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Challenges in Higher Education for Sustainability

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Toward Sustainability Through Higher Education: Sustainable Development Incorporation into Portuguese Higher Education Institutions

Ana Marta Aleixo, Ulisses Miranda Azeiteiro and Susana Leal

Abstract This study aims to investigate how sustainable development (SD) has been incorporated into Portuguese higher education institutions (HEIs). A review of literature and the analysis of the available documentation in institutional webpages of the different HEIs were conducted to establish the theoretical framework and validating the current state of integration of sustainability in Portuguese HEIs (how SD is integrated in the practices of HEIs). We analyzed the two types of Public HEIs (Universities and Polytechnics) and we found the existence of different ways of approaching SD. The SD dimensions analyzed were the environmental, economic, social/cultural, and institutional/political/educational ones (e.g., Leal Filho et al. in Int J Sustain High Educ 16:112–129, 2015; Lozano in Int J Sustain High Educ 12:67–78, 2011; Segalàs et al. in J Cleaner Prod 18:275–284, 2010; Waas et al. in *Sustainability, 3*, 1637–1661, 2011). We have also researched the different stages that HEIs are in the incorporation, dissemination, and institutionalization of SD. We have reviewed all the institutional websites for the 34 Public Portuguese's HEIs, which 20 of them are polytechnics and 14 universities. The majority of HEIs communicate their SD practices actively. It was also pointed out that SD practices vary considerably from one HEIs to another. However, the results show that SD in Portuguese HEIs is still in its early stages.

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1 Introduction

The twentieth century was characterized by a deep concern for environmental issues, and this driving for a political debate through the various initiatives that questioned the growth policies (e.g., *Silent Spring* of Carson 1962; *The Tragedy of the Commons* of Hardin 1968; *The Population Bomb* of Ehrlich and Ehrlich 1968; *Limits to Growth* of Meadows et al. 1972) and the limits of exploitation of natural resources cited by economists as Malthus and Jevons.

With the emergence of the first publications on the economic growth, without the social and environmental areas of concern being equally taking into account, the necessity for a new approach to see the world come to light. It is in this context that the approach for sustainable development (SD), in the framework of the Conference of the United Nations on SD, appeared in 1972 (Clugston and Calder 1999; Lozano et al. 2013; Waas et al. 2011).

With the Brundtland Report, "Our Common Future," published in 1987, SD has won a greater emphasis worldwide. It corresponds to the "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED 1987, p. 45).

Clugston and Calder (1999, p. 3) report the Talloires Declaration, the written statements signed in 1990, as determinant in the definition of sustainability in terms of higher education institutions (HEIs), this being signed by more than 265 presidents in 40 countries on five continents.

There are several written statements that recognize the importance of HEIs in promoting the SD (e.g., Beringer et al. 2008; Disterheft et al. 2013; Disterheft et al. 2012; Leal Filho 2011; Lozano et al. 2013; Wright 2002; Wright and Leal Filho 2002). These documents and guidelines ascertain great changes in the HEIs for the implementation of SD (Popescu and Beleau 2014). The intention is that HEIs can join efforts for a SD in all its aspects (e.g., environmental, social, economic, and institutional).

As reported by Lozano et al. (2013), these written statements, charters, and national and international partnership intended to provide guidelines and framework for the incorporation of sustainability throughout the system of HEIs (p. 11). However, its purpose was not, in most cases, the desired range, becoming merely written documents not linked to action or purpose, a situation criticized by different researchers (e.g., Lozano et al. 2013).

As stated in Clugston and Calder (1999), the above documents inspired the origin of a movement and an agenda toward the future and there are now more than 31 written statements of sustainability for HEIs that have been signed by more than 1400 universities in the world (Grindsted 2011). Despite the apparent interest, there are few known examples where sustainability programs in HEIs have been successful.

The literature refers to different examples in the United States of America (Barlett and Chase 2013; Leal Filho 2011), Canada, and Mexico (Leal Filho 2011), which, in general, called for the involvement of all stakeholders of the institution. In

most cases, these initiatives are only relevant when someone is in charge of these goals (e.g., Office of SD).

In agreement with Clugston and Calder (1999), the written declarations of mission and purpose of the institutions should express their philosophies and commitments to sustainability. The HEIs ought to "express prominent and explicit concern for sustainability" (Clugston and Calder 1999, p. 4) and this topic is presented as one of the critical dimensions of sustainability in higher education.

For Popescu and Beleau (2014), there are several studies that are based on the analysis of the websites of the HEIs, which reports its interest and needs to implement measures to reduce the effects of the HEIs action on society; however, they argue that the lack of understanding of the concept of SD in most HEIs influences the proper application of the SD principles.

As stated in Ramos and Pires (2013), Internet was an important medium to disclose information about the different practices of SD in HEIs. There are several studies that are based on the analysis of institutional websites, which reports its interest and need to implement sustainable policies, strategies, and measures though not always apparent with a proper applicant of the SD principles (see Popescu and Beleau 2014). There are also several studies which analyzed the Internet as a tool to communicate with stakeholders and report SD (e.g., Popescu and Beleau 2014; Ramos and Pires 2013). Thus, the Internet could be a tool for communicating SD practices and, consequently, to develop a positive social image for its stakeholders (Ramos and Pires 2013).

