

SUSTAINABILITY AND SUSTAINABLE DEVELOPMENT: A TAXONOMY IN THE FIELD OF LITERATURE

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Introduction

The emergence of sustainable development (SD) as a political and social project of humanity has promoted the orientation of efforts in order to find ways for sustainable societies (SALAS-ZAPATA et al., 2011). Since then, there has been lot of literature devoted to the subject, and no doubt a blurring of focus.

A growing interest in sustainability (or SD) and, more recently, the approaches regarding strategies, cleaner production, pollution control, eco-efficiency, environmental management, social responsibility, industrial ecology, ethical investments, green economy, eco-design, reuse, sustainable consumption, zero waste (GLAVI; LUKMAN, 2007), among many other terms.

The approaches depend on the field of application (engineering, economics, management, ecology, etc.), in which each science tends to see only one side of the equation (CHICHILNISKY, 1996), however they are common, as they turn to sustainability (or SD). It is no coincidence that the concepts of sustainability and SD are still poorly understood (DOVERS; HANDMER, 1992), and in many cases, are treated as synonyms. But not all who research these concepts see them as such.

To Dovers and Handmer (1992) sustainability is the ability of a human system, natural or mixed, to resist or adapt to endogenous or exogenous change indefinitely, and, in addition, SD is a way of intentional change and improvement that keeps or increases this attribute of the system meeting the needs of the population. In a first perspective, SD is the way to achieve sustainability, that is, sustainability is the ultimate long-term goal.

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For Elkington (1994), creator of the term *Triple Bottom Line*, sustainability is the balance between the three pillars: environmental, economic and social. The expectation that companies should gradually contribute to sustainability arises from the recognition that businesses need stable markets, and must have technical, financial and management skills necessary to enable the transition towards sustainable development (ELKINGTON, 2001). This is, therefore a second perspective, different from the first: SD is the goal to be achieved and sustainability is the process to achieve SD.

Regardless of the two perspectives, this research turns to sustainability. It is observed that there is now a variety of research and publications on the subject in order to address a way of understanding and explaining sustainability, be it as a process or an end goal. In this sense, it is important to have a clear notion of what is meant by sustainability or lack thereof (TISDELL, 1988).

The term sustainability is used, but little explained. It is of conceptual in nature, misunderstood (EKINS *et al.*, 2003). It is a fashion accessory (HASNA, 2010) or common sense (MOLDAN *et al.*, 2012). There is an inconsistent interpretation and application, high degree of ambiguity of the concept, including an incomplete understanding of the problems of poverty, environmental degradation and the role of economic growth (LÉLÉ, 1991; MORI; CHRISTODOULOU, 2012; SLIMANE, 2012). And the situation has not improved so far, it remains a popular and brilliant slogan (SLIMANE, 2012).

In this context, this study aims to examine the literature on the topic of sustainability in order to characterize it and set the stage it is in, as well as analyze gaps and challenges in order to bring contributions for future research.

This article, besides this introduction consists of the sections: ii) Methodological Procedures; iii) Literature Review; iv) Results; and v) Conclusions.

Methodological Procedures

Based on the goals of the work, we carried out the definition of the criteria for selecting journals, the collection of articles, the sorting of articles, content analysis and presentation of results.

For the literature review, we proceeded to search for keywords, them and their variations being: *environmental sustainability, economic sustainability, social sustainability, indicators, definitions, green, performance measurement, indices, organization, business, firm, industry, sustainable development, environment management systems, ISO 14031, measures, cleaner production and sustainable development.*

We selected databases available on the CAPES Journal Portal to compose the database, selecting those with the potential to collaborate with the research topic in question, these being: *Engineering Village, Elsevier, ISI Science Direct, Scopus and Wiley.*

The software used to import the publications selected in the databases searched was EndNote X6®. Upon completion of the search of the 18 keywords on the 6 databases, 13,928 publications were selected. Among these publications, the repeated articles were removed, leaving 7,346 publications. Analyzing the alignment of the titles with the objective of the research, 250 articles remained.

