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Review

When sustainable development risks losing its meaning. Delimiting the concept with a comprehensive literature review and a conceptual model

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ABSTRACT

The concept of sustainable development still needs more scientific discussion to be useful for decision-making processes. The polysemy of the term sustainability has undermined the credibility of the concept, leading, among other effects, to the inability to translate discourse into practical actions and to distortive appropriations of the term. The purpose of this article is to propose a basis for discussion to demarcate the concept. In this context, a literature review was conducted on the theme, encompassing an exploratory approach and a systematic hermeneutics analysis of the literature. Based on a structured discussion of the evidence collected in papers and books, we developed a conceptual model named Sustainable Development with an Axiological Perspective, encompassing three dimensions: satisfaction of human needs (including social and economic aspects), natural resources (making explicit Earth's limitations) and decision-making perspective (from an axiological point of view). The model proposes that sustainable development can be seen as development aimed at improving the well-being of society as a whole (including future generations), enabled by an axiological perspective in decision-making processes, considering the limitations of environmental resources. The model explicitly includes a value-based mindset in the concept of sustainable development, as pointed out by the axiological perspective. This perspective is intrinsic to the main definitions of sustainability, but is not explicit in the models and in the literature on sustainable development.

1. Introduction

Sustainability is a confusing concept that has evolved steadily over the last three decades, according to Faber et al. (2005). There is a plethora of definitions and opinions about the concept of sustainability (Kirkby et al., 1995; Lindsey, 2011). Numerous definitions of the concept have arisen from different disciplines and perspectives (ecology, economics, sociology, biology, etc.) that focus on specific elements while failing to capture the whole spectrum (Mebratu, 1998). However, they are often difficult to compare due to their disparity (Dale, 2001). The concept of sustainability means many things to different people, and this diversity of meaning tends to increase. Gatto (1995) questions whether this concept is well defined. Highlighting the three most widely used definitions (by biologists, ecologists and economists), he discusses the inconsistencies of each of these views. Since the 1992 Earth Summit in Rio de Janeiro, the difficulty of clearly identifying what sustainability is has been illustrated by the obstacles encountered in passing from theoretical discourse to action, due to technological and political constraints (Matthew and Hammill, 2009).

Some authors argue that the term must evolve due to the uncertainty inherent in natural and human systems (Newman, 2005), while others criticize the existence of so many meanings. Johnston et al. (2007) show how the proliferation of definitions has limited the concept's credibility, questioning its practical applicability and the real importance of advances achieved so far, and arguing that environmental and social progress based on the concept of sustainability has been limited. Rees (1989) claims that a satisfactory definition of what "sustainable" actually means is a prerequisite for the formulation of policies.

From a different standpoint, Robinson (2004) argues that the polysemic interpretation of sustainable development can be seen as an opportunity. Suggesting sustainability as a necessarily political act, he defends the idea of sustainability as a conversation about what kind of world we want to live in today and in the future, rather than a set of future conditions of society or a process of

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moving toward some predetermined point of view. In this case, a polysemic interpretation could help to bridge differences and major conflicts of interest, as traditional opponents come together to discuss under the broad shared banner of sustainability. As Hopwood et al. (2005) argued, leaving the same concept open to various interpretations can be critical: "*the concept of sustainable development represents a shift in the understanding of humanity's place on the planet, but it is open to the interpretation of being anything from almost meaningless to being of extreme importance to humanity (p. 40)*". Other elements should be introduced to prevent the inclusion of distorted views in the concept of sustainability and to warn of the presence of very differing viewpoints, as Bosshard (2000) also pointed out.

Based on the gap in the literature about the polysemy of the concept of sustainability and sustainable development, and seeking to go beyond an opportunistic use of the concept, i.e., focusing only on market-related issues, the purpose of this article is to propose a basis for discussion to demarcate this theme, which led to a proposed model for sustainable development. We believe that the concept of sustainability is used in many ways and that it is, in fact, still under construction. Therefore, we must clarify how we propose to use it, in order to avoid misunderstandings. Because it is important to understand its diverse uses, we propose to present and compare different points of view, enabling us to adopt the most pertinent ones, within a perspective as consistent as possible from the epistemological standpoint.

2. Research methods

The research method is based on a critical analysis of the literature using two complementary approaches. The first approach is an exploratory review of the literature to identify publications on sustainability and sustainable development, considering linked keywords and cited references. The second approach complements and substantiates the findings of the first approach through a hermeneutic analysis of a specific sample of articles identified by means of a structured method. Therefore, the first approach broadens the spectrum of knowledge about the concept of sustainability, while the second makes a more in-depth contribution of specific relevant researches. Rather than exhausting the theme, the idea is to propose a debate based on a deeper scrutiny of the issues involved in this process. Each approach is described in greater detail below.

2.1. First approach: exploratory literature review

The method used in this paper is literature review, aiming to broaden the knowledge base in the research area (Kumar, 2011). The theme of sustainability is characterized by the presence of extensive literature and multidisciplinary views that are sometimes contradictory. The literature review was expected to our expand knowledge about sustainability, enhancing it and finding useful new connections for a more encompassing definition of the theme. Based on the works of Gil (2002), Kumar (2011), and Marconi and Lakatos (2005), this research was developed in several stages.

After selecting sustainability and its related issues as the object of study, a preliminary review of the literature enabled us to formulate the research problem: the existence of polysemy of the term sustainability (the lack of a satisfactory definition) and its functional use linked to specific interests. The work plan consisted initially in reading and preparing book reports of the books proposed by Visser and the University of Cambridge (2009) as the 50 most important ones that discuss sustainability. Each new concept associated with sustainability that appeared during the readings was successively targeted for further literature searches in books and papers in the SCOPUS, ISI Web of Science and Google Scholar databases. The literature search was dynamic (whenever a concept was identified, it was examined in depth through subsequent readings) and was not structured upon predefined sources.

Greater freedom of research was employed in order to reach the largest possible number of disciplines instead of focusing on single views of sustainability. During the reading phase, the texts were sorted according to the main themes and theories, and a theoretical framework was built concomitantly and improved continuously (Kumar, 2011). Three months after starting the literature review (the time limit set *a priori* by the researchers to search for sources, read the material and write the book reports), the logical organization of the topics and the conclusive theoretical framework were defined. This phase was important to summarize, select and link themes and subjects that are of relevance to the study to answer the initial problem (Kumar, 2011). In particular, linking the history of sustainability to the evolving vision of development resulted in the most significant points of the literature review, based on the original purpose of the researchers. Before passing on to the writing of the text, based on the theoretical framework, additional literature was searched for and analyzed in order to increase the theoretical consistency of the selected subjects.

2.2. Second approach: hermeneutic analysis

To complement the discussion resulting from the first approach, i.e., the exploratory literature review, an analysis based on hermeneutic guidelines was made of a selection of papers considered relevant in the discussion about the concept of sustainability and sustainable development. The aim of this analysis was to deepen the investigation of elements useful to achieve the research objective of this paper.

Modern hermeneutics emerged with the purpose of achieving a better interpretation of a given text, restoring the author's original intention and individuality (Schleiermacher, 1977). In doing so, hermeneutics proposes to be a method that enables the researcher to attain the same objectivity as that of natural sciences research (Dilthey, 1976). However, as Heidegger (1962) pointed out, subjectivity is intrinsic to the interpretation process, because it presupposes interpretations of a previous text. Therefore, this process is based on pre-existing prejudices and assumptions. However, the influence of the interpreter's worldview is not a drawback, but a fundamental condition of the cognitive process (Gadamer, 1989).

To assign the necessary degree of rigor to the hermeneutic process, which is required in scientific researches, Ricoeur (1981) proposed a structured process of interpretation based on both Heidegger's and Gadamer's ideas. According to Ghasemi et al. (2011) and Tan et al. (2009), Ricoeur's theory of interpretation is based on hermeneutic circles of explanation (examination of the internal nature of the text), understanding (in-depth interpretation of the text considering its context), and appropriation (changes made by the interpreter).

This approach can be considered a strategy and a plan to obtain and interpret the results, eliciting a heightened awareness on the part of the interpreter, in a dual relationship between his immersion in the studied texts and his distance from them, which enables him to understand them, in an action that correlates explanation, understanding and appropriation (Tan et al., 2009).

