer extracts the data from different original data sources, clear the inconsistent data, keep the data in required form and structure, integrate all the data together and upload it in defined data warehouse or data mart. The data processing or transformation is done by using programming language, scripting or SQL

language. Here the transformed data is having different coding, quality than the source data. Non-relevant (repeat & missing) data are excluded. The data warehouses technology is subject-oriented, integrated, time-variant and non-volatile collection of data which supports the management's decision-making process [10].

3. **Data Analysis/Application layer**
   It consists of tools which are used for analysis of integrated data. This analys is identify trends, patterns and exceptions also. OLAP (Online Analytical Processing databases) are used to process the data and provides different point of view from all angles of the same data. Sales data can be collected within one particular territory, within a limited time frame and of a particular product or product line. The most significant component of the application layer is data mining a computational process involving the discovery of patterns in large data sets [11] .It involves using methods that are at the intersection of artificial intelligence, machine learning, statistics, and database systems to present useful information to users [12]. The outcomes of the data mining are used for prediction and description (describes reality).The already known variables are used to predict the future outcome. The data mining uses various techniques and some of these are listed by Hen et al. (2011) in their publication Data Mining: Concepts & Techniques and analyzed in Stodder's research text Customer Analytics in the age of social media(2012)are Cluster Analysis, Anomaly Detection, Association Rule mining, Classification methods, Regression analysis & natural language processing.

4. **The presentation or display layer**
   It presents the data in user-friendly manner. The outcome in different performance ere ports which is used to monitor the performance of business. The reports can be customized as per the need of the final user. Results are in the form of spreadsheet or dashboards. The strategic decisions are derived from these dashboards. The dashboards measures the business performance effectively which is a multi-layered applications built on business intelligence and data integration infrastructure [13]
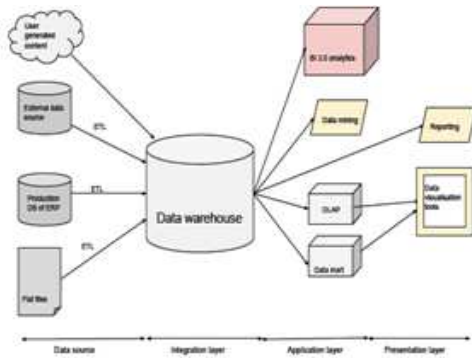
Figure 1. Business intelligence architecture (source: Hen et al. (2011))

Applications of BA in marketing

Marketing department of an organization has the responsibility of identifying, satisfying and retaining the customers using their product or services. The data driven digital marketing belongs to the emerging trends in marketing along with cross channel and content marketing.BA proves to be very effective in these marketing activities.BA can be used effectively in below area of marketing.

1. **Customer Segmentation and Profiling**
   The marketing decisions are depend upon the results derived from the application of customer segmentation and profiling techniques. The model used here is RFM model.(figure). This model divides the customers into groups according to the following three metrics values: recency meaning how recently the customer made a purchase; frequency, standing for how often they purchase; and monetary value, or how much they spend. The other segmental information like demographical segmentation (Age, sex, marital status, education) and behavioral segmentation (How often they purchase a product) can be also determined by BA. It also studies the migration of customers from one segment to the other and can be used for effective decision making regarding a product.

2. **Supportive analysis for cross selling & up selling**
   Here the previous purchases of specific customer are taken into consideration while selling the products. The market basket analysis identifies interdependencies between the products and clustering them as a model can be used in BA. The affinity grouping model identifies which product attract the sale of other products. These factors increase the sale of the product remarkably. Cross selling and up selling are considered to be the most attractive marketing objectives organizations hope to be achieve when

implementing Business Intelligence into decision-making processes [14]

3. **Survival time Analysis**
   This technique shows how loyal the customer is to the brand and what is the probability of it that he will switch to another brand. The organization receives this be havioral information to prolong a customer's survival time.

4. **Forecast the development of strategic business process**
   The use of historical, present and anticipated data can predict the future of the company. The potential behavior of the customer can be analyzed which predict future sales, profit and overall strategies of the business.
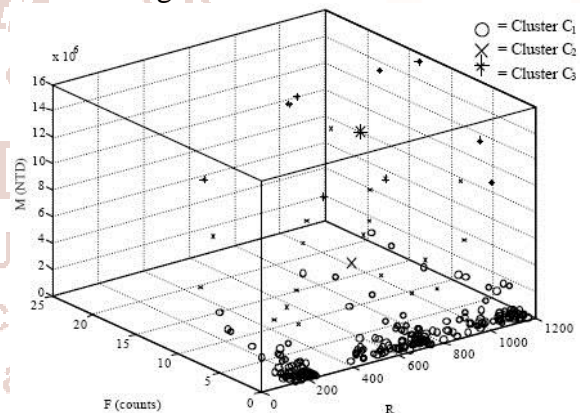

Figure 2.RFM model (Source: Hsu (2012))

Application of BA in social media

Many authors believe that social media analytics presents a unique opportunity for businesses to treat the market as a dialog between businesses and customers; instead of the traditional business-to-customer marketing approaches [15]

