Chapter 86
Mobile Big Data:
A New Frontier of Innovation

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ABSTRACT

Mobile technologies have given rise to tremendous amounts of data in real-time, which can be unstructured and uncertain. This growth can be attributed as Mobile Big Data and provides new challenges and opportunities for innovation. This chapter attempts to define the concept of Mobile Big Data, provide description of various sources of Mobile Big Data and discuss SWAI (Sources Warehousing Analytics Insights) model of Big Data processing. To understand this complex concept, it is important to visualize the Big Data ecosystem, respective players. Moreover, mobile computing, Internet of things, and other associated technologies have been discussed in light of marketing and communications based applications. The current trends in Mobile Big Data and associated value chain help us understand where the next frontiers of innovation are and how one can create value. This is linked to the future aspects of the Mobile Big Data and evolution of technologies from now onwards.

1. INTRODUCTION: WHAT IS MOBILE BIG DATA?

Mobile technology has exploded in the past decades from a research tool available in advanced economies to handheld devices in developing nations to access internet. The growth has been fueled by reduction in hardware costs, accessibility of services, increase in computation power (in range of 200 billion times since 1980s) and increase in usage for day-to-day activities. On the other hand, people from different age groups, especially teenagers and millennia generation have learnt to use these mobile technologies in creative, collaborative and collective manner. Moreover, the mobile manufacturers have built in a series of sensors to facilitate the usage of phones in a diverse ways, as well as, network externalities worked in the favor of developers creating millions of applications for the same. Some of the examples of such sensors are GPS, infrared, NFC, accelerometer, gyroscope, microphone, high resolution camera and

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Bluetooth. This created a fertile ground for data to be generated, captured and analyzed in a systematic manner. And companies, NGOs, governmental entities, inter-governmental agencies (such as United Nations) are finding this new challenge of massive, real time, unstructured data quite intriguing and highly valuable at the same time. This forms, what we can assert as "Mobile Big Data", but to understand this complex concept, we first have to fathom the notion of Big Data itself and then, we can visualize Mobile Big Data as a special case of the same.

This chapter attempts to define the concept of Mobile Big Data, then provides detailed description of accompanied sources and respective applications. To understand this complex concept, it is important to visualize the Big Data ecosystem, described in the next section. Then, we discuss the Mobile Big Data value chain and associated disruptive technologies. This brings us to the final section comprising of a holistic perspective and put forth insights on Big Data influence in policy making and business decisions (with a specific case of Mobile operators). We take the case of mobile operators who have ready access to huge volumes of subscriber data, their data and network usage, consumer behavior, spending patterns and other activities. Moreover, this access to individual level data is also enhanced by their role as last mile connection provided where the new information is gathered continuously and accurately. In sum, we conclude and discuss the future aspects of Mobile Big Data.

1.1 The Concept of Big Data

Big Data is a complex and elusive concept. From epistemological perspective, Big Data is often referred to as a term with definition based on the size of dataset, although there is no formal or informal demarcation above which a dataset shall be considered "Big", but as of 2014, may be larger than some terabytes. Big Data can be seen in the light of not only size but also heterogeneity, incompatibility, unstructured formats, real-time generation & analysis and other accepted technical possibilities. This has fuelled the popularity and pertinence of the term in public policy, corporate plans, and research agendas in scientific or philosophical manner. A more abstract definition could be "data whose size forces us to look beyond the tried-and true methods that are prevalent at that time" (Jacobs, 2009). In other words, "Big Data refers to datasets whose size is beyond the ability of typical database software tools to capture, store, manage, and analyze" (Manyika, et al., 2011). But according to these definitions, it ought to be a moving target which depends on the current stage of technology development and associated parameters will continuously change over the course of time. One of the most important parameter that must be used to define "Big Data" is based on the structural construct of the dataset. Traditional relational database managements systems have inbuilt capabilities to store, manage and analyze quite large enough datasets, subjected to one attribute, the datasets should be structured enough. But, nowadays, the data created via social media, different device interfaces in context of smart cities, different public agencies, etc. is highly unstructured and entails a completely different set of technologies to store, manage and analyze it. A more eloquent definition of "Big Data" can be stated as "a large dataset with/without a combination of structured and unstructured data, which cannot be managed/analyzed by traditional database management methodologies."

On the other hand, (Feijoo, Gómez-Barroso, & Aggarwal, 2015)provided an economic-based perspective to the understanding of the Big Data concept. Viewing from the lens of value, it has been declared as a new asset class (World Economic Forum, 2012)[1] and the basis of "a drift toward data-driven discovery and decision-making" (Lohr, 2012). Moreover, a new influx of data has been encountered in