Studying Ricoeur's theory of interpretation, Ghasemi et al. (2011) claim that a hermeneutic approach enriches the understanding of those that adopt it, expanding their horizon. This approach is not a reproducible method because, although the steps employed to identify the papers are the same as those used in other

studies, the interpretation of the texts is tied to the subjectivity of the interpreters involved.

Ricoeur's process of interpretation was applied in this paper, based on previous presuppositions of the research group whose backgrounds are in production engineering, ergonomics, and the psychodynamics of work.

The approach started with the identification of the sample of articles to be analyzed in greater depth, using hermeneutics. The first article sample was obtained from the ISI Web of Science, using a combination of the following terms or words in the published titles: ("sustainability" OR "sustainable development") AND (concept* OR review* OR theor*). With this result in hand, only articles were selected. This first article sample yielded a list of 438 articles.

The second article sample was obtained by expanding the analysis to include the references cited in the first article sample. This was done by using the Sitiks bibliometric software program (Schildt, 2002), which resulted in a list of 16,549 references. This second article sample was organized so as to identify the most relevant references. In some cases, reference data (titles, authors, journal, etc.) in the same publication were written in different ways. Thus, 85 references with 5 or more citations were analyzed and the number of citations were combined, whenever that was the case.

For the hermeneutic analysis, we used the first 12 publications of the second sample, which were cited at least 10 times in the first article sample (see Table 1). This last selection considers highly relevant publications that contribute to the concept of sustainability and sustainable development.

Table 1
Classification of the 40 most cited articles (or books) and number of their respective citations (Sitiks output).

Book or article	Cit.
WCED (1987) – Our Common Future	127
Meadows, D.H., et al. (1972) – The Limits to Growth	26
Elkington J. (1997) – Cannibals Forks	19
Clark W.C. (1986) – Sustainable Dev Bios	12
Freeman R.E. (1984) – Strategic Management	12
Lele S.M. (1991) – World Dev	11
Katex R.W. (2001) – Science	11
Harding (1968) – Science	11
Barbier E. (1989) – Blueprint Green Ec	10
Wackernagel, M., Rees, W. (1996) – Ecological Footprint	10
Pearce D.W. (1993) – Ecol Econ	10
Hopwood B. (2005) – Sustain Dev	10
Norton, B.G. (2005) – Adaptive Ecosystem Management	9
Meadows, D.H., et al. (1992) – Beyond the Limits	9
Hartwick JM (1977) – Am Econ Rev	9
Daly H.E. (1989) – Common Good Redirect	9
Dyllick T. (2002) – Business Strategy En	9
Georgescuroegen. N. (1871) – Entropy Law Ec Proce	9
Funtowicz S.O. (1993) – Futures	8
Holling C.S. (1973) – Annual Rev Ecol Syst	8
Mitchell R.K. (1997) – Acad Manage Rev	8
Hicks John Richard (1946) – Value Capital	8
Solow R.M. (1986) – Scand J Econ	8
Hart S.L. (1995) – Acad Manage Rev	8
Gunderson L.H. (2002) – Panarchy Understandi	7
Pearce D.P. (1990) – Ec Natural Resources	7
Costanza R. (1992) – Conservation Biol	7
Bossel H. (1999) – Indicators Sustainab	7
Robinson J. (2004) – Ecol Econ	7
Dimaggio P.J. (1983) – Am Sociol Rev	7
Ciegis R. (2008) – Technol Econ Dev Eco	7
Dryzek J. (1997) – Politics Earth Env D	7
Parris T.M. (2003) – Annu Rev Env Resour	7
Carson R. (1962) – Silent Spring	7
Robert K.H. (2002) – J Clean Prod	7
Ludwig D. (1993) – Science	7
Rockstrom J. (2009) – Nature	7
Eisenhardt K.M. (1989) – Acad Manage Rev	7
Barbier E.B. (1987) – Environ Conserv	7
Holling C.S. (2001) – Ecosystems	7

These articles were analyzed considering the guidelines proposed by Ricoeur (1981) on hermeneutic circles of exploration, interpretation and appropriation. In particular, all the texts were examined not only in terms of their explicit content but also of the context in which they were written, such as the history of the authors and the origin of the publication (Ghasemi et al., 2011; Tan et al., 2009).

3. Research results

The results presented in this section are divided in two parts according to the research method, highlighting the main findings of the exploratory literature review and the hermeneutic analysis.

3.1. Results of the exploratory literature review

The results of the first approach of the literature review were structured in three major conceptual discussions: (i) a broader discussion on sustainability, (ii) sustainable development and (iii) development, and sustainability. After the discussion about the origin and implications of sustainability, the concept of sustainable development, which can be considered as the discussion of sustainability in the international context of development, is also presented. The third section introduces development models which, albeit not always associated directly with sustainability, show the evolution of the meaning of development over the last few years.

3.1.1. A broader discussion on sustainability

The word "sustainable" derives from the Latin "sustinere," meaning defend, maintain, assume, bear, etc. (Castiglioni and Mariotti, 1981). According to Faber et al. (2005), "Semantically, sustainability indicates a relationship between an (sustainable) artifact and its environment that exists indefinitely. In other words, sustainability refers to equilibrium between an artifact and its supporting environment, where they interact with each other without mutual detrimental effects. Sustainability explicitly refers to this equilibrium (p. 5)". Unlike the concept of sustainable development, sustaining an activity or process means ensuring that the system works for a long time (Moffatt, 2007).

The concept of sustainability has a long history. It has been in practice for thousands of years (Saadatian et al., 2012), and in forestry the concept of sustainability has been an accepted principle since the 18th century (Wiersum, 1995), when Hans Carl von Carlowitz coined the German concept of 'Nachhaltigkeit' (sustainability) in 1713 in his work *Sylvicultura oeconomica* (Carlowitz, 1732). Starting from a predicted shortage of timber, Carlowitz proposed that a balance be reached between forest restoration and logging, so that timber could be used continuously and perpetually (with positive economic and social impacts). The environmental movement adopted the term, associating it with the defense and preservation of the environment and of life (Gallino, 2005). The word gained space and visibility when the human–environment relationship began to be discussed, particularly insofar as it concerns problems resulting from the deteriorating relationship between our global ecology and current economic development (Edwards, 2005), although the concept of sustainability was originally tied strictly to environmental aspects, such as that of carrying capacity (Lanza, 1997).

The management of a resource (natural and renewable) is defined as sustainable when, aware of its reproductive capacity, its use does not exceed a given limit, i.e., its carrying capacity (Lanza, 1997; Rees, 1996). This concept is linked to the others such as

critical natural capital, equity, option value, uncertainty, and irreversibility (Lanza, 1997). The discussion of sustainable management of a natural and renewable resource reveals numerous cases of unconscious management (Laurance et al., 2012; Jacobsen et al., 2012). The Living Planet Report 2012 (WWF, 2012) states that actions that overwhelm the carrying capacity of natural resources lead to ecological impoverishment, reducing Earth's natural capital. Because it is not restricted to a specific resource, the concept of carrying capacity may also help explain the sustainability of worldwide human development (Rees, 1996).

The discourse of environmental sustainability and of surpassing Earth's carrying capacity is not the exclusive domain of ecological research. Environmental non-sustainability has a clear and direct impact on human activities and the economy (Costanza, 1995).

Constraints on mankind's economic development due to limitations imposed by the environment appear as early as in the works of Malthus (1766–1834) and Jevons (1835–1882) concerning the growing world population and the scarcity of energy and natural resources (Baker, 2006; Dresner, 2012). The beginning of the use of the concept of 'Nachhaltigkeit' in forestry arose from the concerns of Europe's most prominent economists and statesmen about a predicted shortage of timber. Carlowitz (1732), for example, predicted a severe economic crisis that, in the long term, would ruin the silver mines and metal melting industry and break the economic backbone of Saxony.

