Data Science Technology Review

Big Data in Government and Public Sector

Assignment No. 1

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CPSC 531-01 (13548)

Spring, 2019

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February 26, 2019

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Abstract

Big Data as technology is trending in the market today. Technological advancements in several fields like storage, processing, data acquisition, and manipulation, etc. have resulted in the flow of huge streaming data flooding from different sources. And the hard task is processing such data. However, having a big data implementation plan is very crucial and necessary. Rapidly moving technology and its necessity to cope with big changes create a real challenge for the government sector to make an effective plan to process, store and analyze the huge data effectively for the well being of the society and public. And the evolution of sectors like social media, society e-participation tools and other tools which generate big data have been crucial to be part of these challenges meanwhile adopting it in public sector and in the lifestyle of citizens for these trendiness and effective interaction with technology. Most importantly for citizens to improve their Electronic-participation process, government innovativeness, and satisfaction of citizens, the government needs to improve supporting participation. And when the Government becomes Electronic by utilizing the big data technology, it will turn out to be more than just Big and not necessarily just confined to limited data, and it has potential in transforming the traditional government to modern and smart government. However, systematic research in the field, suitability of the situations and application of big data for the modern and smart governance lacks. Apart from the above ideas in this paper, we will look into a few big data implementation issues, skepticism about how the industry would evolve, implementation of the technology for smart governance, review of issues when they are applied to e-government and their proposed solutions which are difficult while the big data is evolving exponentially. Last but not least we will look at the Big Data technology case study applied within the public sector in Jordan-NCSCM and a glimpse of application of Big data where rural Health care can improve people health in India.

Keywords: *Big Data, Government and Public Sector, E-government, public administration, smart government, Big Data Analytics, NCSCM (National Center for Security and Crises Management), Rural health care, Swastha Bharat*.

1. Introduction

In the present-day scenario "Artificial Intelligence, Machine Learning, Deep Learning, Big Data, Internet of Things" are the buzzing technologies in the market and of all these Big data remains the core and foundation for all the above, since all the above depends on Big Data. Hence, studying Big Data is paramount (E. Dogdu, M. Ozbayoglu, A. Yazici, and Z. Karakaya, 2018). In the last few years, data has been growing exponentially. International Data Corporation (IDC) reported in 2011 that 1.8ZB (≈ 1021B) was the total data that was generated throughout the world. (Z. A. Al-Sai and L. M. Abualigah, 2017).

Government and Public sector gather a lot of data. However, processing and analyzing them remains challenging. Meanwhile, to give best and effective facilities to its citizens, it requires efficient data analytics on its collected data (E. Dogdu, M. Ozbayoglu, A. Yazici, and Z. Karakaya, 2018). And information and communications technologies (ICT) helps in building effective e-government by increasing access to government services (Z. A. Al-Sai and L. M. Abualigah, 2017).

Fig1: citizen-centric Big Data (Google, (2017)).

Several organizations have started to feel the importance of data as they work on sentiment analysis for the customer's data and Other predictions of user's interest to enhance the customer experience. This approach offers an everlasting relationship with customers; meanwhile, empowering the organization (Z. A. Al-Sai and L. M. Abualigah, 2017).

A challenging task for the government is to find how one can make use of ICT to improve service delivery. and it is wonderful if citizens start using the facilities; however, most of the citizens are skeptical about the technology for privacy issues. For a long time, several countries have tried using ICT in many instances to reach goals meanwhile giving a transparent, accountable implementation (Z. A. Al-Sai and L. M. Abualigah, 2017).

In the 21st century, the Government is judged based on how smart it is, and technology plays a vital role in it where effective and efficient public administration is paramount. And smart governments are the next level concepts of e-governments and the new trend where politicians, academicians, researchers, use modern technology in enhancing the public administration. They help in enabling the fastest and efficient way to make policies with support from information, and which can be used to solve the complex societal problems. However, researchers are still skeptical about the future of technology as some raised their concerns about the privacy concerns of using the Big Data in the public sector (M. N. I. Sarker, M. Wu, and M. A. Hossin, 2018).

