

# A REFLECTION ON BIG DATA BUSINESS ANALYTICS IN SMART CITIES

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**ABSTRACT** - Commercial activities are solely executed with an intention of return of investment. In smart cities business depend upon analytics to improve the extent of its operations. Business analytics refers to exploring the past business in order to gain facts. The intention is to identify new insight on related issues and facts on enhancing business. Big data characterized by data sets that are large, diverse and constantly changing they are complex to be processed by traditional processing applications. Smart cities concept is preserved for cities that use information and technology to improve the lives of its citizens by enhancing performance and quality of service delivery. Smart city are dependent upon data and analytics in most of their operations. With (BDBA) dependence on data to enhance return of investment (ROI), Smart cities provide best platform to facilitate availability of large volumes of data which can serve both purposes. In this paper we will reflect on the impact of big data business analytics (BDBA) in a smart cities and challenges arising from its application.

## INTRODUCTION

Technological evolution has sparked need to digitalize most of the processes. Emergence and adoption of the World Wide Web has contributed positively to this course. Nowadays there are a number of different social media platforms, deployment of billions of sensors to record real time information and action taking place, wearable devices, explosion of usage of smart phones and tablets so on. Internet has changed the way of live in the world, all government are rushing to have their services delivered online, educational institutions, health care services, businesses across board and so on. [2]

Business entails tasks that are carried to enable one make a living; it involves selling of goods and services with any intention of returns from the investment that is made. Business types include small scale to large scale business. Small scale includes startups that are limited in size and extent of operation. They are small in terms of capital needs, geographical area of operation, workforce, customer capacity and others. Business ownership includes partnership, corporation, cooperatives, franchises and so on. [9]

Internet has changed the business operation mode way of live and functioning of various governments. This transformation has increased data generation in terms of variety and volume of data collected. This kind of data carries a lot of information due to the emergence and wide spread usage of the internet. Since the last twenty years there has been tremendous growth of data. [2]

The growth of data can be experiences in every sector of economy. According to international data cooperation (IDC) report it claimed that between 2012 and 2020 information available in the universe will grow by 35 trillion gigabytes. Emergence of social media cloud computing contributed to increase in the volume of data. For instance face book has an average of 1.04 billion active users' 934 million active daily subscribers, available in different languages, large number of photos upload and comments. [4]

Smart cities are one of the ideologies that has benefited from this advancement. Smart cities are cities that use information technologies to improve the lives of its citizens. Smart cities also benefit from collection of this data. Importantly by connecting collecting and analyzing provides a better understanding of cities that enhances a comprehensive that enables to improve cities efficiency in service delivery. Rich streams of data are likely to depict a current model better and be used effectively for future development. [5]

In business analytics business intelligence is a common term in that field. It is defined as a set of software's systems that are designed to enable decision making based on gathered and analyzed fact. This systems reviews historical data, cross marching with available principles in business environment along with outlined protocols and cross matching with what is currently happening in order to come up with a better vision. [1, 3]

Smart cities act as a home of huge volumes of data collected from different sources within the cities. This information is refereed as big data since the data sets contains the 3v's (volume, variety). Businesses in smart cities make use of this data available to benefit their impact positively. Big data business analytics (BDBA) is the new understanding of business intelligence. BDBA involves

refers to using skills and technology for continuous exploration and checking the past business operation performances in order to provide new operational insights. Using the analysis to predict the future is important features on top of using it tie make decisions. [6]

In this paper we reflect on the impact of big data business analytics in smart cities, and analyze the emerging issues that need to be considered in smart cities. The number of cities is growing globally and likely to double by the year 2050. Half of the world is projected to be living in cities by the same. Emerging issues need to be identified earlier so that solutions can be provided over the same. [7]

The rest of the paper is organized into: section 2.0 Big data and smart cities section 3.0 section Big data business analytics 4.0 Emerging issues 5.0 concluding remarks and lastly 6.0 references.

## 2.0 BIG DATA AND SMART CITIES

### 2.1 Big data

Big data is commonly used by almost all the people ranging from academicians citizens and industry experts. The concept can be traced back to 2001 when challenges of continuous increase of data were solved using 3vs representing volume variety and velocity. [10]

International Data Corporation defines big data as a new technologies and architecture of this generation that is designed on economical extraction of value from large volumes of data thus capturing high velocity analysis and discovery of information that is economically valuable. [4]

As per the statistics from **STATISTA** period 2014 to 2018 it shows general growth of big data over years in terms of market price in dollars and the projection growth in future up to 2027. The growth in terms of size and value is source of potential growth in value has informed additional of vs to the previously stated. Valuable information derived from big data can be used for decision making.

Big data has grown faster projected at forty percent in terms of data that is generated on the global scale yearly. About ninety percent of the data was captured in the past few years. This can be attributed to increased use of digital devices and data is uploaded to the network. For example many photos are taken yearly that end up on face book and other online social networks, sensors record data and other smart devices and business are having open data policy to their customers seen numerous volumes of data added to internet. Many governments have started to use

that big data to support development of smart cities around the world.

Characteristics and feature of big data include three main one and two additional ones.

- Velocity: Is the speed of storage generation analysis and processing of data. In smart cities emphasis will be on real time processes.
- Volume: The size of data created from different sources.
- Variety: the nature of different data being generated. Either data can be structured or instructed.
- Value: advantage big data will offer to business based on collection analysis and usage.
- Variability: refers how structure of data keeps on changing

### 2.2 Smart cities

Smart city concept originated from [Bollier 1998] movement to the late 1990s. They were steering and advocating for improved planning policies. Portland Oregon is most recognized smart growth example in the beginning. The phrase has been adopted by companies like Cisco and IBM which were making complex information system with the intention of integrating urban infrastructure and services.