The studies about SD in HEIs are still scarce in Portugal, and there is no known study that refers to existing practices in Portuguese's HEIs (Madeira 2008). Tauchen and Brandli (2006) published a study where they systematized the different procedures for environmental management system implementation, based on good practices, including practices of the Portuguese HEIs, but it only studied the environmental dimension.

As there are no studies about SD in Portuguese HEIs, we aimed to describe how SD has been incorporated in Portuguese's HEIs. We intend to conduct a review of the topic, establishing the theoretical framework. Then, we validate the current state of integration of sustainability in Portuguese HEIs, through data collection on the institutional websites of HEIs. This data is analyzed to verify how SD is present in each HEIs. So we will search, primarily, to contribute to the understanding of the level of implementation, incorporation, and institutionalization of the SD in Portuguese's Public HEIs.

Thus, the specific objectives of this research are as follows: (a) identify the SD practices adopted by Portuguese Public HEIS and formally communicated in the institutional websites; and (b) compare the SD practices adopted by Portuguese HEIS by size, type, and stage of the SD implementation in HEIs.

This paper will allow us for the first time in the Portuguese HEIs to ascertain what issues are being considered on the topic of SD and sustainability, by analyzing the formal communication in the institutional websites.

2 Theoretical Framework

2.1 Sustainable Development in HEIs

Several researchers have the opinion that the role of the HEIs of their own SD and society's SD is determinant to the development of sustainability and presents a relevant identity of the HEIs (Sammalisto et al. 2014; Steiner et al. 2013).

According to Zilahy et al. (2009), HEIs have a growing responsibility for the globalization of a knowledge-based society. The mission of the HEIs is the development of citizens who are capable of thinking and analyzing critically the surrounding reality, are capable of exercising active citizenship that respects and demands the respect of others, and are able to learn continuously (Vieira and Marques 2014, p. 29). Its mission, today, goes far beyond the role of training new technicians and leaders.

For Disterheft et al. (2012), HEIs have, in today's world, a two fold mission: to reduce their environmental impact as operating institutions, caused through direct and indirect activities, and "to carry out research and teaching in the field of sustainability, and on creating settings that allow students and staff to develop new competencies that lead to more sustainable practices and finally to a more sustainable society" (p. 80). Also for Clugston and Calder (1999), a sustainable university is one that enables students to understand the environmental degradation, motivating them to sustainable practices, and the various injustices that are felt in society. In this way, the authors argue that a sustainable institution shall (i) include this commitment in their mission and academic goals; (ii) incorporate the concept of SD in teaching and research; (iii) encourage critical thinking by students toward environmental problems; (iv) demonstrate sustainable practices which reduce their ecological footprint; (v) promote support services to students; and (vi) develop local and global partnerships in order to improve sustainability. Velazquez et al. (2006, p. 8) showed that there are not many HEIs that included sustainability in their mission statement, and it is more usual to incorporate policies to support sustainability. As reported by Disterheft et al. (2013, p. 4) although there are some progress and developments of good practices in the implementation of SD, only some institutions develop it in a holistic way.

Zilahy et al. (2009) report that despite the increase in funding for research and development as a way to respond to competitiveness between HEIs, the difficulties associated with the attractiveness of students, quality of teachers, and financial issues have hampered the incorporation of SD in HEIs.

The principal barriers to the development of SD in HEIs, influencing their innovations strategies are (e.g., Barth 2013; Leal Filho 2000; Lee et al. 2013; Littledyke et al. 2013; Lozano 2006; Lozano et al. 2013; Shriberg 2002; Shriberg and Harris 2012; Stephens et al. 2008; Velazquez et al. 2005, 2006; Wright and Leal Filho 2002) (a) the lack of management support, human resources, and infrastructure to support their development; (b) the ignorance and misleading to the concept associations; (c) the lack of financial funds; and (d) the resistance toward change.

Almost all authors agree that these were the factors that difficult the implementation of SD practices in HEIs (e.g., Davis et al. 2009; Leal Filho 2011; Shriberg 2002; Shriberg and Harris 2012; Velazquez et al. 2005, 2006; Wright 2010; Wright and Wilton 2012). The consequence is the lack of commitment to implement and incorporate the SD in HEIs. Thus, Velazquez et al. (2006, p. 389) referred to the need for *cultural awareness* as a strategy to implement sustainability initiatives.

So, for Lozano (2006), university leaders must ask themselves how we should incorporate the SD in their policies as a whole. Lozano (2006) infers on the extent that HEIs have given the increasing numbers of this practice within and outside the institutions where the approaches should include a systematic and holistic view of the SD.

The multidisciplinary education, interdisciplinary education, and transdisciplinary education present themselves as facilitators of the merger process, diffusion, and institutionalization of the SD in HEIs (Lozano 2006). Disterheft et al. (2013) argue that the Science of Sustainability (SS) and the education for sustainable development (ESD) can be critical to the transition for sustainable HEIs.

Lozano (2006), beyond the four activities that make up the system of HEIs already identified by Cortese (2003) (e.g., education, research, campus operations and community outreach) proposes a fifth one (Lozano 2006, 2011; Lozano et al. 2013): the form of communication and disclosure practices of HEIs over the SD. Lozano (2011) agrees that the GRI Sustainability Guidelines would be more appropriate if they were adjusted to the need of HEIs. He also argue that is important to learn with the experience of companies. This fifth activity refers to the method the HEIs could use to communicate with the different stakeholders in terms of education, research, operations on campus, and awareness in the community. This activity refers to the need to record, through reports and documents, the implementation of the SD in HEIs, designated evaluation, and report.