On the economic side, irresponsible environmental management that exceeds the planet's carrying capacity leads to diminished use of resources due to their permanent degradation in small or large areas in different regions around the world. Today there are many cases and examples, such as overexploitation of fisheries (Longo and Clark, 2012) and desertification due to aggressive agriculture (Emadodin et al., 2012). In the past, inadequate environmental management was not a major problem: human activities ceased and shifted to other resources and/or other geographical areas. A notorious example is Easter Island; the study of this case can lead to analogies, albeit on a different scale, to what could befall the Earth (Foot, 2004; Nagarajan, 2006). Both this island, in the past, and Earth, today, can be analyzed as closed systems, the former isolated from other islands or continents and the latter isolated from other celestial bodies. The inhabitants of Easter Island could not develop a civilization outside the system, and depended entirely on the natural resources in their demarcated territory. Starting as a place covered in forests, with fertile soil, abundant food and construction material that enabled the development of a sophisticated culture and technologies, the depletion of its natural resources (especially forests) led to environmental, economic, and finally social collapse (visible above all by its demographics). The same does not apply to another isolated island in the Pacific Ocean, Tikopia, whose population has managed its own development observing the limitations of its natural resources (Mertz et al., 2010).

The issue gained visibility in the international arena when such cases of non-sustainability reached higher levels, shifting from the local to the national, the transnational, and ultimately the global domain. Earth is the only place in the universe currently known where humans can live. Hence, at least for now, it cannot be abandoned in favor of another place after its resources have been depleted. Irresponsible actions have serious, even irreversible consequences, compromising mankind's future development. Therefore, sustainability is a core issue because human life and development are at stake. As Bologna (2008) points out, the time elapsed from the appearance of our direct ancestors (hominids) to the present represents less than 0.1% of the Earth's existence. In that period, numerous species have appeared and disappeared, and the same fate could befall the human species. This author believes that mankind's survival will depend on harmonious coexistence with natural systems, and this depends on human actions.

In addition to environment and economy-related issues in the context of sustainability, the social aspect is also extremely important. Direct consequences of the type of environmental management on the economy impact people's lives. Returning to the example of Easter Island discussed by Nagarajan (2006) and Foot (2004), the environmental collapse caused by its population led to economic degrowth (the environmental capital dwindled so severely that it could no longer meet all the population's basic needs), bringing about the sociocultural decline of the entire population and drastically reducing the number of its inhabitants. Sternberg (2012) and Hefny (2012) discuss a more recent example, claiming that among the root causes leading to the "Arab Spring" conflicts in 2011 was the rising price of wheat resulting from a drought in China's grain producing region. Although this natural phenomenon has not been attributed to human activities, it illustrates how an event in a given region can have negative economic impacts with social consequences in another. This strong interconnection is presumably related to strong demographics.

By understanding that some environmental changes lead to strong socioeconomic impacts, the issue of sustainability has become notorious in international discourse when linked to the term development (Dresner, 2012).

3.1.2. Sustainable development

The term "sustainable development" was formally adopted in an international political framework during the first world conference on man and the environment, the UN Conference on Human Environment (UNCHE), held in Stockholm in 1972 (Dresner, 2012), with the creation of the World Commission on Environment and Development.

Scientific issues related to sustainability were the basis for the adoption of the term "sustainable development" in international discussions. Beyond all the questions regarding the limitations of some natural resources for human economic development, such as Carlowitz's concept of sustainability in forestry, the period before the UNCHE is marked by several publications. In that period, the ecologist's vision sees the impact of man on nature as violence. Leopold (1949) argues that a "land ethic" must be adopted whereby humankind no longer conquers the environment but is a member of the Earth community. In her book "Silent Spring," Carson (1962) criticizes industrialization (particularly that of the chemical industry), arguing that humans have no control over nature since they are a part of it. Other important issues are the demographic problem (Ehrlich, 1968), and the need to adopt a long-term and overall view of the system to manage Earth's resources (Fuller, 1969). In the same year as the UNCHE was held, Meadows et al. (1972), based on computer modeling, warned of serious possible dangers of constraints (especially on the economy and the world population) to continued growth and suggested that these growth trends be altered and a sustainable condition be established.

Starting from the UNCHE, the development of this concept was enriched by many different perspectives. For example, the contribution of the World Council of the Churches (Cobb, 1992) was originally much more social, and the "blueprint for survival" (Goldsmith, 1972) had a more environmental focus. Many definitions of 'sustainable development' have been formulated, some hardly comparable (Dale, 2001) and others even contradictory (Livingston, 1994).

The environmental issues that gave rise to the use of the term sustainability remained predominant, above all in the definitions of the initial period. This group of issues includes concepts such as

exploitation of renewable resources (Allaby, 1988), sustainable management of natural resources (Markandya and Pearce, 1988), maintenance of basic life support systems (Liverman et al., 1988), the joint consideration of environment and economy (OECD, 1990), and the reversal of the degradation of natural stocks (Costanza and Wainger, 1991). Coomer (1979), for instance, states that "*A sustainable society is one that lives within the self-perpetuating limits of its environment. It is not a 'no-growth' society, but rather, a society that recognizes the limits of growth and looks for alternative ways of growing* (p. 1)". In this definition, Coomer (1979) identifies a primary aspect, the environment, from which, successively, all other aspects can function (social, economic and political).

Concomitant to the definitions centered on environmental issues, others began to place humanity at the center of their perspective. This is the case, for example, of definitions that focus on human social development. This group encompasses several definitions (Hossain, 1995; IUCN et al., 1991; O'Riordan and Yaeger, 1994), but the most well known definition was published in the 1987 Report of the World Commission on Environment and Development (WCED, 1987): "*Humanity has the ability to make development sustainable, i.e., to ensure that it meets the needs of the present generation without affecting the ability of future generations to meet their own, in which every human being has the opportunity to develop in freedom, within a balanced society and in harmony with the environment* (p. 43)".

Several inconsistencies can already be found between these two groups of definitions. As Lee et al. (2000) argue, the view that proposes the existence of an ecological limitation and the anthropocentric restriction proposed by the WCED centered on human well-being and on the distinction between "haves" and "have nots" may be incompatible. The definition of the WCED, which seeks to connect the priorities of meeting the needs of the poor, protecting the environment and encouraging more rapid economic growth, does not manage to incorporate the need for a different development path. The support for rapid growth, above all, contributed to the adoption of the WCED's definition by business and governments, albeit without causing substantial changes in the development path (Lee et al., 2000). "Sustainable growth," which can be achieved based on the WCED definition, could therefore be considered oxymoronic (Daly, 1993).

Many other definitions and views of sustainable development can be found in different disciplines and in distinct interests and perspectives (Lee et al., 2000; Waas et al., 2010). What can currently be considered convergent is the view that sees sustainable development as a link to care for environmental, social and economic aspects simultaneously in the short, long and longer term. This is the view of Elkington (1998), who introduced the concept of Triple Bottom Line (TBL): "… there can be no prosperity in one aspect without considering the others." Amending this view, Lozano (2008) proposes the concept of Two-Tiered Sustainability Equilibria (TTSE), which he defines as a complex and dynamic equilibrium among these aspects over time.

Based on the dualism between increments in environmental concerns and increments in socioeconomic well-being and equity concerns, Hopwood et al. (2005) mapped different approaches to sustainable development that are found in the literature. All these approaches can be included in the TBL vision, but each one seeks to solve sustainability problems centered on different objectives (more environmental, or more socioeconomic, or both), and with different approaches. Upon presenting these approaches, Hopwood et al. (2005) managed to individuate at least three different broad views on the nature of the changes necessary in society's political and economic structures and human–environment relationships in order to achieve sustainable development: status quo, reform or transformation. The three views are alternatives which cannot be integrated and in fact are mutually exclusive. In other words, although the TBL concept (visible in the mapping) has the merit of allowing for the inclusion of many views in the discourse of sustainable development, as advocated by Robinson (2004), it does not ensure their compatibility.

The three distinct broad views proposed by Hopwood et al. (2005) indicate the presence of different ways of seeing development with regard to the theme of sustainability. How development is seen (particularly when it comes to "sustainable development") should be a basic aspect of knowledge in understanding the theme of sustainability. The transition from one type of development to another in the context of sustainability represents a shift in understanding relationships of humanity with nature and between people (Hopwood et al., 2005). Historically, development denoted the material and quantifiable economy of a country or region, and was seen as progressive and practically unlimited. In recent years, however, in light of the economic and social consequences resulting from inadequate socio-environmental management, this view has come under discussion (Bologna, 2008; Meadows et al., 1972).