Different analytics techniques are used in social media. These are

1. **Natural language programming (NLP)**
   It is the most common technique and may not be used for processing of real time data. [16]

2. **Opinion Mining**
   The Opinion Mining Technique is defined as the effort of finding valuable information contained in user-generated data [17]

3. **Sentiment Analysis**
   Sentiment analysis software discovers the business value in opinions and attitudes expressed on social media, the news, and in enterprise

feedback. [18]. It is again divided into two techniques 1) Lexicon based method – It depend upon the vocabulary or words of the person. 2) Machine Learning method – Machine learning uses linguistic features.[19]. Overall, these techniques offer many more linguistic challenges, especially when analyzing Twitter and other micro blogs, which do not contain much information, assume implicit knowledge, involve lots of language variations, emoticons, letter-casing, domain-specific slang, hash tags and irony that cannot be processed by common BI [19]

Applications of BA in manufacturing

In majority of manufacturing organization BA services are integrated with existing systems in manufacturing like ERP, MRP, SCM etc. The dashboard is also an important tool used by BA. The manufacturing industry is benefitted by BA applications in which they can see the real time progress of a process which is visually represented in effective manner. Manufacturing organizations experienced higher productivity, reducing manufacturing cost and improved customer satisfaction. [20]

Applications of BA in Society in general

1. **Education Sector**
   BA (Predictive Analysis) models can be used by educational institutes to increase the retention of the student and enhancing their results and achievements.BA also predicts the students' performance in a specific course during the semester and mark the ones that will fail and have low performance in exams.[21]

2. **Agriculture Sector**
   BA models are used to develop a multi criterion support system based on predictive analysis to help the stakeholders having better purchases and the ability to take better sales decisions and knowing the requirements of the green coffee supply chain market in India. [22]

3. **Finance Sector**
   The researchers created a BA model to optimize prediction of products and stock market indications. Thus this model allows to set the stock indications future values and trading of financial services which will allow investors to increase significantly their returns on investment and reduce the risk [23]

4. **Defense Sector**
   In Pakistan the focus of the BA model was to minimize the loss of human life from the drone attack by predicting the future attack frequency and the prospective losses and injuries and its adoption by the government. [24]

Challenges in front of BA

1. **Infrastructure**
   Big infrastructure is needed to use different BA models in industry. Presently large multinationals like face book, Google, IBM, eBay, amazon are using it. Large and midlevel companies should consider the use of online platforms for this purpose. Most mid level companies in India are unaware of online platforms of BA.

2. **Agility**
   Change is permanent in every business. The BA model must be agile/ flexible to accommodate the business requirements of the future.

3. **Trained Work force**
   Specialized and technically qualified/trained people are needed to handle all BA activities.

4. **Privacy Violation**
   The risk in utilizing of big data analytics is obviously the privacy aspects, not all the required information can be easily accessed, so that companies must consider the rules of taking information from other websites or from individual's private accounts.

5. **Integration of current ERP systems with BA models**
   Different online BA models like HADOOP, OLAP are not able to integrate with the current ERP systems of the organization. They cannot extract the exact information used for decision making.

Significance of BA in digital economy of India

NASSCOM predicts the Indian Analytics service industry is growing at a CAGR of 25% and poised to touch USD 2.3 billion by 2018.The industry in India is expected to almost double by 2020. The Indian analytics service market stands at 35%-50% of the global market. [25]

Digital economy in India is progressing fast due to the new internet savvy generation and also government is

promoting it by various measures. The advantages are speed, less cost and convenience. BA will become the important facet of this economy. As more and more transactions becomes digital more and more data will generate, This data will be the important aspects to formulate different BA models. So BA becomes more and more significant and important as the digital economy progresses. The BA scientist dig dipper into this data to make decision making easier for the businesses. Indian corporate world become more streamlined and can take informed business decisions.

Conclusion

Business Analytics is an emerging field in India. Use of BA models will get a boost as the digital economy and use of internet become rampant by every citizen in india.BA provides important information which can be well utilized in business for decision making. BA improves the process efficiency, delivery time, reduces cost, increases customer satisfaction levels and add value to the business. Indian corporates are also formulating the strategies based on business analytics in their respective business domains. It will certainly change the way of doing business.

References

1. Davenport, H., and Jill, D. "Big data in big companies." International Institute for Analytics (2013).

2. http://www.sas.com/en_us/whitepapers/iia-prescriptive-analytics-107405.html

3. Buettner, R. (2016), "Getting a Job via Career-oriented Social Networking Sites: The Weakness of Ties", 49th Hawaii International Conference on System Sciences (HICSS-49), January 5-8, 2016, Kauai, Hawaii.

4. M. Golfarelli, S. Rizzi, and I. Cella, "Beyond Data Warehousing: What's Next In Business Intelligence?" in DOLAP '04, Washington DC, 2004.

