

## Chapter 66

# Sustainability, Risk, and Business Intelligence in Supply Chains

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### ABSTRACT

*Sustainable Supply Chain Management has become one of the most important managerial trends nowadays. Companies can optimize their supply chains by integrating risk management and sustainability programs. This chapter explains sustainability and risk management concepts in supply chains and discusses the relationship between these two issues in a multidirectional way. Business Intelligence tools are addressed in terms of their role and importance in supporting the management of supply chains, their risks and sustainability. The aim of the chapter is to provide a background to better understand the link between supply chain risk management, sustainability and business intelligence.*

### INTRODUCTION

“Sustainability” and “risk” are two important research fields that have gained increasing attention from companies and researchers in the Supply Chain (SC) area (Carter & Rogers, 2008; Ambulkar et al., 2015). Nowadays a lot of companies are making sustainability efforts such as securing sustainable sourcing networks and reducing waste to enhance the performance of their SCs. Some trends and developments including environmental awareness of customers, customer demand for eco-friendly products and services, increasing environmental costs and major risk events have led organizations to sustainability (Keeble et al., 2003). Pressures imposed by governments, customers, competitors and international community force companies to deal with sustainability issues and, balance profitability and sustainability (Seuring & Müller, 2008). Therefore, in recent years, companies have started to pay closer attention to the economic, environmental and social implications of their operations.

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Sustainable development has been defined in many ways. World Commission on Environment and Development defines sustainable development as: “development that meets the needs of the present without compromising the ability of future generations to meet their needs” (WCED, 1987). From an organizational perspective, sustainability is sometimes understood as just an environmental issue or confused with corporate social responsibility (CSR). Bansal and DesJardine (2014) discriminate sustainability from responsibility and other concepts with the consideration of time in sustainability. According to UN Global Compact (2010), SC sustainability has been increasingly recognized as a key component of corporate responsibility. Unfortunately, most companies treat sustainability for complying with regulations and ignore the positive impacts of sustainability on business results. Sustainability management is a strong driver of value, success and good reputation for the companies.

Today competitions in the global market occur between SCs and hence sustainability efforts have expanded to SC networks (Altuntaş & Türker, 2012). Sustainability of SCs is essential to ensure long-term profitability and obtain competitive advantage. Sustainable SCs require effective management of the three pillars of sustainability (social, environmental and economic impacts) in SCs and comply with regulations. These three pillars of sustainability are intertwined and have to be considered with a holistic approach. Companies need to integrate sustainable strategies into their Supply Chain Management (SCM) system and business decisions to improve their SC metrics. However highly dynamic conditions and continuously evolving markets make it very hard to provide SC sustainability.

Risk is an important issue that threaten the sustainability of SCs. SC disruptions and vulnerabilities have a significant effect on SC's performance. Companies have to develop effective Supply Chain Risk Management (SCRM) systems and integrate their risk management into their sustainable business strategy. Risk Management techniques progress in parallel with the developments in sustainability concerns (Pollard & Stephen, 2008). There are a few studies that explicitly examine the relationship between sustainability and risks (Hitchcock & Willard, 2006; Carter & Rogers, 2008; Buddress, 2013; Govindan et al., 2014; Lam & Quinn, 2014). To our knowledge, this is the first study that explains the relationship between sustainability and risk with a multidimensional perspective. There are three different approaches for the relationship between these two concepts in the literature. Companies may increase their sustainability by managing the inherent risks effectively (Govindan et al., 2014). In other words, risk management may be seen as a tool for creating sustainable SCs. Secondly, by incorporating sustainability into Enterprise Risk Management (ERM) systems, companies examine a broader range of concepts and may increase the effectiveness of their risk management process (WBCSD, 2013; AON, 2007). Besides, sustainability efforts may create a new risk category; sustainability risk (Hitchcock & Willard, 2006). All of these approaches are explained in the chapter.

Some major risk events occurred in the past highlighted the weaknesses of SCs for risks and as a consequence SCRM has gained attention in the late 1990s (Takata & Yamanaka, 2013; Er Kara & Oktay Firat, 2015). One of the most-cited events is the Philips wafer fabrication operation fire in New Mexico in 2000 (Basole & Bellamy, 2014; Norrman & Jansson, 2004). Since Ericsson used a single-source policy, a fire in its chips' supplier caused Ericsson an estimated \$400 million loss and disrupted its position in the cell phone market (Tang & Musa, 2011). Terrorist attacks of September 11 2001 in the United States affected some firms indirectly and, Ford and Toyota stopped their manufacturing in this country due to supply disruptions (Thun & Hoenig, 2011). As it is seen, a disruptive event affecting a process or a member of a SC may damage the other operations in the current company or other members of the SC. Furthermore, if low-impact disruptions occur simultaneously or create snowball effect, they may

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