For a discussion about sustainable development, it is essential to have background knowledge about the main development models discussed in recent decades. Understanding the new meanings of development allows one to identify the goals to be addressed by society in the future. The next section analyzes several models of development that are connected in some way to the concept of sustainability. These models can serve as a source of inspiration in delimiting the definition of sustainable development.

3.1.3. Development and sustainability

Although there are many ways of seeing development, only a few identified in the literature review on sustainability will be discussed in depth here. The first model can be inserted successfully into the economic model of capitalism focusing on the material and quantifiable growth of a country or a region's economy. The second view recognizes that there are environmental constraints on development and attempts to insert them in a purely economic assessment. The third view, based on the observation of man's negative impact on the environment and its consequences on society's economic and social development, also focuses on the economic aspect but advocates prioritizing care for the natural environment. The fourth, not entirely disconnected from the third, prioritizes growth in harmony with nature, fostered by an economic downturn, which would vastly improve the quality of life of mankind. The fifth and last model proposes development focused on social well-being. The following section discusses each model independently, although in fact they are not separated by well defined boundaries.

3.1.3.1. Development theories focused on economic aspects. Historically, according to Bologna (2008), the term development refers to the material and quantifiable growth of a country or a region's economy. This view is supported by many development theories. To exemplify, it is supported by modernization theories such as Rostow's linear stages of growth model (Rostow, 1960), or the dual-sector model proposed by Lewis (1954); by theories of structuralist economics such as that of Furtado (1959); by dependency theories such as the Singer–Prebisch thesis (Prebisch, 1950; Singer, 1949), the world-systems theory of Wallerstein (1974), and others. In the neoclassical models, Solow's exogenous growth model attempts to explain long-term growth from the standpoint of productivity, capital accumulation, population growth, and technological progress (Solow, 1956). In this model, like in those considered exogenous (Meade, 1961) or endogenous (Nelson and Phelps, 1966; Romer, 1994) by other researchers who

share the same school of thought, the development indicator of a given region is represented exclusively in economic terms, with no variable linked to environmental issues.

Underpinned by the same idea of development promoted by development theories focused on economic aspects, global and national development was estimated for many years based exclusively on the annual growth of gross domestic product (GDP) per capita (Ray, 1998). To this date, countries (and their development) are classified based on this or a similar indicator. The International Monetary Fund (IMF, 2013), for instance, classifies economies as advanced, emerging and developing based on three indices, one of which is per capita GDP. The World Bank (WB, 2013) ranks the world's countries based on their Gross National Income per capita (GNI per capita), dividing them into four categories. As a result, the development of countries is still measured based exclusively on economic and financial parameters.

3.1.3.2. Environmental economics and weak sustainability. While conventional economic theories assumed that economic systems were independent of environmental constraints, which were considered externalities and market failures, public concern for environmental pollution increased starting in the 1960s (Beder, 2011). Based on neoclassical economic theory (Spash, 1999), environmental economics sought to include this concern in economic discourse. Wiesmeth (2012) believes that the state of the environment affects mankind's well-being and that environmental issues should be integrated in the economic system. Introducing the concept of environmental commodities, Wiesmeth (2012) argues that they become relevant when scarcity is perceived, are strongly dependent on the environmental awareness of each economy/country, and must be managed to ensure economic efficiency. From an economic standpoint, the ultimate goal of environmental economics is to find an optimal solution to problems of allocation, taking into account environmental commodities (Wiesmeth, 2012). This new vision, supported by environmental economists, proposes placing a price on the environment, similar to the new ways in which national accounts are done considering natural capital depreciation (Pearce, 2002). The main limitation of this stream of thought, according to Beder (2011), is the lack of interdisciplinarity, which hinders its effectiveness in terms of understanding environmental problems and how to solve them.

The dominance of the economic aspect and its effectiveness is also present in the concept of weak sustainability, which, according to neoclassical economists, argues that capital can, in principle, replace all types of natural capital through technological innovation (Simon, 1981). This replacement is natural because of the laws of the market: price increases due to scanty natural resources foster technological advances and the introduction of replaceable goods and services. Solow (1991) claims that weak sustainability requires only that the total stock of capital assets (the sum of human, natural and ethico-cultural capital) remain constant over time. Thus, taking care of the natural capital is not as necessary. This position, albeit not directly connected to the concept of weak sustainability, is also expressed by Lomborg (2001) who, after a review of several environmental problems, suggests that technology will help overcome any environmental crisis.

3.1.3.3. Ecological economics and strong sustainability. Aiming to bring together economists and ecologists (Spash, 1999) and based on a vision that differs from the neoclassical one (Costanza, 1991), the viewpoint of ecological economics recognizes that it and human development do not depend solely on market regulations (Gallino, 2005) but also on the delicate balance and respect for limits in natural resource management. Based on the concept that Earth is a steady state system, Daly (1991) argues that this system permits qualitative development but not aggregate quantitative growth. Georgescu-Roegen (1971) presents the same view, extending the properties of the law of entropy to the material process of production, while Boulding (1973) proposes the idea of "spaceship earth." According to Daly (1991), the remaining natural world can no longer supply the sources for the metabolic processes necessary to sustain the existing economy, which is oversized.

The literature on ecological economics converges on several points: the need for sustainable management of the flow of resources through equitable distribution and efficient allocation (without exceeding the capacity of natural systems to metabolize wastes); the valuing of ecological aspects such as biodiversity conservation and maintenance of eco-evolutionary dynamics; consideration of Earth's carrying capacity with respect to human population; the need to measure the well-being and richness of our society more completely and comprehensively; and lastly, the impossibility of making mechanical exchanges between human and natural capital (Bologna, 2008). In short, according to ecological economics, Earth is a finite system and can therefore not present material growth (Costanza et al., 1997).

According to Costanza (1991), ecological economics is the science and management of sustainability. The predominance of the environmental aspect is also present in the concept of strong sustainability. The stock of natural resources and all ecological functions are irreplaceable by other values such as social and economic ones, and if degraded, there is no remedy or reversibility (Daly, 1991). According to this vision, sustainable development must impel society to adopt an economic approach unlike the current one, seeking to value natural resources and ecological functions so as not to diminish the opportunities of life (Brekke, 1997). In other words, in today's world, the limiting factor for development is not social capital, as it was in the past, but natural resources, which we attempt to save or recycle, consuming them without exceeding their capacity to recover. "Very strong" sustainability implies that every component or subsystem of the natural environment, every species, and every physical stock must be preserved (Hediger, 1999; Pearce and Atkinson, 1995).

As Myers and Simon (1994) propose, there are different views about people's relationship with their environment. The distinction between weak and strong sustainability identifies how the concept of sustainability can be interpreted in different ways and with different meanings, and is clearly a scientific discipline under construction.

3.1.3.4. Development models disconnected from economic growth: economic degrowth. As early as the late 20th century, authors such as Opschoor (1998) wondered if economic growth is compatible with concern for the environment and welfare. Starting from the same question, a growing number of authors are imputing continuous economic growth as the main cause of environmental non-sustainability (Hueting, 2010; Latouche, 2010; Schneider et al., 2010). They argue that economic growth based solely on the market is unsustainable, and that human progress would be possible without economic growth (Schneider et al., 2010). From a critique of GDP accounting (Van den Bergh, 2010), the current property-based economy (van Griethuysen, 2010) and a parallel need to evaluate development using other indicators (including social and environmental), the theme of this economic degrowth has been gaining ground in recent years in the discussion of sustainable development (Schneider et al., 2010). According to Spangenberg (2010), the growth policy is structurally unsustainable. There are several contributions to this theme (Latouche, 2010), and Schneider et al. (2010) define sustainable degrowth as an equitable reduction in the scale of production and consumption that increases well-being and improves ecological conditions at local and global levels in the

short and long term. The proposed decrease should not result from an economic downturn or a catastrophic crisis, but must be sought through a voluntary, smooth, equitable and democratic transition to a regime of lower production and consumption (Kallis, 2011; Schneider et al., 2010). However, it is increasingly unlikely that such policies, which threaten to "harm" the economy, will be implemented in existing market economies (Kallis, 2011). The transition will be accepted and facilitated if people's material aspirations are moderated, and if the emphasis on material achievements in our daily environment is reduced (Matthey, 2010). This transition will have to be the result of explicit political decisions (Nørgård, 2013), of a cultural and political change through a radical political project (Kallis, 2011), or of collective action that creates self-constraints, which cannot be achieved through voluntary action (Van den Bergh, 2010).

