

# Chapter 17

## Sustainability in Information and Communication Technologies

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### ABSTRACT

*Information and communication technologies (ICT) can provide added value in an organizational context in order to enhance the definition of business support strategies. The purpose of the chapter is to focus on the contribution of ICT to implement a sustainability policy in the organizations, in the context of the sustainable development goals to improve cooperation and promote development. In this context, the principles of the Karlskrona Manifesto are applied to the development of software systems. The methodology focused on the literature review of the domain and on a case study, in order to analyze the impact of ICT as an engine of sustainability in organizations. The main conclusions focus on the analysis of the impact of established practices in organizations to design and develop sustainable software systems. The results point to a greater consciousness of the potential effects of software systems on sustainability, which will improve management practices, reducing the quantity of material to be recycled, and aligning organizational strategies with Green IT.*

### INTRODUCTION

Taking sustainability into consideration can have significant impact in the development of new technologies. The study of sustainability in the field of Information Systems (IS) and Information and Communication Technologies (ICT) is of the utmost importance in order to promote the integration of the 17 Sustainable Development Goals (SDGs) outlined by the United Nations (UNDP, 2015).

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By taking advantage of systemic approaches, the integration of the SDGs connects issues between sectors and thematic areas and leverages the creativity and knowledge of the whole society - from national and international governments and communities to civil society, academia and the private sector - to create solutions that respond to people's needs (UNDP, 2020).

The concept of sustainability is often extrapolated to software development with the Karlskrona Manifesto (Becker et al., 2015). This manifesto serves as a guide for designing and developing more sustainable software systems. In fact, the nature of the systems we build continues to change and as they cross collectively in our lives, we must attend not only to the technical elements of software development, but also to human needs (Booch, 2015) - social, environmental, economic and cultural. In this sense, human needs must be present in the organizations' sustainability policy and in IS development.

The principles of the Karlskrona Manifesto are applied to the development of software systems, namely: sustainability is systemic, sustainability is multidimensional, sustainability is interdisciplinary, sustainability transcends the system's purpose, and sustainability applies to both a system and its wider contexts.

In the context of the specificity of the organization under study, it is considered that knowledge management refers to the creation, identification, integration, recovery, sharing and use of knowledge within the organization, and can also be understood as the art of generating value from intangible assets of the organization (Serrano & Fialho, 2003). Thus, it is argued that knowledge management techniques can and should be applied to promote IS sustainability and improve software development processes in organizations.

Based on the concerns in the field of IS and ICT sustainability, it is considered that this research can contribute to the creation of integrated solutions, in several fronts, in order to help countries tackle the world's most pressing challenges and enhance the use of IS in favor of People. Thus, the objective of the chapter focuses on the analysis of the contribution of Information and Communication Technologies to a sustainability policy in organizations, in view of the Sustainable Development Goals outlined by the United Nations World Organization in order to improve cooperation and promote development.

It is also considered that the chapter may constitute added value in the scope of ICT sustainability, due to the way it describes the institution's practices. It is also considered that ICT can contribute to the definition of sustainability strategies, allowing the improvement of management practices and reducing the amount of material to be recycled, thus aligning the organizational strategies with Green Information Technologies (IT).

This chapter is organized into five sections. The first is the introduction in which the problem is presented in order to contextualize its objective. In the second section, the theoretical framework is presented about the various themes that are addressed in the chapter. Sustainability in IS is characterized in the third section in order to present the concerns underlying the sustainability issue in its different aspects and how the interconnection with the SDGs has been achieved. The fourth section describes the case study where a social community is presented. Finally, in section five, conclusions are drawn and proposals for future work are presented.

## **BACKGROUND**

In the current operating context, and in most organizations, it is considered that they are dependent on ICT to create added value to their business. Leveraging the different types of networks that organiza-

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