These 250 articles were submitted to analysis of the alignment of the abstract and keywords relating to the research goal, therefore, leaving 141 articles with aligned titles, abstracts and keywords. And, in the last selection, the bibliographic portfolio for content analysis totaled 103 articles with total text alignment, freely available in the databases.

Next, we proceeded to read the full content of the articles. They were analyzed according to (Figure 1): (i) authors and year; (ii) study on foundations or applied studies; (iii) the dimensions of environmental, economic and social sustainability (ELKINGTON, 1994; SEURING 2013); (iv) individual, global or regional scale (RAMOS; CAEIRO, 2010; TODOROV; MARINOVA, 2011); and (v) emphasis - in the sense of the purpose of the article. Concomitant to content analysis, were analyzed gaps raised by the authors, therefore, presented in the form of challenges in one of the following items. With this purpose, it is important to mention that the items listed in the Figure mentioned allow for an initial reference on the topic of sustainability, but do not exhaust the countless possibilities that exist.

Literature Review

Sustainable Development and Sustainability

Emerged in the 1980s, the term SD emerged from the relationship between preserving the planet and meeting human needs (IUCN, 1980). The Brundtland Report (WCED, 1987) explains the same term simply as development that “meets the needs of the present without compromising the ability of future generations to meet their own needs”. This definition is lasting because it is flexible and open to interpretation (PRUGH; ASSADOURIAN, 2003).

In essence, SD is multi-dimensional, incorporating different aspects of society, seeking environmental protection and maintenance of natural capital to achieve economic prosperity and equity for present and future generations (KELLY et al., 2004).

For other researchers, SD is seen as: the maintenance of essential ecological processes, preservation of genetic diversity and sustainable use of species and ecosystems (TISDELL, 1988); equal opportunities for future generations (CHICHILNISKY, 1996), a process of change in which the exploitation of resources, the direction of investments, orientation of technological and institutional change are made according to the future, considering present needs (HOVE, 2009).

What we now call SD has evolved as an integrating concept, an umbrella under which a set of inter-related issues can be gathered. This is a variable process of change that seeks the ultimate goal of sustainability itself. In the same context, sustainability is the ability of a human, natural or mixed system to resist or adapt to endogenous or exogenous change indefinitely (DOVERS; HANDMER, 1992), represented as a goal or end point (HOVE, 2009). Therefore, to achieve sustainability, sustainable development is required (PRUG; ASSADOURIAN, 2003).

The concept of DS remains contested because of the different positions taken in relation to what can be considered fair (TODOROV; MARINOVA, 2009). It is so broad and generally applicable that its vagueness makes it dead and open to conflicting

interpretations (DOVERS; HANDMER, 1992). It does not explicitly embrace future thoughts. In turn, almost all published definitions of the concept of SD are based on principles of sustainability, for example, long-term perspective, fundamental importance of local conditions, understanding the nonlinear evolution of environmental and human systems (MOLDAN et al., 2012).

Thus, the term sustainability appeared regarding renewable resources and has been adopted by the ecological movement. The concept refers to the existence of the ecological conditions necessary to support human life at a specific level of wellness through future generations, and this is ecological sustainability and not sustainable development (LÉLÉ, 1991).

According to Ayres (2008), sustainability is a normative concept about how humans should act in relation to nature, and how they are responsible for each other and future generations. In this context, it is noted that sustainability is conducive to economic growth based on social justice and the efficient use of natural resources (LOZANO, 2012).

Often, sustainability is seen at two different levels: weak sustainability or strong sustainability. Weak sustainability can be interpreted as the extension of economic welfare (NEUMAYER, 2003), therefore, the economic capital produced by current generations can compensate for loss of natural capital for future generations (FIORINO, 2011). Therefore, in weak sustainability it is required that the value of natural capital is preserved, for example, in the case of non-renewable resources, the extraction should be compensated by investment in renewable resource substitutes of equal value (eg, wind farms to replace fossil fuels in electricity generation).