Based on this theory, Nørgård (2013) proposes a model for happy and sustainable degrowth for rich countries, which implies the transfer of some activities of the "professional" economy, driven by money, to an unpaid voluntary "amateur economy" driven by people's affective motivations. A key element of this transition is the combined reduction of consumption and production, which would be achieved by reducing working time or labor productivity and transforming part of leisure time into volunteer activities.

3.1.3.5. Human development. In the first half of the 20th century, authors such as Young (1928) and Leibenstein (1957) stated that two economies with the same fundamentals could move along very different paths. Other authors, such as Kuznets (1941), recognized the limitation of focusing exclusively on market activities while excluding other activities and assets that presumably have no productive value or do not produce satisfaction. For Ray (1998), one of the greatest exponents of development economics – a branch of economics that studies economic transformations in low-income and developing countries – economic advances should not be restricted to a few income-related indicators. Development also means eradicating poverty and malnutrition, increasing life expectancy, facilitating access to basic sanitation, drinking water and health services, reducing infant mortality, increasing access to knowledge and school, etc. Based on the capability approach, Sen (1999) defines development as the expansion of human freedoms (political freedom, available financial services, social opportunities, transparency guarantees, protection and safety). For this author, development requires the elimination of all "obstacles to freedom," such as poverty, tyranny, lack of economic opportunities, systematic social deprivation, negligence of public resources, and repression. Many dimensions can be included in this concept of development, but in fact there is no fixed list of capabilities to be considered (Sen, 2004). Alkire (2010), extending the discussion to other authors and initiatives (Narayan et al., 2000; Ranis et al., 2006; Stiglitz et al., 2009), identifies a convergence among the dimensions be considered. Linking the capability approach and human development, Alkire (2010) proposes the consideration of some capabilities: Health and Life, Education, Decent Living Standards, Political Freedom and Process Freedoms, Creativity and Productivity, Environment, Social and Relational, Culture and Arts. Thus, human development would be "the expansion of people's freedoms and capabilities to lead lives that they value and have reason to value" (UNDP, 2011). Indirectly connected to this context, several authors (Aburdene, 2005; Gray, 1998; Handy, 1998) suggest changing the actual economic system.

3.2. Results of the hermeneutic analysis

As presented in the research method, the second approach of the literature review complements the previously discussed results. This involved a deeper analysis of specific references that were more frequently used to underpin articles about the concept of sustainability and sustainable development. The main contributions to the discussion on the concept of sustainable development are described in this section, considering not only the content of each publication but also the context and the authors of the articles.

It is interesting to note that many of the publications analyzed are the result of the formal multidisciplinary initiatives of members from several parts of the world whose efforts focus on deepening research and scientific knowledge about sustainability and related issues. This is evidence of the difficulty in understanding the challenge of sustainable development and in developing practical contributions to its solution. Some examples are the Brundtland Report (WCED, 1987), published by the World Commission on Environment and Development (WCED), which was created in 1983 by the United Nations; the book of Clark and Munn (1986), in which the chapter on Holling (1986) was consulted, which is one of the outputs of the initiative IIASA Feasibility Study on Sustainable Development on the Biosphere (Holling, 1986); the paper written by Hopwood et al. (2005), which publishes results of the Sustainable Cities Research Institute; and the article of Kates et al. (2001), which was written by participants of the Sustainability Science Workshop held in 2000 at Friibergh Manor, Örsundsbro, Sweden.

The multidisciplinary aspect of sustainability is also confirmed by the fact that the academic qualifications of the authors of this basic literature on sustainability encompass several areas of knowledge, such as *ecology and ethology*, the Ph.D. theme of Rees; *environmental economics* the in-depth knowledge of Pearce; *microbiology*, the Ph.D. thesis of Hardin; *economics*, the main discipline taught by Markandya and Barbier; *geography*, the main subject of Kates; *electrical engineering, systems science, energy and resources*, the areas of expertise of Lélé; *business administration*, Freeman's focus of teaching; *sociology and social psychology* associated with urban and regional planning, the academic formation of Elkington; and *community and regional planning*, the PhD theme of Wackernagel. This indicates the need for a joint effort by several disciplines to develop, promote and disseminate solutions to the challenges posed by sustainable development.

The validity of the references studied via the hermeneutic approach is reinforced by the relevance of each author in his/her respective field of action. Some examples are Elkington, ranked fourth among 100 people by a CSR International survey in the list of the Top 10 CSR leaders in 2009; Holling, one of the conceptual founders of ecological economics and founder of the journal "Ecology and Society" (impact factor of 2.8); Pearce, one of the main pioneers of Environmental Economics; Wackernagel, currently president of the Global Footprint Network, and Rees, founding member of the One Earth Initiative.

Considering these contextual appointments, one of the issues discussed in the main references used to build the concept of sustainability focuses on the limitations of Earth's natural resources, from an objective and quantitative perspective (Holling, 1986; Pearce and Atkinson, 1993; Wackernagel and Rees, 1996). Meadows et al. (1972) present a mathematical model, which was built specifically to investigate five major interconnected trends of global concern: accelerating industrialization, rapid population growth, widespread malnutrition, depletion of nonrenewable resources and deteriorating environment. The authors prove that these trends lead to limitations in growth (Meadows et al., 1972). Holling (1986) does not refer directly to sustainable development or make any explicit criticism about human exploitation of nature. His research is tied strictly to natural phenomena, and human activities are treated as external factors. However, it contributes to the discussion of sustainable development because it discusses the issues involved in Earth's resilience and points to the need for

awareness of the fact that even gradual variations in the environment (and particularly these) can lead to an irreversible situation that is incompatible with human man survival.

Pearce et al. (1989) propose a number of indirect and direct techniques that could be used to value the environment and for environmental accounting, since the authors stress the need to place greater emphasis on the value of the natural environment for its direct and indirect contributions to economic growth and to human well-being. Based on Victor (1991), Pearce and Atkinson (1993) confirm the importance of capital theory to build sustainable indicators and describe one form that a "weak" sustainability indicator can take. The authors' contribution to sustainable development is the need to maintain the level of overall capital stock (the sum of monetized natural capital and man-made capital) which should be non-decreasing. They recognize the limitations of this proposal, since not all economic functions of ecological systems can be captured by natural capital measurements.

The main concept presented by the publication of Wackernagel and Rees (1996) is the ecological footprint, which is "an accounting tool that enables us to estimate the resource consumption and waste assimilation requirements (p. 9)" of a certain population. In other words, it measures the carrying capacity of a specific population. This book contains an explicit discussion of the relationship between ecological footprint and sustainability and describes the severe consequences of economic development on the environment. According to the authors, man has been responsible for a certain level of resource harvesting and waste generation that the natural dynamics is not able to regenerate (Wackernagel and Rees, 1996). The contributions of each of these publications complement each other, but the main overall result is that they urge mankind to reduce the depletion of natural resources, because otherwise they will be eradicated, and in consequence, no human life will be possible.

Another relevant aspect that can contribute to the concept of sustainable development is the approach that the main benefit and need is society's well-being (Lélé, 1991; Pearce et al., 1989; WCED, 1987). Although Hardin (1968) does not mention the terms "sustainability" or "sustainable development", his discussion is tied closely to these concepts, particularly with respect to the limitations of natural resources to absorb human needs (carrying capacity). The author presents the human problem from a very critical point of view, arguing that a positive rate of population growth is incompatible with the guarantee of humankind's everyday needs, such as food, waste disposal and leisure (Hardin, 1968). The Brundtland Report is emphatic in its social and political approach, stating that "sustainable development requires meeting the basic needs of all and extending to all the opportunity to fulfill their aspirations for a better life (WCED, 1987)". The book by Pearce et al. (1989) begins its discussion with several definitions for sustainable development, including the famous one attributed to the WCED (1987). For these authors, achieving sustainable development requires devising a social and economic system which ensures that desirable goals for society (not only real income per capita, but also health, education and general social well-being) are sustained (Pearce et al., 1989). Considering the need to extend the time horizon and increase equity (intergenerational and intragenerational equity), the authors focus on the importance of the environment in achieving sustainable development (Pearce et al., 1989). Lélé (1991) also points out the social implications of sustainable development and advises academics and practitioners to realize that the origin of poverty and environmental degradation is not only economic, since structural, technological and cultural aspects are also contributing factors. Therefore, the latter publications demonstrate the close relationship between sustainable development and social issues such as education, health and poverty. Such concerns lead directly to the need for active political intervention to ensure society's current and future well being (Holling, 1986; Kates et al., 2001; WCED, 1987).

