Principles of sustainability and practices in the heavy-duty vehicle industry: A study of multiple cases

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ABSTRACT

Sustainable development is challenging the thinking of organizations, starting to interfere directly in formulating their business strategies. The automotive industry is part of a global context that involves a complex supply chain in which economic, social, and environmental pressures have caused the issue of sustainability to become a competitive edge. Despite its importance, studies point out inconsistencies in the adoption of sustainability practices as broader discussions are not found on the alignment between sustainability principles models in the literature and organizational actions implemented in practice. This research aimed at identifying how the principles of sustainability outlined in the academic literature are aligned with organizational policies and practices in the heavy-duty vehicle industry in Brazil. The study was conducted in three industry companies based in the state of São Paulo, which represent about 74% of jobs in the sector. In general, it is concluded that the environmental dimension is in a more advanced level than the other dimensions with regard to the adoption of sustainability practices. However, there was no evidence that the actions aimed at sustainability are addressed in an integrated manner with regard to investments and generated impacts on environmental, social, and economic dimensions.

1. Introduction

Over time, people and organizations have caused damage to the environment, whether it be through the uncontrolled extraction of natural resources or the generation of production process waste, to meet the increasing consumption at a rate that is not proportional to nature’s capacity of restoring and regenerating itself. Facing an uncertain global future, it is necessary to understand how governments, organizations, and individuals have worked to find ways to avoid a global collapse. According to Shrivastava and Berger (2010), once the performance does not depend only on manufactured products, sold products, the services provided or the profit obtained, sustainable development challenges the thinking of organizations. It also concerns social and human wellbeing and the maintenance of the environment on which our lives depend. Over recent decades, documents originating from the United Nations or produced by managerial initiatives have defined the principles of sustainability, aiming at establishing the conditions for responsible management and sustainable development. The concept of sustainability has been constructed in the academic literature alongside these initiatives (Ehrlich and Holdren, 1971; Elkington, 1997; Pagell and Wu, 2009). Lozano (2008) represents sustainability in three dimensions where the issues in each aspect, economic, environmental and social, interact with each other in the temporal perspective. Barbieri et al. (2010) note that organizations are institutionalizing values connected to sustainable development and environmental policies to a greater or lesser extent. However, according to Galpin et al. (2015), there is a gap in the literature in encouraging a debate on the alignment between the sustainable principles and models discussed in theory and the organizational policies applied in practice. Additionally, according to Venkatraman and Nayak (2010), studies indicate inconsistencies in the practice of sustainability. Several organizations work with their economic, social, and environmental problems individually and have not explored their interconnections. Thus, these organizations are being forced to rethink their business strategies to improve their contribution to both stakeholders and society as a whole. Amini and Bienstock (2014) emphasize the importance of evaluation of corporate sustainability practices and highlights the significance of balancing the three dimensions of sustainability economic,

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environmental and social.

In addition, Mayyas et al. (2012) highlight the importance of the research on sustainability within the automotive industry through a thorough review that includes different metrics of sustainability and the models used for the issue of sustainability. It is worth noting that automotive companies are part of a global context that involves a complex supply chain in which economic, social, and environmental pressures confront the companies’ processes and strategies in adopting measures that can and should have a sustainable direction, thus making the issue of sustainability a competitive differential (Orsato, 2007).

Therefore, from the elements discussed by Orsato (2007), Lozano (2008), Venkatraman and Nayak (2010), Mayyas et al. (2012), Amini and Bienstock (2014) and Galpin et al. (2015), the following research question that guides this study is formulated:

Are the practices in the automotive industry of heavy-duty vehicles in Brazil in line with the principles of sustainability highlighted in the academic literature?

This study was conducted in three heavy-duty vehicle manufacturers based in the state of São Paulo that represent approximately 74% of the employment in the industry.

2. Theoretical reference

This topic aims to identify which main sustainability principles, variables, and practices are present in the literature to guide the development of the research model. Thus, this section is structured as follows, a review of the concept of sustainability, followed by a discussion of the evolution of the heavy-duty vehicle industry regarding the evolution of competitive priorities, and finally, the identification of sustainability principles, variables and practices related to the automotive industry.