In contrast, strong sustainability is a paradigm of non-substitutability, in which there are natural systems that cannot be eroded or destroyed without compromising the interests of future generations (FIORINO, 2011). Therefore, in strong sustainability it is required that a subset of the total natural capital is preserved in physical terms, so that their functions remain intact.

If the existence of sustainability depends on their socioeconomic and environmental relationship, it can be seen as a major subject and addressed in different ways. Ignacy Sachs (2002), for example, used eight types of sustainability (social, economic, ecological, spatial, territorial, cultural, national and international policy) to display the dimensions of what is called eco-development.

In the business, it became more convenient to think of sustainability as a “triple bottom line”. Environmental sustainability is defined as the dematerialization of economic activity, since a decrease in material processing can reduce the pressure on natural systems and expand the provision of environmental services to the economy. Economic sustainability is the maintenance of natural capital, which is a necessary condition in order to avoid economic degrowth (BARTELMUS, 2003). And the approach to social sustainability refers to social homogeneity, fair income and access to goods, services and employment (LEHTONEN, 2004).

Sustainability is discussed as a state in which three types of interests (or conflicts) are met (or resolved) simultaneously: (i) the interests of the current generation to improve their actual life conditions (economic sustainability), (ii) the search for an equalization of living conditions between rich and poor (social sustainability), and (iii) the interests of

future generations that are not committed to meeting the needs of the current generation (environmental sustainability) (HORBACH, 2005).

Within the above context, there is a lack of consensus on the terms SD and sustainability. This is due to the fact that sustainability is used to describe the processes and activities (for example, sustainable finance, sustainable business, among others). In other cases, the activities aim to be sustainable, such as sustainable tourism, sustainable agriculture or sustainable buildings. Therefore, SD mainly focuses on people and their well-being (MOLDAN et al., 2012).

Although there are several understandings, sustainability and SD aim to pass on to future generations a stock of capital that is at least as large as our own generation has inherited from previous generations (GAUSSIN et al., 2013). Concomitantly, they are about collective choices and values. Because the values, politics and our understanding of the Earth and its systems will evolve, and the notions of what is sustainable will never be static (PRUGH; ASSADOURIAN, 2003).

Results

Characteristics of Sustainability

In order to understand what is being studied and proposed on sustainability, there are many efforts that present, through studies on foundations or applied studies, objectives and challenges that seek to answer the concerns of today: how to achieve sustainability.

According to Figure 1 the following key features involve:

- i) conceptualizations and discussions on environmental, economic and societal spheres, environmental change, environmental policies, growth and boundaries, economic degrowth, strong or weak sustainability, poverty and living standards, causes and resource scarcity, planning and communication;
- ii) development, use and evaluation of indicators and indices;
- iii) cities, regions and countries, the manufacturing sector, economic systems, industries, universities and scientific academies, supply chain and investment projects, production systems;
- iv) reviews of methodologies, performance evaluation, use of tools, sustainability models;
- v) search for causality between environmental, economic and social dimensions;
- vi) long-term perspectives, time series, forecasting, *sustainometrics*;
- vii) identification of challenges.

The numerous discussions and conceptualizations exist due to the plurality of purpose in characterizing and measuring sustainability. An important step in reducing this confusion is the acceptance of distinctions in terminology, data and methods (PARRIS; KATES, 2003), which in turn, the real situation may be evaluated by considering the particular characteristics of each region.

In this context, sustainability occurs on several levels: global, regional and local. What is sustainable at a regional level is not necessarily sustainable nationally. This discrepancy is due to the geographical transfer mechanisms through the negative consequences of a country or region to other countries or regions (SLIMANE 2012). The regions do not use the same indicators for the same subject, the data are not uniformly collected (VAN ZEIJL-ROZEMA et al., 2011). Therefore, decisions may be ineffective or even counterproductive if not considering the characteristics of each region.