Inserted in the a research project on Sustainable Cities, the publication of Hopwood et al. (2005) makes an interesting contribution to the concept of sustainable development, considering several initiatives and mindsets related to the theme and illustrating them on a map. This map correlates socio-economic well-being and equality concerns with environmental concerns. As a result, the authors propose a continuum of possible approaches to problems related to sustainable development, starting with status quo, moving to reform and ending with transformation. There is a need for real transformation or at least for some kind of reform to build a more sustainable society, considering core values such as environmental protection, justice and equity (Hopwood et al., 2005).

Another important aspect to be considered in the discussion on sustainable development discussion is the role of (Elkington, 1997; Freeman, 1984). The main concept introduced by Elkington (1997) is the Triple Bottom Line (TBL). The transition to a sustainable world can be accelerated by organizations, which are to be concerned not only with economic objectives but also with environmental and social aspects. The author proposes that firms should make changes in seven paradigms: market (from submission to competitiveness), values (from rigid to flexible), transparency (from closed to open), life cycle technology (from product to function), partnership (from disunion to symbiosis), time conception (from intense to long term), and governance (from exclusive to inclusive).

In contrast, Freeman's (1984) book did not mention sustainability or sustainable development. The author himself said afterwards "when the main academic audience for my ideas became people who taught Business and Society or Corporate Social Responsibility or Business Ethics I was surprised. I had originally thought that the main academic audience would be strategy professors (Freeman, 2004, p. 229)". But the stakeholder approach presented in Freeman (1984) is related directly to Corporate Social Responsibility (CSR), since the latter encourages companies to assume responsibility for their actions by considering the consequences for other parts that are affected (i.e., for stakeholders). Furthermore, the contribution of this publication to the sustainability approach (in the form of CSR) lies in the relationship attributed from the stakeholder idea of ethics and values. As Freeman (2004) later stated, "one of the key questions of enterprise strategy is how does your firm make each stakeholder better off, and what are you doing to improve any tradeoffs that may exist between stakeholders (p. 233)".

The hermeneutic analysis of a carefully chosen set of publications presented in this section offers important insights into sustainability challenges. Initially, it is worth noting that concerns about sustainability challenges (and related issues) are not recent and require the integrated efforts of several disciplines. The sooner people act to reach this stability (and sustainable development), the greater the chances of success (Hardin, 1968; Meadows et al., 1972). Furthermore, considering the ecological footprint, the literature proposes that technological innovation plays an important role, but is not enough to solve the related issues, since these problems are associated with a behavioral and social crisis (Hardin, 1968; Wackernagel and Rees, 1996). The key to a long term effective solution is a fundamental issue on morality (Hardin, 1968). Hence, the solution to this crisis must take into consideration that mankind is, at the same time, competitive and cooperative (Wackernagel and Rees, 1996). Given Earth's carrying capacity, a cooperative solution needs to be discussed and supported by man (Wackernagel and Rees, 1996). Furthermore, there is also the need for greater

flexibility in human systems, to enable adaption to dynamic and variable situations (Holling, 1986). In order to avoid this crucial situation, it is necessary to reach ecological and economic stability, e.g., "the basic material needs of each person on Earth are satisfied and each person has an equal opportunity to realize his individual human potential (Meadows et al., 1972, p. 24)", as also pointed out by the WCED (1987).

4. Discussion

Based on the two-staged research method to investigate elements that delimit the concept of sustainable development, three main points of discussion (PD) are presented below. They are followed by a conceptual model for sustainable development that contributes to an understanding of the concept by participants of academia, public policies and private (profit or non-profit) organizations.

4.1. Main points of discussions

The exploratory literature review and the hermeneutic analysis enable us to reach clear conclusions about three points.

PD-A – Sustainable development is based on environmental issues: The environment represents a constraint to achieving sustainable development, because the limitations of natural resources have a direct impact on the economy and, ultimately, on society.

As we have seen in the literature review, in its original discussion, economic and social aspects gave "sustainability" strength and weight through the possible negative consequences caused by environmental problems (such as those discussed in the UN Conference on Human Environment held in Stockholm). In fact, the word "sustainable" stemmed from the need to take better care of environmental causes that had negative impacts on the natural environment, and thus on the economy and on society. Linked to all development, models, but particularly to human economic and quantitative (material) development, and employed according to Faber et al. (2005), the term "sustainable" originally referred to the balance there should be between these types of development (the artifact) and the context in which it is inserted and that supports it (environment), i.e., the natural environment. Moreover, the Latin dictionary defines the term sustainable (Castiglioni and Mariotti, 1981) as: defend, maintain, assume, support, is also aligned with the concepts of Carrying Capacity (Bologna, 2008; Costanza, 1995; Costanza et al., 1997; Hardin, 1968; Lanza, 1997; Rees, 1996), Biocapacity (WWF, 2012), and Ecological Footprint (Moffatt, 2007; Wackernagel and Rees, 1996).

Furthermore, based on different depths of investigation, 11 of the 12 publications analyzed hermeneutically consider the environment an important aspect to be considered in achieving sustainable development. The only analyzed publication that did not focus on environmental aspects was that of Freeman (1984). The author originally believed that "the main academic audience would be strategy professors (Freeman, 2004, p. 299)" and he was surprised to discover that his book was used in discussions about corporate sustainability (especially CSR). It can therefore be concluded that the concept of sustainable development must take into account the limitations of natural resources to absorb human needs (thus representing a constraint on human development).

PD-B – Sustainable development is an anthropocentric concept: The overall concern with respect to sustainable development lies in the search for solutions for mankind's short and long term survival and well-being.

As presented in PD-A, human development, including social and economic aspects, depends on the exploitation of natural resources. The analyzed literature does not focus on the preservation of all ecosystems, but focuses specifically on the natural resources that are used as input for societal activities and needs. As far back as Carlowitz (1732), the environment was considered not for its own sake but for its impact on Saxony's silver mines and metal foundries. Hence, the aspect of nature that concerns sustainable development is the one that affects mankind's survival and well-being.

The findings and motivation underlying the researches on sustainable development reported in the literature can be justified based on human needs (Hardin, 1968; Lélé, 1991; Pearce et al., 1989; WCED, 1987). Carrying capacity (Bologna, 2008; Costanza, 1995; Costanza et al., 1997; Hardin, 1968; Lanza, 1997; Rees, 1996), Biocapacity (WWF, 2012), and Ecological Footprint (Moffatt, 2007; Wackernagel and Rees, 1996) enter the discussion on sustainable development not only because they are linked to the environment but also, and more specifically, because they deal with natural resources that are useful inputs for the production of goods. Hence, these resources are important to satisfy human needs and must therefore not be allowed to disappear.

The anthropocentric focus of sustainable development is clearer when the debate involves sustainable development. Discussions about sustainable development imply that the object to be achieved is development, for which sustainability is a qualifier. The discussion on "development" presented in Section 3.1.3 shows that one possible way of understanding development is by maximizing human well being. The initial approach of development focused on quantitative economic growth. The evolution of the term reveals a stronger tendency to focus on human qualitative needs and a lesser tendency to focus on purely quantitative economic growth. This more recent approach to development encompasses not only physiological, basic and tangible needs (quantitative needs), such as food and shelter, but also other more intangible needs related to well-being (qualitative needs), such as family, safety and higher education. What characterizes the latest models of development is the intention of linking purely economic aspects with social goals of welfare for the majority of society.

PD-C – Human ethics and values: Sustainable development implies changing the perspective from an individual to a collective driver in decision making.

