

## Chapter 4

# Commercial Potentials of NBloT and Its Impact on the Economy

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### ABSTRACT

*The internet of things (IoT) has emerged as a potential game changer in the modern ICT landscape. Like several other technologies, it is going to disrupt the global markets to a large extent. The main potentials of IoT are its pervasive presence and multiple applications. For the large-scale deployment of the IoTs, a huge amount of resources are needed. In that case, a lighter or energy efficient version of the IoT is preferred for the large scale projects such as the smart cities and healthcare applications. In this regard, narrowband IoT (NBloT) is preferred which is a resource efficient version of the modern IoTs. The pervasive uses of the IoTs are going to change the economy and the social landscapes to a large extent. IoT will be pervasive, and it will touch every aspect of the human lives. Due to its pervasiveness, the economy associated with it is going to be equally pervasive. In this chapter, the aim is to provide the commercial potentials of NBloT and to analyze the changes it can bring to the economy. In the commercial potentials the author include the common applications where NBloT is the main choice and can play a crucial role in the long term. Normally, these sectors are widely accessible to the general public such as the healthcare, traffic monitoring systems, smart cities, utilities management, retail management, industrial automation, and the emergency services.*

### INTRODUCTION

Modern digital landscape is changing very fast due to the arrival of the Internet of things (IoT). Through the cellular networks, it was possible to connect remote areas through the mobile devices. Now, IoT has gone much beyond it. Now, through the sensors and actuators one can connect the objects with the Internet. The wireless sensor networks (WSNs) were the extension of the interconnected sensors for some specific tasks. The introduction of the computing and the communication protocols for data transfer changed the whole scenario. WSNs were changed by a large margin in terms of their capabilities. Now the WSNs have been changed to IoTs to a large extent (Routray, 2020). In this new paradigm of IoTs

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there are numerous issues. Resource requirements and utilization in the operations is one of the main issues. In this regard, IoT has several versions which can save the resources significantly. Narrowband IoT (NB-IoT) is one such leaner and thinner versions of IoTs which needs very small amount of transmit power and bandwidth (Routray, 2020). This is how it becomes popular in several applications.

NB-IoT is one of the popular and standardized versions of IoT. It has been standardized in several releases of LTE since the first one in Release 13. It is very popular due to its easy compatibility with the cellular networks. It can be deployed in 2G, 3G, 4G and 5G cellular networks. Of course in 5G it will have a large number of functionalities and better control over the resource utilization. NB-IoT over 5G networks is certainly an attractive solution for large projects which needs a lot of sensors and covers a large area. Main popularity of NB-IoT is due its low power wide area (LPWA) features, meaning it consumes very low power for its operations while covering the services over a large area. Among the LPWA members NB-IoT is one of the most popular ones due to its simple deployment and low costs.

Due to the widespread applications of NB-IoT, it is now one of the main technologies in the changing IoT paradigm. It can be deployed over the cellular networks and if needed can have its own networks in a standalone mode. Deployment of NB-IoT is faster, simpler, and cheaper (Routray, 2019). So NB-IoT is popular for a large number of applications ranging from the smart cities to agriculture to healthcare to manufacturing. This is how the investment on NB-IoT is growing very fast. It has a considerably large potential in the IoT based technology markets. Now its economy is very significant in the technology domain.

In this chapter, we study and analyze the current and future commercial potentials of NB-IoT. We study and analyze a large number of contemporary literatures on this subject. The increasing importance of NB-IoT too has been studied in this chapter. In Section 2, we analyze the recent literatures on IoT and NB-IoT. We find the previous instances of commercial applications of these technologies. In Section 3, we go through the potentials of NB-IoT and its applications. In Section 4, we analyze the market of NB-IoT considering the current trends and the future projections. In Section 5, we go through the future research directions foreseeable for the NB-IoT potentials and applications. In the last Section, we conclude the chapter with the summarizing points.

## **Literature Review**

IoT and NB-IoT are now well researched areas. There are several papers and articles available in the journals, conferences, magazines, and newspapers. Some books are also available on some specific aspects of IoT and NB-IoT. The economic aspects of the IoTs are also studied widely by the technical as well as the management faculties. In this section, we provide literature review for the main commercial potentials of IoT. Subsequently, we have also reviewed the relevant literature for the overall economic impact of IoT and NB-IoT on the contemporary market.

An overview of IoT has been presented in an Internet Society publication (Rose, Eldridge & Chapin, 2015) which is intended for the general public. It systematically explains what IoT is, and what it can do for a connected environment. The main issues and challenges of IoTs have been addressed in it. Security, privacy, regulatory, and legal issues have been pointed out with some clear examples. The technology for IoT is very much dependent on the ICT and its supporting technologies. The authors finally discussed about the economical aspects of IoT and how it can bring changes in the society. In this regard, the authors have pointed out the growth the world has witnessed from the Internet. Now, IoT as a pervasive extension of the Internet has the similar potential to push the economy further. IoT can assist

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