Most governments are engaged to sustainability, but for a better policy development it is interesting to know the causality between the pillars of sustainability. A first plausible mechanism is that environmental performance leads to changes in financial performance. Or, the direction of causality can be reversed: profitable companies can afford to invest in environmental performance. But improving the environmental performance of a company can lead to economic improvement, and not necessarily an increase in cost (AMBEC; LANOIE, 2008). The causal patterns between the pillars of sustainability are quite sensitive to the characteristics of countries that are grouped, suggesting to avoid generalizations across heterogeneous countries (HOSSEINI; KANEKO, 2011).

Expanded readings on social sustainability indicate the need to rely less on objective data and evidence to encourage changes in human perspectives on environmental issues. This is not a call to abandon environmental science, but a suggestion for its practitioners to work alongside social scientists in order to explore how residents interpret and incorporate concerns of the places in which they live and the world around them (VALLANCE et al., 2011). As the debate on sustainability becomes more widespread and socially complex, more is being appropriated by different social forces that start to define the meaning that best expresses their values and interests (LIMA, 2003).

Aggeri et al. (2005) indicate that the sudden and massive involvement of large companies in the sustainability discourse raises some contradictory debates: it is a new discourse to speak of things that companies were already doing previously in social and environmental protection; companies always exercised their responsibility towards society; and, finally, the positioning of companies is a mechanical response to a number of external pressures (new social and environmental regulations, criticizing from the civil society, etc.).

Martinet and Reynaud (2004) contribute to understanding the role that organizations can play in society. According to the authors, companies would shift between two extremes: one financial and one sustainable. The financial extreme encourages a short-term horizon, standardizing growth models, which seeks the control and submission to formal procedures. Now the sustainable extreme, opposing the financial end, aims at the long term, the development of internal abilities, the concern with the social management of employees and the concern with the ecological impact given the activities of the organization. Thus, thinking strategically and making decisions means stopping to aim only for economic return and seeking to incorporate other dimensions, because the development process is not constant or stable over time and space (GUIMARÃES; FEICHAS, 2009).

Despite the many debates associated with sustainability, many studies turn to the operationalization by means of indicators and indices. To conceptualize phenomena and highlight trends, indicators and sustainability indices simplify and quantify. Given this

function, they must be developed for specific proposals, that is, that adequately represents the sustainability of a region (SICHE et al., 2008).