Just as Disterheft et al. (2012), this is a different way that HEIs could use to implement the SD throughout their system, beyond eco-efficiency, green curricula, operations on campus through environmental management, transaction system for the SD with the involvement of stakeholders, conferences, assessment tools, assessment, and certification system.

Also for Godemann et al. (2014), the environmental, social, and economic factors should be considered when discussing the role of HEIs in favor of the SD. This is one of the reasons that justifies the increasing number of HEIs, all over the world, who adopt and report their initiatives, especially in terms of environmental management of their campus (e.g., environmental preservation, emission reduction, and improving the management of its resources).

These initiatives are often developed through eco-management, audits, and ISO 14001. However, concerning the social dimension, despite the health and safety indicators that are part of the reality of HEIs, there is a lack of evidence of a significant investment on this dimension. Godemann et al. (2014) report that in terms of community involvement or sustainable consumption (e.g., regional and fair trade) this situation is still far from reality and HEIs can improve the developing strategies for SD.

Under the SD in HEIs, Godemann et al. (2014) emphasize the need for greater understanding of the need to change (face context), where transdisciplinary research may have an important role. This author also indicates that there are few HEIs committed to these practices throughout the system and the need for continuous commitment, which is possible when the HEIs perceive the true importance of these concepts for organizational change.

2.2 Dimensions of SD in HEIs

There has been a great discussion around the clarification of the concept of sustainability (Leal Filho 2011; Lozano 2008; Naredo 1996; Owens and Legere 2015; Waas et al. 2011). For some authors, the Brundtland Report could present a concept with multiple interpretations and ideologies. Meadowcroft (2007) argues that the concept of sustainability is complex and contested (p. 300).

Kidd (1992) distinguished six principles of sustainability that are ecological/carrying capacity, resources/environment, biosphere, critique of technology, no-growth/slow growth, and ecodevelopment. Some years later, Jabareen (2008) presented seven: ethical paradox, equity, global agenda, eco-form, utopia, integrative management, and natural capital stock. For Quental et al. (2011), there are four principles: limits, means and ends, needs, and complexity. These references and others can be found at Waas et al. (2011, p. 1638) that reviewed the "analysis of the plethora of sustainability literature, including its terminology, genesis, fundamental principles, mainstream views of sustainability and several governing aspects," together with the arguments to combat common misconceptions of sustainability.

To SD, Baker (2006) presents four models, namely (a) pollution control, (b) weak sustainability, (c) strong sustainability, and (d) ideal model. These models represent, by the same order, the more anthropocentric (associated with a weak sustainability) SD concept to the more ecocentric view (associated with a stronger concept of SD). Also according to Baker (2006), the concept associated with weak sustainability refers to the replacement of natural capital for human capital aiming at consumption. On the other hand, the strong sustainability argues that natural resources cannot be replaced by any other type of resource, so this concern will result in its preservation.

In agreement with Waas et al. (2011), sustainability is considered by many as the way to meet the large, complex, and interrelated environmental and social problems, presenting itself therefore as vital to the well-being of present and future generations (p. 1640), allowing change and the critical practices and conventional thinking.

Throughout its historical evolution, the concept of SD has been subjected to various interpretations (Leal Filho 2011; Waas et al. 2011). However, we can identify three pillars or dimensions (Alshuwaikhat and Abubakar 2008; Amaral et al. 2015; Baker 2006; Disterheft et al. 2013; García and Vergara 2000; Godemann et al. 2014; Hass et al. 2002; Lozano 2010; Meadowcroft 2007; Sammalisto et al. 2014; Waas et al. 2011): (a) economic, (b) social, and

(c) environmental. These three dimensions are referred by García and Vergara (2000) as integral Sustainability and transdisciplinary. According to Disterheft et al. (2013), many researchers disagree that the definition of the SD embraces only these dimensions, characterizing them as vague and anthropocentric.

As stated in Waas et al. (2011), the three dimensions or pillars of SD are often designated by "3 Ps," "Triple Bottom Line," or "People-Planet-Profit" which relates to the Nobel Peace Prize winner, Mohan Munasinghe, as the founder of the model which distinguishes and reveals the interaction between economic objectives, ecological or natural, and social resources (poverty/equity). However, depending on the model of SD it is increasingly common to come up with other SD pillars, namely (a) institutional (e.g., Baker 2006; Disterheft et al. 2013; Leal Filho et al. 2015; Lozano 2008; Pfahl 2005) and (b) cultural (e.g., Baker 2006; Disterheft et al. 2013; Leal Filho et al. 2015; Lozano 2008; Siemer et al. 2006).

Alshuwaikhat and Abubakar (2008) suggest five dimensions of SD: ecological, social, economic, cultural, and one called spatial (p. 1778). Waas et al. (2011) suggest that the concept of SD is stemmed from four dimensions of SD (economic, social, environmental, and institutional).

Apart from different conceptual frameworks, some dimensions have the same meaning and different names. This is the case of the cultural dimension that it is mentioned by Siemer et al. (2006) as social dimension. As reported by Leal Filho et al. (2015) the cultural dimension it is necessary for the SD, where peace and well-being most be the aim to achieve.

Lozano (2010) refers one educational dimension which is curriculum, research, and service, and refers to the incorporation of SD in different activities, namely curricula, capacity to building, research, grants, publications, and products and other services (p. 70).

