Chapter 69
How Can ICTs Contribute Towards a More Sustainable Future?

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ABSTRACT

Since antiquity technological innovations endanger environmental balance and there is major need to keep this balance in check. Any new technology generates more business activity, leading to increased resource extraction and waste and directly affecting natural ecosystems. Thus technological progress and economic growth are based on unsustainable practices. In the last few decades, information and communication technologies (ICT) accelerated globalized business activity by making the world smaller, more connected and smarter. ICT gradually transformed all aspects of human life including work, learning, and leisure; it has a global impact on business processes and practices, communication, logistics and transportation, finance, and commerce among other aspects. This resulted in wealth accumulation, resource depletion and social divide which have led to problems, directly and indirectly, such as scarcity of natural resources, global warming, climate change, population growth, and increasing youth unemployment. This chapter outlines some of the challenges of the new technologies and ICT practices. It proposes a practice-oriented framework for adoption of more sustainable ICT strategy in companies.

INTRODUCTION

Historically, human progress and development of technologies have created a negative impact on environmental stability and integrity of ecosystems. For 10 millennia, technological innovations have fundamentally transformed the human life. Innovations gradually leaded to resource extinction, environmental exploitation and represent a global trend for the future. In the beginning of 21st century, people could not even imagine the world without technologies. However in order to continue to benefit from technologies people have to make substantial changes in their current business practices and general perceptions. Financial and economic global crises, combined with frequent natural disasters make planning of busi-

ness operations unpredictable with markets being unstable and investments riskier. In the same time, global economic activity has tripled in size since 1980, and is predicted to quintuple in the next 50 years.

The concepts of sustainable development were defined 30 years ago. However, only recently businesses and social communities have opened the discussion for a truly sustainable future. Do we still have time to reverse the global trends? Some of the most urgent problem areas for businesses nowadays are: scarcity of natural resources and their rising prices; fuels; minerals; fresh water; energy; environmental factors (ecosystems integrity, waste management and global warming effects, increased number of natural cataclysms); and social factors (cost of living, increased world population, aging society, mobility and migrations). More generally, politicians, researchers, and companies still miss the holistic approach for coping with increased sustainability challenges. The high complexity of the term "sustainability" makes possible for myriad different interpretations. Moreover, different contexts of applying sustainable concepts and tools lead to overall misunderstanding and perplexity.

Globalization and fast emergence of new technologies resulted in accelerated production and consumption models that provoked irreversible economic, social, and environment changes. New technology-based innovations formed the backbone of the recent economic growth, fueling the market competition and catalyzing social and environmental footprints around the globe. Information technologies transformed the logic of business operations and accelerated the globalization processes. Nowadays information technologies are practically involved in every aspect of human activity including business, education, communication, and entertainment. More specifically, IT plays and increasingly important role in innovations and R&D processes; cost-effectiveness and efficiency; customer services; and finally they have general impact on business competitiveness. Information technologies represent a unique expanding economy sector having large influence on overall economic activity.

Widely spread across businesses all over the world, usually ICT can have very detrimental influence on organizational environmental footprint (Jenkin, Webster, & McShane, 2011). Information technologies have short product life spans (e.g., laptops, 3–4 years; networks, 5–7 years); their manufacturing and disposal have resulted in toxic hotspots; and a large portion of organizations' electricity costs (and concomitant greenhouse gas emissions) is due to IT energy use (e.g., office buildings, 26%; data centers, 95%) (Jenkin, Webster, & McShane, 2011). In contrast to other technologies, information technologies, and especially information systems, have a large potential to reverse the negative impact. As discovered by Gartner (2007), ICTs are responsible for about 2% of global carbon emissions. The main contributing sectors within the ICT industry include the energy requirements of PCs and monitors (40%), data centres, which contribute a further 23%, and fixed and mobile telecommunications that contribute 24% of the total emissions. However, the majority of researches cited by Molla et al. (2008) believe in the potential of technologies to create sustainable business and society. It is estimated that 'Green' IT/IS can have positive impact on the environment with the potential to reduce global emissions by 15% (The Climate Group, 2008). Even dominating corporate reports in the field of green IT/IS speculate that IT has a potential to create new competitive opportunities, to reduce carbon emissions, and to improve overall business efficiency (Molla et al., 2008).

The objective of the chapter is to identify the current trends of ICT and to propose a concise holistic framework for companies to enhance their development and implementation of green IT technologies. Moreover, there is a discussion of several practical aspects and examples. It starts with a short overview of recently emerged concepts of green, sustainable and clean technologies, focusing on green IT. Some related concepts are then discussed as well as sustainable development, sustainable and eco-innovations, sustainable manufacturing. The second part proposes a holistic model for ICT development and imple-

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