FIGURE 1 – Characteristics and approaches to the topic of Sustainability

Years	Author(s)	Study		Dimensions					Scale			Emphasis
		Empirical	Theoretical	Environmental	Economic	Social	Specific	Global	Country	Regional		
1984	Tolba											Environmental dimension in global development.
1988	Tisdall											Emphasis of economists and ecologists in production and resource conservation.
1991	Lalé											Interpreting and conceptualization of SD and Sustainability.
1992	Stedman e Hill											Environmental Impact Assessment (EIA).
1993	Redcliff											Environmental changes, physical and human behavior.
1993	Solow											Resources for the future.
1995	Mitcham											Origins and conflicts of Sustainable Development.
1995	Goodland											Concepts of environmental sustainability (example: growth, limits, scale).
1996	Chichilnisky											Well-being and sustainable development criteria.
1996	Lintott											Environmental and social indicators.
1998	Ayres											Long-term sustainability.
1998	Mebratu											Conceptual review of sustainable development and sustainability.
1999	Foxon <i>et al.</i>											Urban sustainability indicators.
1999	Tyteca											Indicators of sustainability.
2000	Kaivo-OJA											Alternative scenarios and social development.
2000	Anand e Sen											Human development and economic sustainability.
2001	Nijkamp e Van Den											Causes and solutions for the scarcity of economic and environmental resources.
2001	Epstein e Roy											Corporate social development conductors.
2002	Cabezas e Fath											Mathematically translating "sustainable systems".
2002	Linton e Yeomans											Forecasting model in sustainability.
2003	Holland											Ecological footprint.
2003	Parris e Kates											Characterization of sustainability.
2003	Anastas											Green engineering and sustainability.
2003	Bockstaller e Girardin											Method for validating environmental sustainability indicators.
2003	Parkin <i>et al.</i>											Understanding of the concept of sustainable development and practical challenges.
2003	Marshall e Brown											Sustainability strategies.
2003	Frugh e Assadourian											Discussion on the concept of sustainability.
2003	Bartelmus											Dematerialization versus maintenance of capital.
2004	Huetting e Rajindersb											Construction of environmental, economic and social sustainability indicators.
2004	Lou											Sustainability indices to evaluate environmental and economic performance.
2004	Lehtonen											Social-environmental interface of sustainable development.
2005	Labuschagne <i>et al.</i>											Evaluation of industrial performance.
2005	Spangenberg											Concepts and indicator of economic sustainability.
2005	Krajnc e Glavic											SD indices for performance comparisons between companies.
2005	Islam <i>et al.</i>											Sustainability measurement.
2005	Cabezas <i>et al.</i> ^a											Characteristics of a sustainable system with simulation models.
2005	Cabezas <i>et al.</i> ^b											Behavior of a real ecological-social system.
2005	Alshuwaihat											Strategic environmental evaluation.
2005	Saisana <i>et al.</i>											Sensitivity and uncertainty analysis; construction of indicators.
2006	Spangenberg <i>et al.</i>											Multi-criteria evaluation of social sustainability.
2006	Mandersson											Explanation of sustainability through conceptual framework.
2006	Bithas e Christofakis											Operational framework to evaluate urban systems.
2006	Tainter											Models to mitigate or control social complexity.
2006	Sarkis <i>et al.</i>											Conceptual support methodology for the decision on environmental systems.
2006	Sartorius											Innovation in the context of sustainability.
2006	Lockwood											Green construction projects.
2007	Ness <i>et al.</i>											Categorization of tools to evaluate sustainability.
2007	São José <i>et al.</i>											Environmental requirements in evaluating sustainability.
2007	Glavic e Lukman											Definitions of sustainability terms in environmental engineering
2007	Plass e Kaltenegger											Practical evaluation tools for Urban sustainability.
2007	Zidanssek											Sustainable development and the happiness of nations.
2008	Darnall <i>et al.</i>											Management of green supply chain.
2008	Mannberg e Wihlborg											Obstacles and opportunities for the implementation of local sustainable development.
2008	Gasparatos <i>et al.</i>											Reductionist approach to evaluate progress around sustainability.
2008	Mauerhofer											Hierarchies and priorities in the environmental, economic and social relation.
2008	Langford											Indicators of environmental performance.
2008	Shastri <i>et al.</i>											Exploration of sustainability limits through systems models.
2008	Hasna											Revision of engineering methods to evaluate sustainability.
2008	Siche <i>et al.</i>											Comparison of environmental sustainability indices.
2008	Meyer											Strengths and weaknesses in sustainability indices.
2008	Graymorea <i>et al.</i>											Evaluation methods for local sustainability.
2008	Ambec e Lanoie											How to improve financial and environmental performance of companies.
2008	Alshuwaihat <i>et al.</i>											Environmental management of universities.
2009	Lim <i>et al.</i>											Environmental indicator selection using network.
2009	Gnègnè											Influence of net savings on well being (human development index).
2009	Moore e Manring											Development of SME strategies for sustainability and creating value.
2009	Tseng <i>et al.</i>											Development of production indicators.
2009	Sá de Abreu											Environmental policy to improve corporate sustainability.
2009	Tosun e Knull											Integration of economy and sustainability.
2009	Isaksson e Steimle											Contribution of business for sustainable development.