5. S. Negash, and P. Gray, (2003). "Business Intelligence", in Americas Conference on Information Systems (AMCIS), 2003.

6. FATIMETOU ZAHRA MOHAMED MAHMOUD, (2017), 'The application of Predictive Analytics: Benefits, Challenges and how it can be improved, International Journal of Scientific and Research Publications, Volume 7, Issue 5, May 2017 , ISSN 2250-3153

7. Martin Aruldoss, Miranda Lakshmi Travis, V. Prasanna Venkatesan." A survey on recent research in business intelligence". 19 January 2014. Vol. 27 Iss 6 pp. 831 - 866.Journal of Enterprise Information Management.

8. Osama T. Ali, Ali Bou Nassif and Luiz Fernando Capretz. "Business Intelligence Solutions in Healthcare A Case Study: Transforming OLTP system to BI Solution". 2013. IEEE

9. NEGASH, S. Business Intelligence. Communication of the Association for Information systems,, 2004, Vol. 13, p. 177-195

10. INMON, W. H. Building the data warehouse, New York, USA: John Wiley &Sons. 3 ed. 2002. ISBN 0471081302

11. WITTEN, I. H. and FRANK, E. Data Mining: Practical Machine Learning tools and techniques 3rd ed. The Morgan Kaufmann Series in Data Management Systems. Amsterdam: Elsevier/Morgan Kaufmann, 2005. ISBN 0123748569

12. OLSZAK, C. M., and ZIEMBA, E. Business Intelligence Systems in the Holistic Infrastructure Development Supporting Decision-Making in Organizations. Poland: 2006. Interdisciplinary Journal of Information, Knowledge, and Management. Vol. 1. ISSN 1555-1229

13. ECKERSON, W.W. Performance dashboards: Measuring, monitoring & managing your business. . 2nd Ed. New Jersey: John Wiley & Sons, Inc., 2010. ISBN 978-0-470-58983-0

14. STODDER, D. Customer Analytics in the Age of Social Media. [online] 2012, Renton, WA: The Data Warehousing Institute (TDWI) [Cit. 2015-11-04] URL <https://www.tableau.com/sites/default/files/white papers/tdwi bestpracticesreport_customeranalytics_july2012.pdf>

15. LUSCH, R. F., LIU, Y., and CHEN, Y. The Phase Transition of Markets and Organizations: The New Intelligence and Entrepreneurial Frontier. 2010. IEEE Intelligent Systems. Vol. 25, Iss. 1, p. 71-75. ISSN 5432262

16. MUNOZ-GARCIA, O. and NAVARRO, C. Comparing user generated content published in different social media sources, 2012. [online] In: Proceedings of @NLP can u tag # user generated

content? vialrecconf .org, [cit. 2016-05-04] URL < http://www.lrec-conf.org/proceedings/lrec2012/ workshops/21.LREC2012%20NLP4UGC%20Pro ceedings.pdf>

17. KASPER, H., STAVRAKANTONAKIS, I., GAGIU, A.E., TOMA, I. and THALHAMMER, A. An approach for evaluation of social media monitoring tools. Common Value Management, 2012, Vol. 52

18. POWER, D. and PHILLIPS-WREN, G. Impact of Social Media and Web 2.0 on Decision-Making. In: Journal of Decision Systems, 2011, Vol. 20, Iss. 3, p. 249–261. ISSN 2116-7052

19. MAYNARD, D., BONTCHEVA, K. Twit IE: An Open-Source Information Extraction Pipeline for Micro blog Text. 2013. in Proceedings of the International Conference on Recent Advances in Natural Language Processing. Association for Computational Linguistics [online] Available at <http://cite-seerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.3 67.7383>

20. Ernie Mazuin Mohd Yusof, MohdShahizan Othman, Yuhanis Omar and Ahmad Rizal Mohd Yusof, The Study on the Application of Business Intelligence in Manufacturing: A Review, IJCSI International Journal of Computer Science Issues, Vol. 10, Issue 1, No 3, January 2013ISSN (Print): 1694-0784 | ISSN (Online): 1694-0814, www.IJCSI.org

21. Foteini Grivokostopoulou, Isidoros Perikos, Ioannis Hatzily geroudis. "Utilizing Semantic Web Technologies and Data Mining Techniques to Analyze Students Learning and Predict Final Performance". December 2014. International Conference of Teaching, Assessment and Learning.

22. N. Ayyanathan, A. Kannammal. "Combined forecasting and cognitive Decision Support System for Indian green coffee supply chain predictive analytics". 2015. IEEE.

23. Chandra J, Dr Nachamai. M, Dr Anitha S Pillai. " An Integrated Approach to Predictive Analytics for Stock Indexes and Commodity Trading Using Computational Intelligence". Vol. 5, No. 8, 142-148, 2015.World of Computer Science and Information Technology Journal (WCSIT).

24. UzmaAfzal, Tariq Mahmood. "Using Predictive Analytics to Forecast Drone Attacks in Pakistan". 2013. IEEE

25. https://www.thehindubusinessline.com/info-tech/india-is-emerging-as-a-growing-hub-for-analytics/article9968795.ece