The dimension of economic sustainability refers to the economic viability of a given system, which aims to address the economic needs. This area includes economic growth and equity, which should be considered in the long-term and extended to all (Baker 2006). According to Santos et al. (2005), it is necessary to adopt policies and practices that coincide with increased social responsibility and ensure greater sustainability (p. 41).

In turn, the environmental or ecological dimension refers to the impact of the community on natural resources and ecosystems, including the impact on urban development (Baker 2006). That is, it refers to the impact that an individual has on the environment, and its concerns and limitations that future generations have on.

The environmental dimension must include the organization's strategy along with economic and social issues (Santos et al. 2005, p. 51), which could contribute to viable solutions that can respond to habitat conservation, pollution reduction, and resource consumption (Baker 2006). Santos et al. (2005) suggest that the environmental concerns should be integrated into the organization's strategy.

The social dimension refers to the need for distributional justice based on intragenerational solidarity and resulting changes to an economic policy (García and Vergara 2000) and cohesion (Baker 2006). Once the concept of SD is associated with the concept of freedom, democracy, and social justice (Baker 2006;

Waas et al. 2011), this area should have as purpose the needs of the people to work for food, education, health, energy, and sanitation (Baker 2006). For Santos et al. (2005), the social dimension of sustainability takes actions directed either to the human resources of the organization or the surrounding context of the social community.

The reference for the institutional dimension of the SD began, in 1985, when the United Nations Commission developed an indicator for assessing progress in the implementation of Agenda 21 and, after the World Bank Development Report (Pfahl 2005, p. 81), thus justifying the evidence of four dimensions of SD. For Pfahl (2005), the institutional dimension refers to how institutions shape their behavior, values, and perceptions of different stakeholders in their approach and objectives over the SD. According to Pfahl (2005, pp. 83–84), institutional sustainability must be judged according to the institution's capability to coordinate human interaction in order to achieve specific sustainability goals.

In terms of the institutional dimension, the various declarations signed, commitments to good practice, and case studies adopted are presented as relevant in terms of the response to the implementation of the SD (Disterheft et al. 2013, p. 5).

According to Waas et al. (2011), this fourth dimension of DS refers to democracy and governance and institutional change required to achieve the SD that includes local public participation (national and international). For Pfahl (2005), it also refers to participation in decision-making, transparency of decision-making, and accountability for sustainable policies (activities, policies, and effectiveness of HEIs).

The political or institutional dimension refers to governance, peace development, and common good. In turn, the political dimension is presented by Leal Filho et al. (2015, citing Rockefeller 2010) as an interaction opportunity of SD values, inducing action, presented as the answer to mitigating the adverse impacts of economic development component.

According to Disterheft et al. (2015), it is necessary to change how HEIs see SD, from the vision of only environmental sustainability to a more holistic vision so that we also have a change in the HEIs culture. On the other hand, and given the financial constraints that characterize the HEIs, most of their actions or practices focus on the economic sustainability of the institution (e.g., Disterheft et al. 2013) what also justifies a more holistic view.

The institutional dimension can be presented as the culmination of the strategy to the development of sustainable HEIs.

To facilitate the analysis, we considered in this study the social dimension together with the cultural dimension. Siemer et al. (2006) suggest this link. Additionally, there are different indicators and practices that show many similarities with respect to these two dimensions (e.g., indicators and/or practices suggested by Santos et al. 2005 and Hass et al. 2002) which justifies the aggregation of both dimensions.

We also sought to join the educational and institutional dimensions because, in the educational sector, they share commonalities that, in our point of view, justify their aggregation. The educational dimension is the purpose and the mission of the HEIs, so fitting in the institutional dimension, particularly in terms of indicators such as the promotion of education for the SD through the curriculum and science technology. The political dimension was similarly included in the institutional dimension, which was mentioned by Leal Filho et al. (2015) also as institutional (still related to good governance).

In order to summarize and systematize the review of the literature (e.g., Burford et al. 2013; Ferrer-Balas et al. 2010; Khalil et al. 2013; Leal Filho 2011; Leal Filho et al. 2015; Lozano 2006, 2010, 2011; Popescu and Beleau 2014; Segalàs et al. 2010; Sibbel 2009; Siemer et al. 2006; Singh et al. 2012; Waas et al. 2011) performed on the dimensions of SD, we organized Table 1.

These methodology and dimensions have been used by several authors when reporting sustainability practices in HEIs and implementation of SD in HEIs (e.g., Alonso-Almeida et al. 2015; Alshuwaikhat and Abubakar 2008; Jorge et al. 2015; Lozano 2011; Nejati and Nejati 2013).

Table 1 Issues of practices of sustainable development in HEIs

Dimensions	Practices
Environmental	Declarations and actions related with HEIs involvement in environmental issues and resource scarcity (environment of used sustainable resources; prevention of pollution; protection of environment and biodiversity; restoration of natural habitats; ecological footprint; non-renewable resources; depletion of materials; degradation).
Economic	Declarations and actions related to the direct economic impact and financial sustainability of HEIs (financial situation; achieved results; efficiency).
Social/cultural	Declarations and explanations on policies and procedures concerning aspects of human rights (labor practices and decent work; human rights; quality of life; occupational health and safety; the equity dimension; training of employees; involvement in social issues; and action within HEIs community).
Institutional/educational/political	Declarations and actions with explanation of the HEIs views, values, strategy, transparency in the governance, and ethical compromises. Also, declarations, comments, and linking to the national and international criteria on aspects of sustainable development. It was also considered the practices in education, research, university operations (e.g., certifications), external community, and assessment and reporting.