2009	Kuusmannen Kuusmannen																		Appreciation of resources based on their opportunity cost.
	Stables																		Importance of sustainability in the development of students and the society.
	Udo e Jansson																		Challenges of Sustainable Development.
2010	Baumgärtner e Quaes																		Debate on economic sustainability.
	Fauzi <i>et al.</i>																		Approaches to measure corporate social performance.
	Martens e Raza																		Analysis of the globalization process of countries through indices.
	Schneider <i>et al.</i>																		Debate on degrowth (definitions) and the economic crisis (2008-2009).
	Ramos e Caetano																		Evaluation of sustainability indicators.
	Jia <i>et al.</i>																		Ecological footprint simulation.
	Ellis <i>et al.</i>																		Methodology for the conception and evaluation of environmental planning systems.
	Missimer <i>et al.</i>																		Development of a framework based on backcasting and sustainability principles.
	Vallance <i>et al.</i>																		Clarification on social sustainability.
	Elliot																		Evaluation of environmental sustainability in IT.
2011	Dempsey																		Debate on urban social sustainability.
	Todorov e Marmova																		Modeling of sustainability through conceptual, physical, monetary approach diagrams.
	Bina e Vaz																		Contribution of the human being for the individual and environmental well-being.
	Ekens																		Minimum security standard approach to evaluate environmental sustainability.
	Baumgärtner																		Comprehension of sustainability problems and development of solutions.
	Giljum <i>et al.</i>																		Suggestion of a set of indicators for the use of resources on a micro and macro level.
	Van Zeeijl-Rozema <i>et al.</i>																		Method composed of indicators to evaluate and compare regions.
	Robinson <i>et al.</i>																		Backcasting approach to explore future alternatives on climate changes.
	Gaussin <i>et al.</i>																		Evaluation of the ecological footprint of manufactured products.
	Morin e Christodoulou																		Review of indicators and sustainability indices.
2012	Hosseini <i>et al.</i>																		Testing causalities between sustainability pillars.
	Farla <i>et al.</i>																		Transitions to sustainability: interventions, resources and strategies.
	Singh <i>et al.</i>																		Overview on sustainability evaluation methodologies.
	Dahl																		Implementation of sustainability indicators and their challenges.
	Moldan <i>et al.</i>																		Different approaches and types of indicators for evaluating environmental sustainability.
	Slimane																		Debate on the role of leadership in sustainable development.
	James e Card																		Factors that contribute to reach environmental sustainability.
	Urban e Govender																		Nature of industrial environmental management practices and activities.
	Hak <i>et al.</i>																		Development of a method to evaluate the relevance of sustainability indicators.
	Porter e Derry																		Sustainability management in complex adaptable systems.

Briefly, it is possible to note the trajectory of studies around sustainability according to the emphasis given in Table 1. Until the early 1990s, SD was a part of development studies, environmental, urban and regional planning, human impact on the use of land resources (renewable and finite), environmental changes (TOLBA, 1984; TISDELL, 1988; STEDMAN; HILL, 1992; REDCLIFT, 1992; SOLOW, 1993; AYRES, 1996). This is due to the support of international agencies such as the United Nations Conference on Environment in 1972, the Brundtland Commission with the Brundtland Report in 1987, the Montreal Protocol in 1989.

Academic initiatives gain strength with debates about what is SD and sustainability (LÉLÉ, 1991; MITCHAM, 1995; MEBRATU, 1998; PARRIS; KATES 2003). Concomitantly, sustainability is characterized by dimensions (KAIVO-OJA, 1999; FOXON et al, 1999; LEHTONEN, 2004; DEMPSEY, 2011).

In the business world, sustainability was introduced by the concept of sustainable management, specifically in how companies produce their products and services, maintain and improve human and natural resources, according to the approach by authors Isaksson and Steimle (2009), Fauzi et al. (2010), Gaussin et al. (2013), Porter and Derry (2012), Urban and Govender (2012), among others.

