AJSTEME

Academic Journal on Science, Technology, Engineering & Mathematics Education (AJSTEME)

Volume 2, Issue 2, June 2022

Page: 1-7

Opportunities and Challenges of Application of big data in Bangladesh context

***Marzan Rahman*[1]**

[1]*Lecturer, Department of Marketing, Hamdard University Bangladesh*

Abstract: *This paper initiates a research effort to begin examining big data issues, opportunities and challenges. "Big Data" originally meant the volume of data that could not be processed (efficiently) by traditional database methods and tools. Big Data mining is the capability of extracting useful information from these large datasets or streams of data, that due to its volume, variability, and velocity, it was not possible before to do it. Big Data is extremely valuable to enhance the productivity in businesses and evolutionary breakthroughs in scientific disciplines, which give us a lot of opportunities to make great progresses in many fields. This study explores the big data issues and also throws light on big data applications, it's opportunities and challenges. This study also analyze how the application of big data help to provide the customized solution to customers and grab the market share .Explorative research design and secondary data were used for this study. The available literature shows that customized marketing programs, better decision making, innovate new products are the most significant challenges. On the other hand, privacy, skill requirement, analytical and technical challenges are the most important obstacle to the application of big data in Bangladesh. But still, company and every sector should manage the challenges and implement the big data application for their goal achievement.*

Keywords: *Big Data, Big data analytics, Data-mining.*

1 Introduction:

The Internet has made new sources of vast amount of data available to business executives. Big data is comprised of datasets too large to be handled by traditional database systems. To remain competitive, business executives need to adopt the new technologies and techniques emerging due to big data. Big data includes structured data, semi-structured and unstructured data. Structured data are those data formatted for use in a database management system. Semi-structured and unstructured data include all types of unformatted data including multimedia and social media content. The advent of the age of big data poses opportunities and challenges for businesses. Big data is not only handles the data being stored in traditional warehouses but also the data not suitable to be stored in those warehouses. Thus there comes the point of access to mountains of data and better business strategies and decisions as analysis of more data is always better.

In many countries around the world, governments have taken the steps to control big data's application. Unfortunately the issue of big data in Bangladesh has very few influences at all. But it may be expected that the effective application of big data will start and gain popularity in Bangladesh. Through this study big data's opportunities and challenges have been identified so that this information give insights to the Bangladeshi companies to start its application and gain competitive advantage. The remainder of the paper is designed in seven sections. Section 2 contains literature review. Section 3 states objectives of the study followed by methodology in section 4. Authors put findings in section 5. Finally, author draws a conclusion and makes some recommendations in section 6 and 7.

2 Literature Review

Advances in data storage and mining technologies make it possible to preserve increasing amounts of data generated directly or indirectly by users and analyze it to yield valuable new insights. For example, companies can study consumer purchasing trends to better target marketing. In addition, near-real-time data from mobile phones could provide detailed characteristics about shoppers that help reveal their complex decision-making processes as they walk through malls. Big data can expose people's hidden behavioral patterns and even shed light on their intentions.

"Big data" derives its name from the fact that the datasets are large enough that typical database systems are unable to capture, save, and analyze these datasets (Manyika et al., 2011). The actual size of big data varies by business sector, software tools available in the sector, and average dataset sizes within the sector (Manyika et al., 2011). Best estimates of size range from a few dozen terabytes to many petabytes (Manyiak et al., 2011). Hence, big data analytics is where advanced analytic techniques are applied on big data sets. Analytics based on large data samples reveals and leverages business change. However, the larger the set of data, the more difficult it becomes to manage (Russom, 2011). Currently, companies are adopting a dual strategy for implementing big data analytics capability. The first is to build a digital capability to make better and faster decisions, and to enhance existing products. The second strategy is to use data and analytics to create insights and custom reports that can be sold to customers and become a new profit center.

Data storage techniques differ depending on whether the data are unstructured or structured. Unstructured and semi-structured data can be analyzed using software like Hadoop. Users analyzing structured big data can use software such as NoSQL, MongoDB, and TerraStore. Due to the volume of data stored, structured data can also be considered big data depending upon how it is stored (scale-out NAS or object-based storage).

The importance of big data to business executives is derived from the data collected. Previously, executives relied solely on structured data collected and stored in a traditional database. Data collected from social media and the Internet of Things provides unstructured data that is constantly updated (Chui, Löffler, & Roberts, 2010). Analysis of these data will provide new information for executives that will enable them to maintain a competitive stance in their business environment. Manyika et al. (2011) propose five major contributions big data can make to businesses: 1) transparency creation, 2) performance improvement, 3) population segmentation, 4) decision making support, and 5) innovative business models, products, and services.