2.3 Approaches to the SD in HEIs

The theme of the SD and the role and means to implement it into the HEIs has long been developed by Lozano (2006, 2010, 2011), and Lozano et al. (2013). Lozano and collaborator's work address the international and national guidelines, compiling these documents (agreements and declarations) and facing their purpose (role and means to implement it into the HEIs).

According to Lozano (2010, p. 637) despite the growing number of HEIs who started an approach in favor of SD, this is still an innovation for the most HEIs. Additionally, in most cases, these practices are not yet impregnated in all disciplines, academics, university administrators, and *curricula*. This is a challenge that involves various barriers, mentioned above, where the involvement of stakeholders will be, probably, the means to achieve their success. For Lozano et al. (2013), most HEIs continue following the reductionist and mechanistic paradigms, styling as an approach based on the "Newtonian and Cartesian mental models." This approach is characterized by a restricted and isolated vision based only on scientific knowledge, and where any change is seen as a difficult reality to implement. This vision is easier to pursue since it consists of a linear approach where changes are almost non-existent.

In agreement with Hopwood et al. (2005), there is a plurality of perspectives of SD. They propose that these perspectives can be arranged in three different positions: (i) Status Quo; (ii) Reform; and (iii) Transformation. These approaches range from a lower awareness and need for change toward a more sustainable behavior (e.g., Status Quo) to greater awareness and need for change to the holistic view, where concerns about the socio-economic problems such as poverty and inequality and the future of coming generations are expressed through actions (e.g., Transformation).

Currently, and also in the Portuguese context, there are already some HEIs developing sustainable practices as part of their intervention, and it is therefore essential, according to Hopwood et al. (2005), to map the approach associated to SD. Additionally, the implementation of SD measures is also crucial; however, that path can be achieved only after the SD has been accepted by everyone in the institution (Lozano et al. 2013). Different organizations have, usually, different approaches and development stages about SD. In the next section, we will put forward the stages of SD accessible in literature, taking into account the HEIs point of view.

2.4 Stages of SD in HEIs

Roger's innovation theory (1995) has been used for several authors to classify the different stages of SD implementation in HEIs. According Lozano (2006; Lozano et al. 2013), the implementation of the innovation on SD can follow five stages

(Rogers 1995): (a) innovators, (b) early adopters, (c) early majority, (d) late majority, and (e) laggards. The innovators represent the stage where the SD is more integrated and developed in HEIs. The latest stages, identified by the late majority and the laggards, have a higher level of resistance to change.

Lozano (2006) identified two types of innovators, namely (i) incremental and (ii) radical. The incremental innovation is characterized by the continuous improvement based on the policies and strategies of the HEIs. On the other hand, radical innovation is observed without having taken into account the policies and strategy of the HEI. Innovators in incorporating the SD in its HEIs present themselves as pioneers. However, there will be those who will have more difficulties on this implementation. As part of the adoption of innovation by HEIs, Rogers (1995) proposes the following stages necessary for the development of sustainability (Lozano 2006): (a) awareness, (b) interest, (c) test, and (d) adoption.

On the other hand, Sherry (2003) presented three stages of innovation: (i) initiation, (ii) implementation, and (iii) institutionalization. The last one is considered when the idea is already incorporated into the culture and operations of the organization (research and education) as stated by several authors (e.g., Sammalisto et al. 2014; Wright 2010; Wright and Horst 2013; Wright and Wilton 2012).

A different approach to the SD stages in HEIs is presented by Leal Filho (2009). He put forward three stages that can be identified in the HEIs in terms of implementation or incorporation of sustainability. In the first stage, Leal Filho (2009) suggested that the principles of SD are not fully understood and there is no effort to promote sustainability in the HEIs. In the second stage, there are already significant visible efforts in the development of operations on campus. Although the principles of the SD are not widely understood, there are already projects to promote sustainability as a whole. The third stage is characterized by a long-term commitment to contribute to SD (e.g., sustainability policies, certifications, and coordination of activities relating to the SD in HEIs).

According to Leal Filho (2010), most of the HEIs are among the first two stages of evolution of sustainability. Therefore, there is much to do for the implementation of the SD in the whole system of HEIs. Taking into account the Lozano (2006) classification, the first stage of SD (innovation) is difficult to incorporate in all activities of HEIs. There is a broad agreement about the difficulty and delay in the institutionalization of the SD in HEIs (e.g., Dobes 2011; Leal Filho 2010; Sammalisto et al. 2014).

According to Sammalisto et al. (2014), the SD institutionalization process in HEIs is an ongoing process where knowledge, inspiration, practice, and the development of intelligence for the SD are skills that should be institutionalized and then transformed to outdoor activities. The development and institutionalization of the SD in HEIs requires a real commitment from the stakeholders in this sense, and Lozano (2006) states that in the early stages, it is difficult for the SD to be automatically included in all aspects of HEIs.

There are factors that can help (or dissuade) the implementation and institutionalization of SD in HEIs and we will see the most relevant factors in the next section.

2.5 The Critical Success Factors in the Implementation of the SD in HEIs and Assessment Tools

Disterheft et al. (2015) identified three features that are critical success factors in developing initiatives for the SD, namely structure (top management support), process (communication strategy), and people (listening, giving feedback and not take value judgments), in which some are influenced by others. For Barth (2013), there are three key aspects of the implementation of SD in their Institutions: ongoing communication, systems of support, and leadership. These aspects may be addressed by three patterns of implementation processes, namely students as agents of change, routines and innovation, and brand recognition (Barth 2013).

