

## Chapter 2

# Business Models Applicable to IoT

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### ABSTRACT

*Business models have been analyzed in the context of the information technology economy and are aligning the idea of innovation developing with the economy or, in other words, business aligning technology and market. Some care must be taken on the transformation of the Information Systems through the introduction of the new unique IoT offers in many fields. For the IoT systems, a complex value stack needs to be addressed in order to realize the possibilities on the innovation in the services. This induces specific requirements when it comes to designing IoT business models. IoT enables new business models, which create value by connecting existing and new things together to establish new business processes, increase business efficiency, enable greater innovation and drive improved visibility across an organization. To be successful, information systems need to consider all the layers of value creation in order to enable the collection of information with the agility needed in the modern world of business. This chapter highlights the IoT systems, its features and market expectations. It also suggests the existence of two classes of business models for IOT, the Digitally Loaded Product and another classified as Sensor as a Service, which address the uniqueness of IoT.*

## INTRODUCTION

Increasingly, the modern world has come up with solutions that release the routine tasks. Automation becomes present in commercial, professional environment and at homes. Anticipating this, Mark Weiser created the concept of Ubiquitous Computing in 1991, where computers will be integrated at environments to perform some tasks in a transparent way (Bezerra; Freitas & Nascimento, 2015). In this and other models, one issue stands out: how to capture real-world data for these computers to work?

One proposal came with the concept of Internet of Things (IoT) created by Kevin Ashton in 1999. At the time, Ashton also emphasized that the data acquired by machines would have not the limitations time, attention and precision. According with him: “If we had computers that knew everything there was to know about things—using data they gathered without any help from us—we would be able to track and count everything, and greatly reduce waste, loss and cost. We would know when things needed replacing, repairing or recalling, and whether they were fresh or past their best.” (Ashton, 2009, p. 1).

As we can see above, Ashton already outlines some aspects of business (reduce waste, losses and cost). In fact, ideas need to be turned into business to prosper in the real world. A business model becomes necessary.

In this context, this chapter aims to show a collection of business models applicable to IoT. For the preparation of this chapter, research was made in online digital databases, aiming at a broad, non-exhaustive review of the literature on the subject. The research can be classified as:

- **Nature:** Basic
- **Objective:** Explanatory
- **Approach:** Qualitative
- **Procedures:** Bibliographic

After this introduction, we are going to present a theoretical review, addressing concepts of Internet of Things, its potential market and aspects of telecommunications networks that can provide the necessary infrastructure. Next, we are going to present the concepts of business models and, finally, the business models surveyed are exposed.

## THE INTERNET OF ALL THINGS

The evolution of the Internet can be summarized in five phases, as can be seen in Figure 1, adapted from Perera et al. (2017). In an initial phase, it was created to connect two computers, using a network interconnection protocol, the IP. In the next phase, the World Wide Web (WWW) was created, allowing the connection of a large number of computers. In a third phase, the Mobile Internet appears, connecting mobile devices to the Internet. In a fourth phase, identities are connected on the Internet through social networks. Finally, the Internet includes objects that connect over the Internet, thus forming the Internet of Things (IoT).

Kevin Ashton initially designated the term “Internet of Things”. In 2001, the MIT Auto-ID center presented its vision of IoT, as quoted by Perera et al. (2014). IoT was formally introduced by ITU (International Telecommunications Union) in the Workshop Report (2005).

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