The concept is perceived differently among different people verses the technological perspective. Still few things can be agreed from either perspectives, it encourages use of technology for better service delivery and efficient management of resources, it's meant to improve the lives of the citizens of cities. [8]

In smart cities different components are interconnected for data collection aided by information communication technology infrastructure to deliver smart services. High level of governance and coordination is ministered from a centralized point. Coordination of this distributed in nature components is achieved by use networks. [12]

Important features of smart cities that have enhanced its growth and more governments are adopting this concept.

- Smart infrastructure that will help in management of water and energy resources this will be aided with use of sensors and smart grid.
- Smart environment: will enable innovations of ICT to manage and sustain environment from destruction, through emission control, sensors for pollution monitoring, recycling so on.

- Smart transportation: real time control and monitoring of traffic systems, networks that are embedded with real time control capabilities.
- Smart living: technological innovation that are geared at improving the living standards of citizens in cities.
- Smart Governance: It establishes urban space that uses technology for engagement and citizen participation platform.
- Smart services: Utilization of technology for all sectors along with government services, this enable citizens to receive services and goods at the comfort of their home.

### 3.0 BIG DATA BUSINESS ANALYTICS

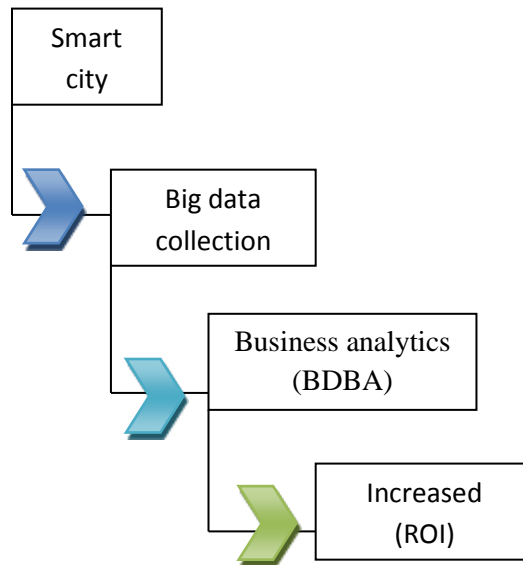
#### 3.1 Introduction

Big data business analytics is emerging as an important topic to pursue. Firms are using technology on data collected to show the accurate business experiments. Business experiments include examining different models, regeneration of customer experience, new market trends and enable making real time decisions. [6]

Xin stted that projected demand of business analytical positions would be more that the current available job market supply trend by 140000 to 190000 positions. Academician and business believe that analytics is going to be the force that will drive the economy in the next twenty years. The stasta release a survey that showed the size and value of big data was on an increase on a yearly basis. [9]

Data is collected by other firms from different online platforms like face book and twitter. Different data mining techniques are employed to make this operation a reality. That means that most of the business firms are using big data as the foundation of various decision making in there firm, there is need of new capabilities to ensure proper access of all data and efficiency in analysis. [6]

#### 3.2 Step by step data flow



The figure above shows the steps of flow of big data in smart cities. Smart cities make informed decision based on big data.

- Big data collection is involves sampling data together in which ninety percent of it is unstructured. The data is collected from billions of sensors that are fitted on different parts of the cities.
- Business analytics are responsible for analyzing the collected, organizing it and extracting the new patterns. Analysis enables to have proper information about given available business in the cities.
- Increased result from new insight will definitely be evident in business.

#### 3.3 Return of investment

Return of investment (ROI) is a performance that evaluates the efficiency of a business. It directly tries to measure the returns of a particular investment relative to investment cost of the same business. The result can be expressed as percentage of ratio.

Return of investment formula:

$$ROI = \frac{\text{Gain from Investment} - \text{Cost of Investment}}{\text{Cost of Investment}}$$

Business intelligence handles complex technologies that allow users to perform data analysis and improve

business. With well dated back of example of a banker sir Henry Furnese in 1865 analyzed environment hence making profits.

Data analytics allows users to organize data into a comprehensive format. The converted data are organized processed and analyzed to support proper decision making. Smart cities produce a data that is considered big data because of its characteristic nature. Since smart cities relay on making informed decision based on analysis of data in really time, data analytics play a crucial role in ensuring efficiency if smart city solutions.

Big data business analytics can be a very productive lot if used effectively in smart city. We argue that smart cities produce big data collected through billions of sensors installed in smart cities. Business intelligence used along with data analytics available in smart city is a great source of business avenues in smart cities.

Return of investments is increased by new analysis of business opportunities available in smart city, increase of client base, new business establishment. Business can be able to do new survey based on technology rather than physical examination through try and error method. System assimilation will be encouraged thus achieving more result.

#### 4.0 CONCLUSION

Smart cities provide opportunities for business to flourish. Big data is often a valuable asset in smart cities. Big data provides real time data that is analyzed and helps in making informed decision to enable improved service delivery. Commercial activities are solely executed with an intention of return of investment. We agree that with application of big data business analytics in smart cities, businesses will be able to increase return of investment. A lot of data collected showing customer preferences, spending habits, location and so on. When analyzed by business and supplies made according to the outcome there will be automatic increase in return of investment.

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