HEIs use different types of assessment tools (standardized and non-standardized) to identify its sustainability performance (Disterheft et al. 2015). Despite the different methods and tools, the indicators are the most used approaches (Ramos 2009; Ramos and Pires 2013). They are essential to demonstrate the implementation of SD in institutions. Thus, the HEIs following its mission should establish indicators that can show their concern and communicate how SD is being implemented. For Disterheft et al. (2015), it is necessary to develop indicators that can monitor SD to identify problems and carry its development.

Disterheft et al. (2015) identify various types of initiatives that illustrated the forms of participation of HEIs toward SD, for instance, implementing the environmental management system, organizing activities for signing the declaration Higher Education Sustainability Initiate Rio+20, and student projects related to campus sustainability. These initiatives demonstrate a large variety of different forms of participation (individual/social/public participation) and consequently different objectives and levels of participation (p. 5).

Lozano (2011) also notes the importance of the reports of sustainability as a way to align its strategy to sustainability. For this author, HEIs should prepare sustainability reports, such as those the companies already use to support its strategy for sustainability.

In the next section, we will present the principal characteristics of the higher education sector in Portugal.

2.6 Higher Education Sector in Portugal

In Portugal, higher education is taught in public and private HEIs, comprising universities, university colleges, polytechnic institutes, and other HEIs. This education is driven by a constant perspective of promoting research and creation of knowledge, aiming to ensure solid scientific and cultural preparation and to provide technical training that enables to perform professional and cultural activities and to foster the development of design capabilities, innovation, and critical analysis (DGES—Direcção Geral do Ensino Superior 2015).

At the end of 2014, the public Portuguese network of HEIs integrated fourteen Universities, twenty Polytechnic Institutes, and eight Military and Police Higher Education schools. In this study, we only considered the Universities and the Polytechnics. It should be noted, however, that there are polytechnics schools integrated in the university system (14 polytechnic schools were integrated in six universities), which were included in the universities' domain.

In this study, we did not consider the Military and Police Higher Education system given its own form of organization, educational context, and objectives different from the other HEIs.

Public institutions of higher education were created by decree-law, according to the national system of public higher education network and taking into consideration their needs and sustainability (DGES—Direcção Geral do Ensino Superior 2015).

Acknowledging the importance of higher education for the economic and social development of a country, this concern was approached in the Portuguese political agenda for the introduction of significant changes in the several governments. These changes had a higher impact, in the 80s, with the adoption of a binary system of higher education (University and Polytechnic), as had already occurred in other countries in Europe, which created a subsystem of polytechnic education. The creation of a polytechnics network intended to develop training with a closer link to the economic reality and the industrial country with more technical training, profession-oriented from the viewpoint of "know-how" and designed in close connection to the social and economic regional reality.

In the context of legal responsibilities, the various legislative documents concerning the creation of polytechnics emphasize the bond that these institutions should have with their regions, not only in terms of institutional partnerships, but also to develop scientific areas in schools that are directly linked with economic activities and the structure of the region.

In recent years, more responsibility and intervention have been attributed to the HEIs, not only to teaching and research, but also in broader functions of study and research. Today, with progress toward a knowledge economy and with the growing economic value of science, some authors attribute a "third mission" to the HEIs (Jongbloed et al. 2008) passing through the contribution to the economic development of a country or region by transferring their knowledge to the business sector.

3 Factors Inducing the Implementation of SD Practices at HEIS and Development of Hypotheses

The SD practices at HEIS are, probably, influenced by different factors, some of them internal and others being external or contextual. We present below the theoretical support about some of the factors that we investigate in this study. We will investigate how the institution size and the type of HEIs (University or Polytechnic) influence the adoption of SD practices. Additionally, we study the stage of implementation of SD on Portuguese Public HEIs.

3.1 Institution Size

Institution size has been "one of the variables most used in order to explain the disclosure of information" and in "universities, Gordon et al. (2002) found that size is significant in explaining the total extent of disclosure" (Gallego et al. 2011, p. 362). In a country, frequently we found very heterogeneous HEIs and some are very large in size and population. Because several studies found a positive relationship between size and implementation of practices of sustainability (e.g., Alshuwaikhat and Abubakar 2008; Gallego et al. 2011; Jorge et al. 2015), we also defend that institutional size has an impact on the commitment to sustainability. Bigger institutions have a higher impact on the environment and on society (Alshuwaikhat and Abubakar 2008) so, probably, they are more motivated to introduce SD practices in their strategies and practices. Furthermore, larger HEIs reach a wider audience and consequently they are more aware of the responsibility of acting in the right way. Their behavior has an impact on its image and in its ability to capture more students and more financial resources.

It should be noted that the institution size was measured by the number of students and teachers of each HEIs. This procedure was followed in several other studies (e.g., Gallego et al. 2011; Siboni et al. 2013).

From the above, we propose the following hypothesis:

H1 *There will be a positive relationship between the size of institution and SD in Portuguese HEIs*

3.2 Institution Type

The binary system of Portuguese higher education is characterized by the coexistence of Universities and Polytechnics (Lei n.º 62/2007 de 10 de setembro). The University system offers solid scientific education combining teaching and investigation. The Polytechnics intend to develop a more technical training with a closer link to the economic reality and the industrial country. Concerning sustainability and because of their nature, the strategies and the context of Universities are one step forward than Polytechnic Institutes. Additionally, Universities develop more investigation and usually are more alert for societal challenges as SD.