Another moment of this trajectory is the need for a quantitative assessment of sustainability (EPSTEIN; ROY, 2001; LINTON; YEOMANS, 2002; CABEZAS; FATH, 2002; TODOROV; MARINOVA, 2011). In this context, evolution has brought many forms of sustainability assessment, such as: indicators and indices (TYTECA, 1999; HUE-TINGA; REIJNDERSB, 2004; MOLDAN et al., 2012; HAK et al., 2012; DAHL, 2012; Singh et al., 2012), environmental tools (HOLLAND, 2003; GAUSSIN et al., 2013), frameworks for organizational analysis (BITHAS; CHRISTOFAKIS, 2006; AMBEC; LANOIE, 2008; ISAKSSON; STEIMLE, 2009).

For the reasons above, sustainability has gradual steps in the process of understanding and positioning the subject, but there are not necessarily boundaries between one approach and another. Moreover, the trajectory can observe many challenges to be overcome. Thus, the first step is to recognize them and develop ways to try to solve them (HUESEMANN, 2004).

What are the challenges of sustainability?

Many are the problems that hinder progress towards sustainability and sustainable development. The challenges are often related to the following criteria (REID *et al.*, 2010): (i) the need for global coordination; (ii) relevance to decision makers; and (iii) leverage. Overcoming these initial challenges collaborates with forecasts of future environmental conditions and their consequences for people.

After analyzing the content of the articles, there are several challenges to sustainability:

1. Implementing environmental protection standards;
2. Capturing the external impacts of activities beyond the local level;
3. Recognizing social sustainability;
4. Human development;
5. Eradication of poverty;
6. Balanced production and consumption;
7. Promotion of education;
8. Development and maintenance of environmental resources;
9. Efficiency in resource allocation;
10. Cooperation among stakeholders, governments and the civil society;
11. Publicly available sustainability methodologies and indicators;
12. Use of complementary indicators on assessments;
13. Use holistic approaches;
14. Indicators for measuring the consumption of resources;
15. Population awareness;
16. Using a standard benchmark between countries;
17. Reconciling local objectives with the overall objectives;
18. Applied research that bring practical results;
19. Balance between the pillars of sustainability;
20. Dynamic sustainability indicators;
21. Pointers directed toward business and local systems;
22. Public participation in planning;
23. Participation of science and technology.

There has been little analysis of sustainable applications and what kind of results can be expected. But there seems to be a consensus on the challenges of sustainability: integrating economy, environment and society, as well as institutional issues; considering

the consequences of the actions of the present in the future; awareness and involvement of society.

In terms of development, it does not mean that society should reach a certain specific state or follow a particular path. On the contrary, the important thing are the factors that influence the evolution of society, so that it maintains characteristics that are considered desirable to the current and future well-being (SILVA NETO; BASSO, 2010).

Conclusions

Sustainability has been defined from a long historical process, as well as the awareness of environmental problems, economic crises and social inequalities. Because it is a complex and ongoing concept, different approaches that attempt to understand and explain sustainability arise. In this context, this study analyzed the sustainability theme, mapping significant works on the subject, characterizing and identifying challenges.

Sustainability is characterized as a principle applicable to systems. Open systems, to interact with society and nature, involving industrial systems (transportation, manufacturing, energy etc.), social systems (urbanization, mobility, communication, etc.) and natural systems (soil, air, water and biotic systems etc.), including flows of information, goods, materials, waste. That is, sustainability involves an interaction with dynamic systems that are constantly changing and require proactive measures.

In this research, few works that meet pro-activity were found, amongst them: analysis of the dynamic behavior in complex and ecological systems (CABEZAS; FATH, 2002); use of forecasting in sustainability (LINTON; YEOMANS, 2002); development of strategies for sustainability (MARSHALL; BROWN, 2003; MOORE; MANRING, 2009); green engineering projects (ANASTAS, 2003); environmental requirements (SÃO-JOSÉ et al., 2007); education for sustainability (STABLES, 2009).