Using big data, open and efficient governance can be established, and Nowadays governments around are facing hassles which reduces the performance and for all these Big data as a technology is the answer for effective and efficient governance (M. N. I. Sarker, M. Wu, and M. A. Hossin, 2018).

2.0 Definitions

2.1 Public Administration

“Public administration is that part of the science of administration, which has to do with the government; it concerns itself primarily with the executive branch where the work of the government is done; though there are obviously problems also in connection with the legislative and judicial branches.” – (Luther Gullick).

Public administration is about implementation of government policies and plans and prepares civil servants to work in public domain whose fundamental goal is to enhance management and policies so that government can function effectively, Some of the various definitions which have been offered for the term are: "the management of public programs", "translation of politics into the reality that citizens see every day" and "the study of government decision making, the analysis of the policies themselves, the various inputs that have produced them, and the inputs necessary to produce alternative policies." (Wikipedia).

2.2 The Big Data

“Big Data, in general, is defined as high volume, velocity, and variety information assets that demand cost-effective, innovative forms of information processing for enhanced insight and decision making.” – (Gartner, Google).

“Big data is data that exceeds the processing capacity of conventional database systems. The data is too big, moves too fast, or doesn't fit the structures of your database architectures. To gain value from this data, you must choose an alternative way to process it.” – (O’Reilly, Google).

"Big data is a term describing the storage and analysis of large and or complex data sets using a series of techniques including, but not limited to NoSQL, MapReduce, and machine learning." – (MIT Technology Review, Google).

2.3 Big Data Analytics

When data comes from multiple sources like sensors, machine, and documents, Big Data analytics as a technology processes these extremely large data sets. Patterns are extracted, or relations are established among data which can be used to make a future prediction to benefit the organization, Big Data Analytics help companies make better business decisions. Which helps with benefits like effective marketing campaigns, new revenue opportunities, improved customer service, and more efficient operations. (NG Data, 2016)

2.4 E-Governance

Electronic governance or e-governance is the application of ICT to serve the citizens and to deliver its goals. There are several models like Government to citizens(G2C), G2B(Business), G2E(Employees), etc. and the E-governance makes all these a matter of Smart Governance (Wikipedia).

3.0 Literature Review

3.1 The Big Data Five V's

Volume, Variety, Velocity are the 3 aspects initially present in big data. However, Veracity and Value came into the picture in later stages

Volume, the total data that is created and backed up. In general, the concepts of data are defined by the size that data generates and Based on this we can conclude that it is big data or not. Insights from this mass of data can be analyzed using various tools (M. N. I. Sarker, M. Wu, and M. A. Hossin, 2018).

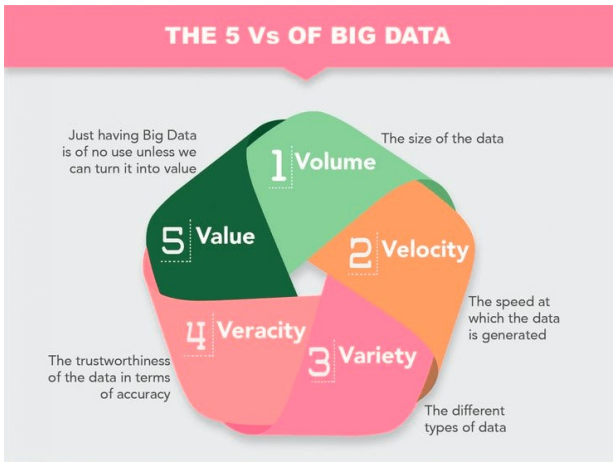

Fig2: Big Data five V's (Wikipedia)

Velocity: data is generated and processed at very high speeds, and this is what velocity defines. Several instances where thousands of tweets and several million trades happen at twitter and NASDAQ are live examples (M. N. I. Sarker, M. Wu, and M. A. Hossin, 2018).

Variety data comes from several sources and variety means the type of data and structures.it can be media files or text files. Big data is highly unorganized, and variety of tools allows the analysts to analyze them potentially (M. N. I. Sarker, M. Wu, and M. A. Hossin, 2018).

