

# Chapter 41

## Addressing Sustainability and Industry 4.0 to the Business Model

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### ABSTRACT

*Industry 4.0 drivers and sustainability are topics increasingly referred to as part of the firm's strategy. Business value creation must be linked to sustainability and be designed on the road to the Industry 4.0. Technological advancements can bring about countless opportunities for growth and success in achieving humanity's set goals fitting the challenges of sustainability. This seminal work attempts to explore how Industry 4.0 creates opportunities to promote business sustainability. Based on the concepts of sustainability, business model, and the Industry 4.0 drivers, this chapter aims to provide insightful information on the potentials of exploring business model in the age of Industry 4.0.*

### INTRODUCTION

The global industrial landscape has changed deeply in the last few years due to increasing technological developments and innovations in manufacturing processes. The Industry 4.0 concept has emerged, and the academic literature has paid increased attention to this topic, which remains non-consensual. Nevertheless, there is a common understanding that the emergence of a new industrial paradigm will lead to novel business models. Little is known about which elements structure and shape the new digital business models. However, it is, at least, consensual that new business models must accomplish the mechanism underlying integration amongst the economic, environmental, and social components of business sustainability (BS).

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Today, economies across the world are facing unprecedented challenges crossing social, economic and environmental dimensions of sustainability including climate change, natural disasters, loss of biodiversity, water scarcity, inequality, social insecurity and so on. These issues involve all stakeholders - citizens, governments, civil society, institutions - and they also involve businesses. A common response is needed as a matter of urgency in order to make sustainability a mainstream topic in business history where businesses and societies can find approaches that will move towards all three goals - environmental protection, social wellbeing, and economic development - at the same time.

Some authors (Bonvoisin, Stark, & Seliger, 2017; Dyllick, 2015; Haanaes et al., 2012) argue that benefits of addressing sustainability issues accrue not only to the society and environment but also to the enterprises themselves, throughout tangible benefits in the form of reduced costs from resource efficiency and regulatory compliance improvement, less labour turnover and reducing risks, as well as in the form of better reputation and image, increased competitiveness, better access to financing and increased attractiveness to talent.

Our world does not only face sustainability challenges but also faces technological advancements in digitalization and automation that are transforming the industrial production systems. In the last years, opportunities created by the Industry 4.0 (I4.0), with the use of emerging technologies, are transforming business and engineering processes in a way that they are deeply integrated making production operate in a flexible, efficient, and sustainable way with constantly high quality and low cost (Wang, Wan, Li, & Zhang, 2016). Some studies show that companies are starting to capitalize on the potential of emerging technologies to rearrange production, services, business models or the whole organization in a more sustainable way. In sum, Industry 4.0 could be an enabler to sustainable business models.

The topic “Business Model” (BM) has been the subject of a growing number of studies and published articles. Interest in business models as a distinct management research topic is relatively recent and some scholars argue that the increasing usage of the BM concept, which began in the mid-1990’s, may have been driven by the advent of the Internet and by the emergence of the “new economy” (Baden-Fuller & Morgan, 2010; Morris, Schindehutte, & Allen, 2005; Zott, Amit, & Massa, 2011). Moreover, the concept is relevant for firms of all sorts, and progress in the field has been still fuzzy and vague by lack of consensus over the key components of a BM (Osterwalder, 2004).

Recent advances in Information and Communication Technologies (ICTs) and business conducted over the internet, with its dynamic, and rapidly competitive characteristics, promises new avenues for reflection on the creation of wealth (Afuah & Tucci, 2001; Amit & Zott, 2001). Introducing the I4.0 levers, new BMs that were unheard of, or very rare decades ago, will lead to organizations experimenting with new ways of achieving their goals, providing a great source of wealth and opportunity in today’s economy.

As I4.0 progresses, BM for traditional manufacturing is changing, and new models are emerging. Little is known about which elements structure and shape the new digital BMs. It is expected that the value generated from the fourth industrial revolution goes beyond the value that can be created through the configuration of the value chain (Porter, 1985), or from the exploitation of unique resources (Barney, 1991). New BMs innovate through new mechanisms structures, automation and big data exchange not present in traditional businesses.

Based on the concept of a business model, this paper will explore the intersections between the opportunities provided by the development of I4.0 and the challenges to business sustainability. To do so, we focus on the business model compositional facets integrating the sustainability issues and the Industry 4.0 challenges. In this paper, we present initial approaches for adapting business models to the new business environment. This analysis, based on the concepts, principles, and drivers of Industry 4.0 can

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