So, from the above, we propose the following hypothesis:

H2 *There will be more SD practices in Universities than in the Polytechnics in Portugal*

3.3 Stage of Implementation of SD in HEIs

In what concerns the stage of implementation of SD in HEIs, we follow the terminology used by Rogers (1995) and Lozano (Lozano 2006; Lozano et al. 2013). Thus, we used the five stages, namely laggards, late majority, early majority, early adopters, and innovators.

Most HEIs are among the first stages or early stages of the SD implementation (e.g., Alonso-Almeida et al. 2015; Ceulemans et al. 2015; García et al. 2006; Leal Filho 2010; Velazquez et al. 2005; Waas et al. 2010) and there are a few examples of HEIS that are in the advanced stages (Lozano 2006; Lozano et al. 2013), namely in European universities (Ceulemans et al. 2015). From the above, we propose the following hypothesis:

H3 *The implementation of SD practices at Portuguese HEIs is in its early stages*

4 Research Methodology

4.1 Sample, Data Collection, and Procedures

To measure the level of SD information disclosed by Portuguese HEIs, a content analysis of all Portuguese public HEIs' websites was carried out. The study reviewed the institutional websites of the 34 public Portuguese's HEIs, in which 20 of them are polytechnics and 14 universities. By institutional websites, we mean the main institutional website of each university or polytechnic. The sites of faculties, schools, or departments were not analyzed.

In this study, were only analyzed the public institutions. In Portugal, the private system is very different regarding funding (public/governmental funding is absent) and students attractiveness and, at the moment, they are facing consolidation problems.

The content analysis method (Bardin 2014; Krippendorff 2013) consisted of classifying the information disclosed in different categories that represent different dimensions of the SD's practices. The simplest form of content analysis consists of detecting the presence or absence of SD's practices in HEIs.

This method has been used successfully and advocated in the literature (Hasim et al. 2011; Katiliūtė et al. 2014). Katiliūtė et al. (2014) used content analysis to identify SD information issues on 14 Lithuanian universities websites, Barth (2013) for activities of SD in 17 German Institutions, and Gallego et al. (2011) for the information disclosed online by 70 Spanish universities.

The data collection was performed by utilizing public accessible data, and relevant documents available on the HEIs main websites (e.g., activity reports, sustainability reports, risks, and corruption management plans). The entire main websites of HEIs were examined, but for the following exclusions: (a) links to

external websites; (b) websites of each faculty or school; and (c) long-term strategic plans, plans of activities, and budgets approved.

The data collection was carried out from December 1, 2014 to February 28, 2015, and each website was reviewed manually. To ensure the accuracy of coding, a strict step-by-step procedure was conducted. To avoid bias in the interpretation, each HEIs main website was reviewed at least four times and established refined themes.

Before the data collection, we developed a coding system, listing all the practices, based on literature review. The practices were organized in four dimensions (Disterheft et al. 2013; García and Vergara 2000; Hass et al. 2002; Khalil et al. 2013; Leal Filho et al. 2015; Lozano 2011; Meadowcroft 2007; Sammalisto et al. 2014; Segalàs et al. 2010; Sibbel 2009; Waas et al. 2011): environmental, economic, social/cultural, and institutional/educational/political (see Table 1). The practices considered as cultural were included in a social dimension, and the political and educational practices were included in institutional dimension. The final coding system contains 124 practices of SD in HEIs, distributed as follows: environmental (27), economic (12), social/cultural (39), and institutional/educational/political (46).

For each dimension, the analysis used a scoring system that assigned a point for each SD practice identified on the institutional websites (e.g., 1: there is evidence; 0: there is no evidence). Disclosure scores for each HEIs were not weighted, being assumed that each practice of SD is equally important.

4.2 Data Analysis

A global index of SD practices (GI_i) was developed for each HEI. This global index includes an index for each dimension studied (environmental index, economic index, social/cultural index, institutional/educational/political index). We gave the same weighting to the four indices (see formula 1) because literature considered that each dimension has the same importance to the SD in HEIs (Leal Filho et al. 2015; Lozano 2011; Waas et al. 2011).

Each index takes into account the total number of practices mentioned above (see Formula 2). All the formulas were converted into percentages by multiplying the results by 100 %. The minimum value of GI_i is 0 % which represents that there are no practices of SD implemented in the *i*th HEI, and the maximum value is 100 % which represents that all the practices of SD considered in the analysis were implemented in the *i*th HEI:

$$GI_i = 0.25EnI_i + 0.25EcI_i + 0.25SI_i + 0.25II_i \quad (1)$$

$$GI_i = 0.25\frac{PEn_i}{27} \times 100\% + 0.25\frac{PEc_i}{12} \times 100\% + 0.25\frac{PS_i}{39} \times 100\% + 0.25\frac{PI_i}{46} \times 100\% \quad (2)$$

where

GI_i Global index of SD practices disclosed in the website of the ith HEI (i = 1, …, 34)

EnI_i Environmental index of SD practices disclosed in the website of the ith HEI (i = 1, …, 34)

EcI_i Economic index of SD practices disclosed in the website of the ith HEI (i = 1, …, 34)

SI_i Social/cultural index of SD practices disclosed in the website of the ith HEI (i = 1, …, 34)

II_i Institutional/educational/political index of SD practices disclosed in the website of the ith HEI (i = 1, …, 34)

PEn_i Sum of environmental SD practices disclosed in the website of the ith HEI (i = 1, …, 34)

$PEcn_i$ Sum of economic SD practices disclosed in the website of the ith HEI (i = 1, …, 34)

PS_i Sum of social/cultural SD practices disclosed in the website of the ith HEI (i = 1, …, 34)

PI_i Sum of institutional/educational/political SD practices disclosed in the website of the ith HEI (i = 1, …, 34)

Additionally, a cluster analysis was performed to identify the stage of implementation of the SD in HEIs. We used the Ward's method with the Squared Euclidean distance to calculate the clusters. Observation of the dendrogram defined the number of clusters.