According to Manyika et al.'s research, big data can enable companies to create new products and services, enhance existing ones, as well as invent entirely new business models. Such benefits can be gained by applying big data analytics in different areas, such as customer intelligence, supply chain intelligence, performance, quality and risk management and fraud detection. Martin (2012) investigates the difference in Big data applications and how they are different from the traditional methods of analytics existing from a long time. Matthew Smith, Christian Szongott, Benjamin Henne, Gabriele (2012) have done analysis on Flickr, Locr, Facebook and Google+ social media sites. Based on this analysis they have discussed the privacy implications and also geo-tagged social media; an emerging trend in social media sites. Big data applications face many challenges. While the government seems to assume that big data users will be more successful, more productive, and have differential impacts across many industries, their underlying concern seems to be a lack of tools and a lack of trained personnel to properly work with big data. Others suggest that the analysis of generic sequences, social media interactions, health records, phone logs, and government records, will not

create better tools and services, but may create a new set of privacy incursions and invasive and unwanted marketing. Boyd (2011) these conflicting concerns drive competing visions of how to deal with big data.
An example from the medical field illustrates how and why big data and new analytics may be truly beneficial. Fox (2011) describes how current data in a patient's medical record and current health situation is used to plan and target patient participation in wellness and disease management programs. Fox asserts that doctors (and insurance companies!) must *understand* the patient rather than the disease(s). To do so, they must collect and analyze data - "crucial social and behavioral data that impacts a patient's choice to participate, level of engagement, and appropriateness from public data associating behavior and health data beyond that solely related to a patient's medical condition". Thus, programs may determine how to better target, retain, and treat people in their programs by leveraging predictive models that could assist doctors and case managers who seek to positively impact the behavior of patients with chronic health disease.

3 Objectives of the study:

The main objective of the study is to assess the opportunities and challenges of big data applications. The specific objectives are to-

- Identify the issues of big data.
- Find out the opportunities and challenges of big data application.
- Examine the impact of big data application in Bangladesh.

4 Methodology

The concept "Big data, its application and big data analytics" is new in the business arena. So, researcher has adopted the exploratory research design in the study. This study has been prepared by using secondary data. In addition, this paper is based on the systematic review of literature on big data applications, it's opportunities and challenges. Literature for this study was predominantly sourced from internet searches. However, based on judgmental approach relevant articles have been selected.

5 Findings

5.1 Application of big data

	Business arena/Ecommerce & Market intelligence	E-Government & Politics	Science & technology	Healthcare & Wellbeing	Security and Public safety
Applications	Social media monitoring &	Government services Public services	Innovation, Hypothesis testing	Healthcare decision support,	Criminal Analysis, Cyber security

	analysis, social & virtual game	Political campaign & E-polling		Patient community analysis	
Impacts	Customized service, Customized offerings, narrowly targeting customers, Innovative products, Effective decision making	Improving equality, Empowering citizen, Transforming governments	Scientific impacts, Technological advancement	Improved healthcare quality, patient empowerment	Improved public safety & security

Source: Analysis of literature review

5.2 5.2 Opportunities of big data application (Business, science & other fields)

Creating transparency: Big data create transparency by making data openly available for business and functional analysis (quality, lower costs, reduce time to market, etc.)

Possibility of segmenting narrowly: from online or social media vast amount of data can be collected and customer segment can be defined narrowly.

Effective marketing programs: Through big data analysis appropriate target customers can be selected and marketing programs can be designed.
Innovation: Vast amount of data generated through the online & offline can help to innovate new products based on customer responses. In addition, it also helps to find out innovative way of delivering service.

Valuable insights: Advances in data storage and mining technologies make it possible to preserve increasing amounts of data generated directly or indirectly by users and analyze it to yield valuable new insights. Big data can expose people's hidden behavioral patterns and even shed light on their intentions For example, companies can study consumer purchasing trends to better target marketing. In addition, near-real-time data from mobile phones could provide detailed characteristics about shoppers that help reveal their complex decision-making processes as they walk through malls.

Support decision making: This information is useful to government agencies as well as private companies to support decision making in areas ranging from law enforcement to social services to homeland security. It's particularly of interest to applied areas of situational awareness and the anticipatory approaches required for near-real-time discovery.

Quality enhancement of healthcare sector: In the scientific domain, secondary uses of patient data could lead to the discovery of cures for a wide range of devastating diseases and the prevention of others.

Solving scientific problems: Effective implication of big data can help to solve scientific problems in areas ranging from climatology to geophysics to nanotechnology.

5.3 5.3 Challenges of big data applications

Privacy and Security: Privacy and Security issue with Big data is sensitive and includes conceptual, technical as well as legal significance. The personal information of a person when combined with external large data sets leads to the inference of new facts about that person and it's possible that these kinds of facts about the person are secretive and the person might not want the Data Owner to know or any person to know about them.

Data Access and Sharing of Information: Big data management and governance process is complex adding the necessity to make Data open and make it available to government agencies in standardized manner with standardized formats thus leading to better decision making, business intelligence and productivity improvements. In addition sharing data about their clients and operations threatens the culture of secrecy and competitiveness.

Storage and Processing Issues: Big data processing needs to outsource the data to cloud. Since big data insights require getting all the data collected and then linking it in a way to extract important information. Terabytes of data will take large amount of time to get uploaded in cloud and moreover this data is changing so rapidly which will make this data hard to be uploaded in real time .