We conclude that the field of sustainability is emerging, characterized by a wide variety of subjects from different areas and with different frameworks. However, with a high and increasing number of papers published on the subject, many are the challenges for future works: the need for applied research that bring practical results; finding a balance at the Triple Bottom Line; indices and/or indicators to assess long-term sustainability; goal alignment with the identified indicators.

For the purposes of this study, one should take into account the established delimitations: articles restricted to the CAPES Portal database; the keywords used in the search of publications; and the fact that only works of the type article were considered. As suggestions for future studies, we highlight the possibility of deepening the analysis, including the use of clusters to analyze work in common.

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SUSTAINABILITY AND SUSTAINABLE DEVELOPMENT: A TAXONOMY IN THE FIELD OF LITERATURE

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Resumo: O termo sustentabilidade é muito discutido, existindo uma variedade de pesquisas sobre o assunto. Sem uma definição única, há um conjunto de pesquisas e estudos que consideram os termos sustentabilidade e desenvolvimento sustentável como sinônimos e há outro conjunto que não. A presente pesquisa selecionou 103 artigos relevantes, em um período de 28 anos, com o objetivo de analisar o tema sustentabilidade, caracterizando o estágio em que se encontra, lacunas e desafios para futuras contribuições. Os assuntos abordados são diversos, como discussões nas esferas ambientais, econômicas e sociais, crescimento e limites, padrões de vida, uso de recursos, indicadores e índices, ferramentas, modelos de sustentabilidade; muitos são os debates e conceituações sobre o tema, mas sua aplicabilidade é rara. Entretanto, há um consenso sobre os desafios da sustentabilidade: integrar economia, ambiente, sociedade e as questões institucionais, considerar as consequências das ações do presente no futuro, conscientização e envolvimento da sociedade.

Palavras-chaves: Triple Línea de base; Revisión de la Literatura; Sostenibilidad; Desarrollo sostenible.

Abstract: The term sustainability is often discussed and there is a variety of research on the theme. Without unique definition, there are series of research and studies that consider the terms sustainability and sustainable development as synonymous and there are others which don't. This study selected 103 relevant articles within a period of 28 years, with the aim of analyzing the sustainability theme, characterizing the stage it is, the gaps and challenges for future contributions. The issues discussed are diverse, as discussions on the environmental, economic and social dimensions, growth and limits, living standards, use of resources, indicators and indices, tools, models of sustainability; there are many concepts and debates about sustainability, but its applicability is rare. However, there is a consensus on sustainability challenges: integrating economics, environment, society and institutional issues, considering the consequences of the actions of this in the future, awareness and involvement of society.

Keywords: Triple Bottom Line; Literature Review; Sustainability; Sustainable Development.

Resumen: Hay una variedad de investigaciones sobre el tema sustentabilidad. No existe una definición única, hay un conjunto de investigaciones y estudios que tengan en cuenta la sustentabilidad y el desarrollo sustentable términos indistintamente y no hay otro conjunto. Este estudio seleccionó 103 artículos pertinentes el período de 28 años con el objetivo de analizar el tema sustentabilidad, caracterización de la etapa en la que es y desafíos para las contribuciones futuras. Los temas tratados son diversos, como debates sobre crecimiento y límites, dimensiones ambiental, económico y social, nivel de vida, uso de los recursos, indicadores e índices, modelos de sustentabilidad. Hay muchos conceptos y debates sobre el tema, pero su aplicabilidad es raro. Sin embargo, existe un consenso sobre los desafíos de sustentabilidad: la integración economía, ambiente, sociedad y las cuestiones institucionales, considerar las consecuencias de las acciones de este en el futuro, la sensibilización y participación de la sociedad.

Palabra clave: Triple Línea de base; Revisión de la Literatura; Sostenibilidad; Desarrollo sostenible.