Veracity refers abnormalities in the data, and they are generally noise, disturbance, data loss, etc., When such huge data is being generated, there are chances that there can be junk data generated. So, finding the trustworthiness of data is really important (M. N. I. Sarker, M. Wu, and M. A. Hossin, 2018).

Value outcome that is extracted from data is very important, and that's what the value refers to (M. N. I. Sarker, M. Wu, and M. A. Hossin, 2018).

3.2 Big Data in Government and Public Sector.

Big data is generally categorized by its huge size which consists of huge and complicated sets of data which has the potential to interact. It's the fact that the traditional tools cannot handle such huge sets of data. In such a scenario, an organization needs to realize that big data Analytics plays a vital role in delivering their services effectively and efficiently (E. Dogdu, M. Ozbayoglu, A. Yazici, and Z. Karakaya, 2018).

Adoption of big data and its technologies in developed nations has been emphasized; however, the developing nations are yet to catch up with the pace. (E. Dogdu, M. Ozbayoglu, A. Yazici, and Z. Karakaya, 2018).

Big data will be one of the most powerful investments that a government can do; it can discover the trends in citizen behaviors and trends in their lifestyles so that their delivery of services can be

effective and efficient. It helps in value creation and business intelligence (Z. A. Al-Sai and L. M. Abualigah, 2017).

The government can analyze the citizen based on social media life, browsing, clicks, tastes, personalities, where they can predict, recommend and even stop criminal activities from happening with right predictions. Big data helps the government in a certain way to structure and restructure smart government and pledge effective services to citizens (Z. A. Al-Sai and L. M. Abualigah, 2017).

3.3 Implementation of big data for smart-governance.

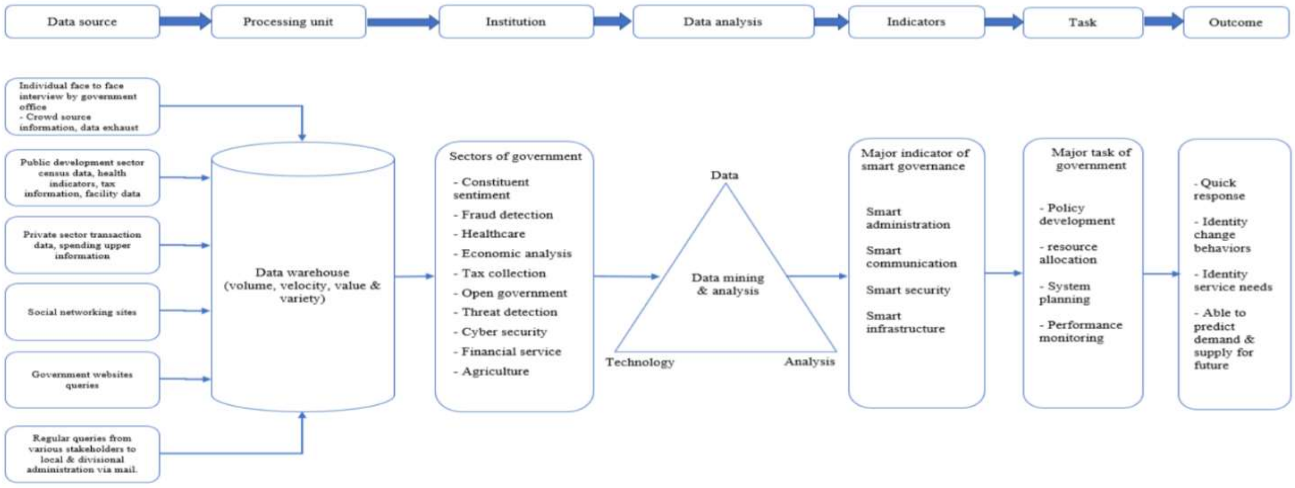

Fig3. Implementation of big data for smart-governance (M. N. I. Sarker, M. Wu, and M. A. Hossin, 2018).

Government analyzes data by checking various aspects for big data related technology and the implementation of smart governance. The above model demonstrates big data implementation for smart governance (M. N. I. Sarker, M. Wu, and M. A. Hossin, 2018).