Time Consuming and Expensive: Some devices can quickly generate a large amount of data which can be expensive to store and time-consuming to process

Skill Requirement
The most important problem of big data application in Bangladesh is adequate number of expert needed. Since Big data is an emerging technology so it needs to attract organizations and youth with diverse new skill sets. These skills should extend to research, analytical, interpretive and creative ones. Moreover, the Universities need to introduce a curriculum on Big data to produce skilled employees in this expertise.

Analytical challenges
This is the main challenge of big data application. The type of analysis to be done on this huge amount of data which can be unstructured, semi structured or structured requires a large number of advance skills. Companies often use process intelligence, mining, or analytics, applying a variety of statistical and artificial intelligence techniques to measure and analyze process-related data.

Ethical Challenges
Companies are using big data to learn more about their employees, increase productivity, and introduce revolutionary business processes. For this, company need to track employees' every move and continuously measuring their performance against industry benchmarks. Such monitoring might be in the best interest of a company but is not always in the best interest of the people who make up that business.

Technical Challenges

One of the technical challenges is fault tolerance. Reducing the probability of failure to an "acceptable" level require high cost. Another type of challenge is heterogeneous data. Big data deals with unstructured, structured and semi-structured data. So, converting unstructured data (collected from social media) in to structured form is difficult.

6 Conclusion

Big data is an emerging concept. At present, big data's application are not exercised in Bangladesh. In this study, big data's opportunities, challenges and applications are examined. Opportunities of big data application includes enhanced data sharing through transparency, improved performance though analysis, augmented market segmentation, increased decision support through advanced analytics, customized marketing programs, customized offerings and greater ability to innovate products, services and business models. On the other hand, privacy, skill requirement, analytical and technical challenges are the most important challenges to the application of big data in Bangladesh. Inspite of this, company and every sector should manage the challenges and implement the big data application for their success.

7. Recommendations

This study's concept can help the government, companies as well as other fields' representatives to consider the application of big data. In this regards, they should train the personnel so that analytical and skill requirement challenges can be resolved. New challenge should be to maximize the benefits of big data while minimizing its harms. However, changes to hardware, software, and data processing techniques are necessary for the implementation of big data.

7 References:

Boyd, D. and K. Craford. 2011. "Six Provocations for Big Data", Oxford Internet Institute's "A Decade in Internet Time: Symposium on the Dynamics of the Internet and Society.

Chen, H., Chiang, R. H., & Storey, V. C. (2012). Business intelligence and analytics: From big data to big impact. *MIS quarterly*, *36*(4).

Fox, B. 2011. "Leveraging Big Data for Big Impact", Health Management Technology, http://www.healthmgttech.com/

GalbRaith, J. R. (2014). Organizational design challenges resulting from big data

Kates A, Galbraith JR. 2010. *Designing Your Organization: Using the Star Model to Solve 5 Critical Design Challenges*. Jossey-Bass, San Francisco, CA.

Kaisler, S., Armour, F., Espinosa, J. A., & Money, W. (2013, January). Big data: Issues and challenges moving forward. In *System Sciences (HICSS), 2013 46th Hawaii International Conference on* (pp. 995-1004). IEEE.

Katal, A., Wazid, M., & Goudar, R. H. (2013, August). Big data: issues, challenges, tools and good practices. In *Contemporary Computing (IC3), 2013 Sixth International Conference on* (pp. 404-409). IEEE.

Manyika, J., Chui,. M., Brown, B., Bughin, J., Dobbs, R., Roxburgh, C., & Byers, A. H. (2011, June). *Big data: The next frontier for innovation, competition, and productivity*. McKinsey Global Institute. Retrieved from http://www.mckinsey.com/Insights/fromhttp://www.mckinsey.com/Insights/MGI/Research/Technology_and_Innovation/Big_data_The_next_frontier_for_ innovation

Manyika, J., Chui, M., Brown, B., Bughin, J., Dobbs, R., Roxburgh, C., Byers, A.H.: Big Data: The Next Frontier for Innovation, Competition, and Productivity. In: McKinsey Global Institute Reports, pp. 1–156 (2011)

Martin Courtney, "The Larging-up of Big Data", *IEEE, Engineering & Technology*, September 2012.

Matthew Smith, Christian Szongott, Benjamin Henne, Gabriele von Voigt,"Big Data Privacy Issues in Public Social Media", *IEEE, 6th International Conference on Digital Ecosystems Technologies (DEST)*, 18-20 June 2012.

Michael, K., & Miller, K. W. (2013). Big data: New opportunities and new challenges [guest editors' introduction]. *Computer*, *46*(6), 22-24.

Oracle. (2011, September). Oracle NoSQL Database. Redwood Shores, CA: Oracle Corporation. Retrieved from http://www.oracle.com/webapps/dialogue/ns /dlgwelcome.jsp?p_ext=Y&p_dlg_id=11739928&src=7328025&Act=24&sckw=WWMK11054205MPP001.GCM.8318.1020

Purcell, B. (2013). The emergence of" big data" technology and analytics. *Journal of technology research*, *4*, 1.

Russom, P.: Big Data Analytics. In: TDWI Best Practices Report, pp. 1–40 (2011)

m