The underlying meaning of the anthropocentric approach to sustainable development is that the focus of sustainable development is not on a specific individual. On the contrary, the literature brings into evidence concerns regarding humanity as a whole, employing terms such as "humanity" (Hardin, 1968; WCED, 1987), "people" (Meadows et al., 1972; WCED, 1987), "society" (Pearce et al., 1989), "mankind/man" (Holling, 1986; Wackernagel and Rees, 1996), "population" (Wackernagel and Rees, 1996), "world growth" (Meadows et al., 1972), "worldwide common challenges" (WCED, 1987), etc. In this context, the case of Easter Island is emblematic, since the consequences of the unsustainable management of its natural resources affected the island's society as a whole (Foot, 2004; Nagarajan, 2006). This approach also evidences the need for understanding and managing the interdependencies between the elements of a society, since the consequences of decisions taken by some individuals can be perceived by others who were not even considered in the decision making process.

Interdependencies make it more difficult to adequately define the problem and to propose effective solutions for sustainable development concerns. They imply the need for integrated multidisciplinary efforts and for the contribution of several representatives of society (Wackernagel and Rees, 1996). In this regard, there is also the need for international cooperation for the effective implementation of solutions aimed at sustainable development, ensuring, among other things, equity through democracy and citizen participation, as important issue in the context of sustainability

(WCED, 1987). Evidence of the need for joint and organized initiatives was found in our hermeneutic analysis, since several relevant publications have been produced by multidisciplinary groups. To promote solutions for sustainable development, society's participation plays a fundamental role, highlighting the importance of the media to disseminate information and of building integrated research, groups, as well as popular mobilization and direct action (Hopwood et al., 2005). The literature also points out the importance of broad discussions by the scientific community regarding solutions for sustainability, since science must be connected to the political agenda for sustainable development (Kates et al., 2001). This may be possible through the construction of institutional and infrastructural networks that promote interdisciplinary initiatives (Kates et al., 2001).

In addition to democracy and citizen participation, important values, such as equity, equality and justice are also addressed in the literature on sustainable development, and can be related to human well-being (Hopwood et al., 2005; WCED, 1987). Along the same lines, Meadows et al. (1972) emphasize the importance of providing equal opportunities to realize the potential of each individual. Furthermore, "sustainable development requires meeting the basic needs of all and extending to all the opportunity to fulfill their aspirations for a better life" (WCED, 1987). Pearce et al. (1989) point out the need for developing a path for economic progress that does not harm the welfare of future generations. Considering that human well-being encompasses society's basic needs, the assurance of food, education and health for each individual on Earth today and tomorrow are also important for global sustainable development. Another fundamental aspect is that of morality, related to the population's awareness of and education about the urgency to exploit nature from a long term standpoint (Hardin, 1968).

What characterizes the most recent models of development is the intention to link purely economic aspects with social goals of welfare for the majority of society. Starting from a vision based on functionalist models, in which there is a preponderance of a single rationality inspired by a strategic instrumental perspective, the latest ideas about development include axiological issues in the debate. Thus, values that embody an ethical and moral perspective are at the core of a long-term vision, combining what is economic, environmental and social in the world. For example, there is more than one way to envision what pertains to the field of economics. Considering positive and negative externalities, one modifies one's own vision of what pertains to the field of economics. Therefore, sustainable development would be impossible in the absence of an axiological vision that considers the economic value integrated with the others.

As part of society, corporate ethics and values are also related to sustainable development. In this regard, the priorities of firms need to shift from a focus exclusively on economic quantitative growth to a focus on sustainable development, with emphasis on the integration of economic, environmental and social qualities (Elkington, 1997). Also expanding the corporate point of view, the stakeholder theory, as part of strategic management, considers not only business owners in the decision making process but also the needs and contributions of other stakeholders such as workers, local community, government, natural environment, etc. (Freeman, 1984). This approach led to the incorporation of ethics as part of corporate strategies (Freeman, 2004). Thus, considering the mindset that decisions about sustainability are based not only on individual but also collective drivers, firms are instigated to examine their role in global society.

The aforementioned literature discusses, some authors more explicitly and others less so, the need for a change of perspective to enable sustainable development. This means that "painful choices have to be made" (WCED, 1987), because, for example, those who are more affluent need to adopt life-styles within the planet's ecological means (WCED, 1987). Many of the analyzed publications focusing on environmental aspects consider the need for new social and economic approaches aligned with sustainable development (Hardin, 1968; Holling, 1986; Meadows et al., 1972; Pearce et al., 1989; Wackernagel and Rees, 1996). Based on several sustainability models, Hopwood et al. (2005) concluded that a change of paradigm through transformation is one of the requisites to achieve sustainable development.

According to the literature review, the discourse on sustainable development emerged to solve the problems (initially caused by environmental issues) of certain societies. The objective of this discourse was to solve broader problems affecting human society as a whole. Thus, what sustainable development introduces is the vision of society as a community. There are problems (environmental, social and economic) that affect the entire world, and sustainable development proposes to solve them. In this context, a model for sustainable development is proposed to support decision making process aligned with sustainability.

4.2. Model of "Sustainable development with an axiological perspective (SD-AP)"

The points of discussion (PD) presented above serve as the basis to build the conceptual model for sustainable development proposed in this section (Fig. 1).

The model presents three dimensions, representing each point of discussion (PD) described in section 4.1. These dimensions are summarized in the following points and in Table 2.

- (PD-A) Natural resources dimension: represents the fundamental basis to satisfy human needs. This dimension considers the intensity of concern attributed to natural resources that are used for the development of society, e.g., the long term increase in well-being. Sustainable development is reached through collective decisions regarding the use of natural resources. In the proposed model, the concept of sustainable development includes environmental issues focusing on natural resources, e.g., on inputs to satisfy human needs. Issues of nature that go beyond natural resources (such as the threat of extinction of large felines) can be considered in more advanced aspects of human needs (axis related to PD-B). In this dimension, the main question is: are the environmental constraints for the present and future considered and ensured?
- (PD-B) Satisfaction of human needs dimension: represents the needs of society (social goals) and considers the satisfaction of human needs for all individuals rather than only for part of society. This dimension can be understood as a cumulative continuum, ranging from none to all human needs fulfilled for all of society. The first human needs to be satisfied are life depending and more tangible (such as food), while the last are transcendental and less tangible (such as freedom). The tangible goals include economic goals. The model illustrates a specific level of human needs (based on WCED, 1987) which can be considered a minimum for sustainable development. The aforementioned level includes aspects such as food, clothing, shelter and jobs (WCED, 1987). Therefore, in this dimension, the main question is: are the human needs of society as a whole met beyond the minimum proposed by the WCED (1987)?
- (PD-C) Decision perspective dimension: represents a continuum of scope to be considered in decision making processes, starting from individual and functionalist drivers and evolving to axiological drivers. In this dimension, it was considered that decisions can be made based on the goals and constraints of the individual, family, organization/community, state, continent or

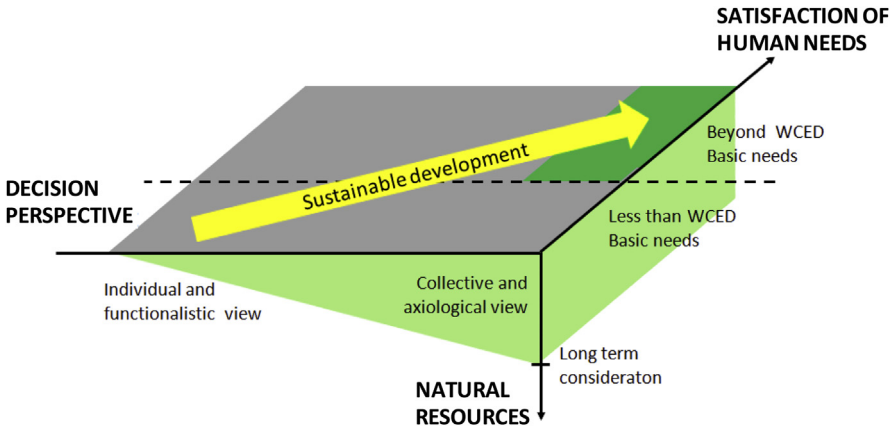

Fig. 1. Model of "Sustainable development with an axiological perspective (SD-AP)".

global society. At one extreme (individual and functionalistic drivers), the decision perspective is concerned with objective, rational, short term, restricted and problem-oriented issues. At the other extreme (axiological drivers), this perspective considers more subjective, emotional, long term, value-based, systemic and intergenerational aspects before greaching a decision. This latter decision perspective promotes initiatives that are based on social values, ethics, cooperation, equity and equality. In this dimension, the main question is: are positive and negative impacts for society considered in decision making-processes?