3.4 A case study on implementing Big Data technology in Jordan and India

In order to reform the ICT, Jordan started a National strategic plan based on Big data, and the strategy had themes like – monopoly elimination, privatizing the few govt services and removal of government domination, access to education, the introduction of new communication technologies, enhancement of commercial and public internet services (N. K. T. El-Omari and M. H. Alzaghal,2017). Jordan with its E-government strategy created an E-government portal using which it addressed the sectors like Electronic versions of Army, Health, education and it was successful (N. K. T. El-Omari and M. H. Alzaghal,2017). A few years ago (NCSCM) was established in Jordan, which addressed all types of crises by preventing and mitigating them (N. K. T. El-Omari and M. H. Alzaghal,2017). In a nutshell, Government programs were successful in delivering the services effectively and efficiently.

India is one of the countries in the world with a huge population of which most of it resides in rural areas, and rural healthcare is always paramount for Government. And the government implemented big data in order to make quality of service and its affordability easy in government institutions, and the implementation of these facilities had themes like electronic-health file, chronic diseases awareness, electronic-prescribe, electronic maintenance of medical records, avoid needleless treatments, scale back facility rates, telemedicine (S. Gupta and P. Tripathi, 2016). The government was very much successful in bringing down rural mortality and morbidity with the above strategies.

4.0 Discussion

4.1 Advantages having Big Data within Government and Public Sector:

The most important objective in the government sector is to preserve domestic problems, and maintain sustainability, enhance economic development, improve the trust of citizens and their security, and to improve the Gross Domestic Product of the country. Big Data has been a game changer in public sectors while they improve public health, maintain law and order, preventing calamities and efficient management of resources (E. Dogdu, M. Ozbayoglu, A. Yazici, and Z. Karakaya, 2018). According to the UN, "*The new term of Big Data analytics refers to tools, applications, and methodologies that support digital transformation of the massive volume of raw data into useful outputs and helps governments to deliver services effectively*." Big data helps in generating high revenue, an increase of storage capacity, ability to generate data faster, empower and enhance the quality of life and increase the level of transparency (Z. A. Al-Sai and L. M. Abualigah, 2017)

4.2 Problems associated with Big Data:

Security and privacy are the biggest concerns. Generally, government agencies do not disclose details due to confidential nature or with the public or for that reason, not every citizen is fine with sharing the details with the government, (E. Dogdu, M. Ozbayoglu, A. Yazici, and Z. Karakaya, 2018). The United Nations Member States have laws on the right to access information. However, there is an equal number of rules about the open government data, and almost all countries offer personal data protection laws (Z. A. Al-Sai and L. M. Abualigah, 2017).

5.0 Implication

Big data is successful in addressing government problems like public health, maintaining law and order, disaster management, resource conservation and many more (E. Dogdu, M. Ozbayoglu, A. Yazici and Z. Karakaya, 2018).

Big data will be a valuable asset of investment for governments. Discovering the trends of patterns and behaviors becomes easy when e-government makes use of big data. it is an all-new concept for public sectors and its such powerful technology that addresses the growth and data availability. Such that the public institution can have, transparency, effectiveness, efficiency, and certainty in service delivery. Technology can drive the government to achieve Smart governance. It is also improving the overall life's standards for citizens (Z. A. Al-Sai and L. M. Abualigah, 2017).

One good thing about big data is , by employing sufficient methods government agencies can work on huge data in the form of collecting it or processing it from various sources. Big data remains as a beacon for the government or public institutions in reducing the red tape-ism, or threats that are hindering the society (M. N. I. Sarker, M. Wu, and M. A. Hossin, 2018).

In a nutshell, the government is responsible if it is doing both the creation and manipulation of data/knowledge and it can do it by means of analyzing the data. (M. N. I. Sarker, M. Wu, and M. A. Hossin, 2018).

6.0 Conclusion

In this paper, I have tried to explain how Big Data is impacting the Government and public sector to improve the efficiency and effectiveness in the service delivery. The paper briefly described the current scenario and trends of big data. Alongside also looking into how big data analytics work in the Public sector and an interesting model which explains the implementation of big data to make smart-governance a vital component of governments all over the world. The paper also highlights the case study of Big data implementation in countries like Jordan and India, summing up finally with Advantages and problems associated with Big data.

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