2.1. Concept of sustainability

Regarding a historical perspective, the idea of sustainability began in the late 1960s and early 1970s to concentrate on the environmental impact of the industrial development projects proposed (Stocchetti, 2012). However, the concept has been reassessed, and presently, it is also seen from both social and economic perspectives (Ehrlich, 2010). The relationship between the economy and the environment is represented by two trends. The first—the environmental economy—believes that there are no problems concerning the use of resources over the long term to create limits for economic expansion. In this trend, resource limitation is relative because the problem can be overcome through a technological process, which assumes that the resources are replaceable. In contrast, the second trend—the ecological economy—states that resources have limits and that they limit economic expansion, i.e., the planet’s levels of consumption must be stabilized over the long term due to the assumption of resource limitation. For this trend, the economic system consists of capital (which is constructed) and natural capital (natural resources), which are complementary (Venkatatalaham, 2007).

In the 1960s, concerns in environmental conservation became a subject of interest when the push for industrialization highlighted the environmental abuses and lack of balance between human evolution and human needs (Christoff, 2012). Since then, serious criticisms have emerged, highlighting the ambiguity of this period: on one hand, several goods and services that generated facilities; on the other hand, the accelerated destruction of natural environments at an unsustainable pace (Stocchetti, 2012).

One of the first studies that documented this concern was conducted by the Club of Rome in 1968, which promoted a work published under the title “Limits to Growth”. This report argued that uncontrolled growth is not viable and that it is necessary to manage the quality and type of growth that the planet’s natural systems can bear (Meadows et al., 1972).

In June 1972, the United Nations Organization (UNO) held the United Nations Conference on the Human Environment in Sweden, also known as the Stockholm Conference (Stocchetti, 2012). Twenty-six principles capable of inspiring and guiding the world in preserving and improving the human environment were published. Historically, this was the first large initiative to face the global environment situation. In March 1987, the concept of “sustainable development” was proposed by the World Commission on Environment and Development (WCED) in the Brundtland Report, entitled “Our Common Future”. According to Stocchetti (2012), this report defined “sustainable development” as “the development that meets the present’s needs without compromising future generations’ capacity of supplying their own needs”.

In 1994, the founder of the British consulting company Sustainability created the expression “Triple Bottom Line” (TBL), which defined the pillars of sustainability involving the economic, social, and environmental aspects (Elkington, 1997). Bettencourt and Kaur (2011) and Kajikawa et al. (2014) argue that sustainability science is a rapidly increasing and diversifying field. According to these authors, it is only in recent years that the integration of perspectives as the management of human, social, and ecological systems has created a new field of research, as judged by the emergence of growing scientific collaboration.

In his study, Lozano (2008) argues that it is possible to separate the different sustainable development definitions into the following five categories: (1) the conventional perspective of economists; (2) the non-environmental degradation perspective; (3) the integral perspective, i.e., encompassing the economic, environmental, and social aspects; (4) the inter-generational perspective; and (5) the holistic perspective.

According to Amini and Bienstock (2014), to remain sustainable over the long term, organizations must consider all three dimensions of sustainability, the environment, the economy and society with the same emphasis.

Hence, from this new perspective, organizations have started to face different challenges that not only are limited to the best economic performance but also include social and environmental responsibilities. In other words, companies have completely changed their economic business perspective and have started to be concerned with sustainable development as a whole (Salvado et al., 2015). According to these authors, sustainable development in the long term, should be assessed in view of the supply chain, taking into account the processes upstream of the automaker, from extraction of raw materials and production of components and downstream considering the use of the product and its disposal after use. Thereby, the current business model in the automotive industry is being questioned, given the externalities generated by the increase in production and use of automobiles, such as the consumption of natural resources, the increase in CO2 emissions, increase traffic volume, congestion and accidents, with the consequent worsening of quality of life (Unniethos, 2013).

Wells (2013) states that the current business model in the automotive industry is not adequate to meet the challenges of sustainability. A sustainable automotive industry depends not only on the adoption of innovative technologies for the product, but of a new business model involving products, processes and management structure that could be built around this technology.

The following topic addresses this evolution in the context of
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