As indicated by the arrow in Fig. 1, sustainable development is achieved when the human needs of society as a whole are satisfied beyond the basic needs described by the WCED (1987), within given limits of environmental resources and based on an axiological perspective for decision-making.

One of the dynamics that contributes to sustainable development is the positive relationship between the decision perspective and natural resources concerns. This can be considered reasonable, since axiological drivers for decision making mean that decisions are not based on the short term individual impact of resource exploitation. Instead, this perspective ensures that future generations are also able to satisfy their needs using the natural resources available in their time.

In the dimension of human needs, sustainable development must consider the limitations of natural resources. The greater the sustainability of development, the more people are included in the well being level of human needs and, as a consequence, the better the resources are divided among all, given the constraints of the environment. In this scenario, significant inequalities in the levels of satisfaction of the needs of different communities would be diminished and people would have to be satisfied with less material and more qualitative needs. In this regard, higher levels of human needs satisfaction are more associated with "being" (satisfied, personally and professionally realized, etc.) than with "having" (expensive cars, high technology devices, etc.).

From the corporate standpoint, investments in technology can be seen as an alternative to contribute to the satisfaction of human needs (and thus sell more), using fewer natural resources, as already considered in the triple bottom line model. The use of the synergy of the three pillars of sustainability can be important to encourage corporations to think beyond their boundaries. However, the contribution of the proposed model is that the profit drivers for corporate decisions to identify socio-environmental initiatives for their business do not suffice to ensure sustainable development. This is because in some cases profits may have to be sacrificed in the decision making process in order to consider the full dimension of the proposed model. The model calls for firms to consider their role in global society and their contribution to society's well being. In this case, the model does not ask firms to give up their revenue, since profits are required to maintain jobs and production levels. Instead, the model induces corporations to survive in the long term, serving society as providers of employment, products and services (rather than exclusively the enrichment of a few stakeholders). Today there is already a tendency for such values to be incorporated in the business context, which go so far as to consider the spiritual dimension (Aburdene, 2005).

Table 2
Dimensions and implications of the SD-AP model.

Axiological dimension	Low level of sustainable development	High level of sustainable development	Effort needed in each dimension	Effort needed for sustainable development
Natural resources dimension	No consideration of natural resources limitations	Long term consideration of natural resources limitations	Research, planning and implementation of processes and products that reduce the depletion of natural resources and, at the same time, can satisfy human needs.	Satisfy the human needs of society as a whole (also for future generations) beyond a minimum level, which is enabled by a collective and axiological paradigm for decision-making, considering the limitations of environmental resources.
Satisfaction of human needs dimension	No satisfaction of human needs achieved for society as whole. This means that, for at least part of society, minimum human needs are not satisfied.	Beyond a minimum level of satisfaction of human needs for everyone in the world	Ensure that everyone's needs are achieved	
Decision paradigm dimension	Individual and functionalistic perspective	Collective and axiological perspective	Make decisions aimed at global optimum rather than local optimum results.	

The proposed view is in line with that of other authors (Gray, 1998; Handy, 1998; Hopwood et al., 2005; Van Griethuysen, 2010), i.e., without a change in perspective and in the economic system, it seems unlikely that sustainable development can be achieved. According to the proposed model, the incorporation of an axiological vision would be essential to augment the likelihood of achieving a sustainable future. However, although it is a common goal to be pursued, there will always be conflicting interests in society. However, it is not possible for only one actor of society (e.g., businesses, or consumers, or national states, etc.) to be responsible for such a change in development. In other words, efforts must be coordinated and aligned.

The first ones to change, however, must be individuals. According to Edwards (2005) and Raivio (2011), people's education should be one of the priorities for a sustainable future, since it is through people's activities and social relationships that a positive future for humanity can be constructed. For palpable results, it is essential that people who play different types of roles become engaged. Trust and understanding between different groups need to be engendered. Although rules and regulations are necessary, it is even more important for people to understand why the commitment to sustainable development provides such interesting possibilities for living a meaningful life.

5. Conclusions

Based on a structured discussion of the evidence collected from papers and books, it can be concluded that sustainable development can be seen as the kind of development aimed at satisfying the human needs of society as a whole (including future generations) beyond a minimum level, which is enabled by an axiological perspective in decision-making, considering environmental limits.

This point of view is based on the SD-AP model (Fig. 1), which encompasses three dimensions: natural resources, human needs and decision perspective. Although these aspects are already considered in the literature, they have not previously been systematized as proposed by the model. This paper contributes to a better understanding of the concept of sustainable development, which is important for concrete and aligned efforts of diverse parts of society. The main advantages of the proposed model are as follows. (i) A wide target group (the model can be used by academia, for public policies or by the private sector). (ii) Representation of the concept of sustainable development in terms of three pragmatic questions: Are the environmental limitations for present and future considered and ensured? Are the human needs of society as a whole met beyond the minimum proposed by the WCED (1987)? Are positive and negative impacts for society considered in decision-making processes? (iii) Objective explanations of its dimensions and their interactions toward sustainable development. And lastly (iv), the balance between the model's easy understanding and its ability to represent the concept and its application in decision-making processes.

Another contribution of this paper is its structured analysis of the literature on sustainability, based on a broad range and in-depth literature review. This enabled the paper to advance in the academic sphere with the SD-AP model, which explicitly includes a value-based mindset in the concept of sustainable development, as pointed out by the axiological perspective. This perspective is intrinsic to the main definitions of sustainability, but it is not explicit in the models and literature on sustainable development. In this context, social values are fundamental for building a sustainable society.

A clear limitation of this paper is that it is based on the literature and does not encompass empirical evidence. Furthermore, as discussed herein, due to the fact that hermeneutics is an interpretative approach, the world perspective of the researches to analyze the publications may eventually bias the findings. In this study, the researcher's background in ergonomics may lead to a tendency to focus on a human centered work perspective. Another limitation of this paper is that it presents a model which, by definition, is a simplification of reality, leaving some issues unrepresented. Moreover, the analyzed literature does not encompass the entire theme since several publications were not included. This limitation of the paper is due to the fact that the literature on sustainability and sustainable development is diversified, broad and situated in several areas of knowledge. Therefore, this discourse can and should be expanded further, serving as the basis and input for other researchers to contribute to the definition of the concept.

Improvements of the proposed model are possible, with further research pointing out critiques and incorporating empirical evidence. Other future research approaches could focus on the meaning of sustainable work of the individual in society, investigating the ability of people's activities to provide favorable conditions for professional development, self-fulfillment and healthy work, i.e., for society's human development. In this regard, it is important to understand how sustainability policies change what people actually do in their jobs and how it is necessary to change practices and provide more apprenticeship opportunities. Considering organizations, it is also an interesting approach to investigate the dynamics of public and private entities to determine how they contribute to sustainable development, through their own activities or through sustainability networks. Furthermore, future researches have a strong potential to contribute to academics and practitioners by contextualizing corporations in the logic of sustainable development proposed herein. This approach is particularly interesting due to its relevance to society and its potential to contribute de facto toward global sustainable development. As this paper points out, further research into technological solutions to measure and reduce the negative environmental impacts of human activities is important in that it should allow for the identification of solutions that maximize the satisfaction of human needs while minimizing the depletion of natural resources. However, technological solutions must go hand in hand with social science research, given the importance of a social shift towards a more value-based mindset.

Regardless of the specific theme for future research, an important point is the need for the contribution of multidisciplinary efforts, reinforcing the tendency that those who wish to contribute to sustainable development are impelled to think outside the box, step out of their comfort zone and incorporate other points of view, so that effective solutions for sustainable development can be identified and implemented.

This paper discusses the need for a shift in perspective, given that sustainable development can no longer be analyzed based solely on a few variables and its evolution traced over time. It is now also crucial to seek to relate different aspects of reality and not separate just a few variables to explain a phenomenon, as is the main perspective of the functionalistic approach. The point of view presented by the proposed model is useful to gain a better understanding of reality and to correlate different aspects of sustainability.

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