5 Results

After computing the number of practices for each dimension and for each HEI, we continued calculating the indices mentioned above. The results are described in Table 2. The HEIs are ordered by global index from the higher to the lower value. For example, University of Minho has a global index of 56 % which means that they implement 56 % of the SD practices considered in the study. For this result contributes a performance of 59 % in the environmental, 67 % in the economic, 62 % in the social/cultural, and 35 % in the institutional/educational/political dimensions.

Approximately, 47 % of HEIs present SD practices in all the categories considered. Fifty percent of HEIs present SD practices in three categories (Economics, Social/Cultural, and Institutional/Educational/Political). Just one HEI (0.03 %) has practices in only two dimensions (Economic and Social/Cultural).

The Economic and Social dimensions of SD are the more formally communicated in the Portuguese HEIs with indices of 39 and 33 %, respectively. The institutional dimension of SD has an index of 14 %. The less formally communicated dimension of SD is the environmental one (index equal to 11 %).

Table 2 Indexes of SD practices in Portuguese public HEIs and cluster analysis results

HEI	Environmental index (%)	Economic index (%)	Social index (%)	Institutional index (%)	Global index (%)	Type	Cluster
University of Minho	59	67	62	35	56	U	1
University of Coimbra	59	58	59	24	50	U	1
Polytechnic Institute of Leiria	33	83	62	15	48	P	1
University of Trás-os-Montes and Alto Douro	48	75	44	20	47	U	1
University of Lisboa	22	67	59	22	42	U	1
University of Porto	19	67	62	22	42	U	1
University of Aveiro	19	50	44	33	36	U	1
Polytechnic Institute of Viana Castelo	26	42	41	17	32	P	2
University of Beira Interior	0	50	51	22	31	U	2
New University of Lisbon	0	58	36	28	31	U	2
Superior Nursery School of Porto	41	58	18	4	30	P	2
Polytechnic Institute of Portalegre	4	42	38	30	29	P	2
Polytechnic Institute of Guarda	0	50	46	17	28	P	2
University of Evora	7	50	36	15	27	U	2
Polytechnic Institute of Beja	4	58	31	11	26	P	2
Polytechnic Institute of Coimbra	0	50	33	15	25	P	2
Polytechnic Institute of Viseu	0	50	28	9	22	P	3
Polytechnic Institute of Porto	0	33	36	17	22	P	3
Polytechnic Institute of Lisboa	33	25	23	4	21	P	3
University of Algarve	4	25	38	15	21	U	3
University Institute of Lisbon (ISCTE-IUL)	0	25	28	24	19	U	3

(continued)

Table 2 (continued)

HEI	Environmental index (%)	Economic index (%)	Social index (%)	Institutional index (%)	Global index (%)	Type	Cluster
Polytechnic Institute of Santarem	7	25	31	9	18	P	3
Polytechnic Institute of Bragança	4	25	21	11	15	P	3
Polytechnic Institute of Castelo Branco	0	25	26	9	15	P	3
University of Madeira	0	17	33	9	15	U	3
Polytechnic Institute of Setubal	0	17	26	7	12	P	4
Superior Nursery School of Coimbra	0	17	21	9	11	P	4
Polytechnic Institute of Cávado Ave	0	17	18	7	10	P	4
Superior Nursery School of Lisboa	0	25	15	0	10	P	4
University of Azores	0	8	26	4	10	U	4
Polytechnic Institute of Tomar	0	17	15	4	9	P	4
University Aberta	0	17	3	9	7	U	4
Estoril Higher Institute for Tourism and Hotel Studies	0	8	15	2	6	P	4
Superior School of Nautica	0	8	10	4	6	P	4
Global Mean of the Indexes	11	39	33	14	24	–	–

Notes: *U* University, *P* Polytechnic. Clusters: *1* early adopters, *2* early majority, *3* late majority, *4* laggards

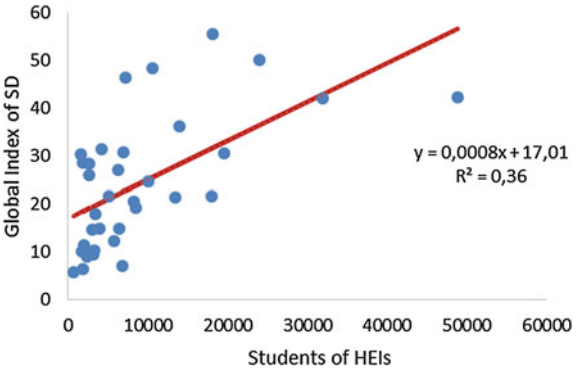

Fig. 1 Students versus global index of SD

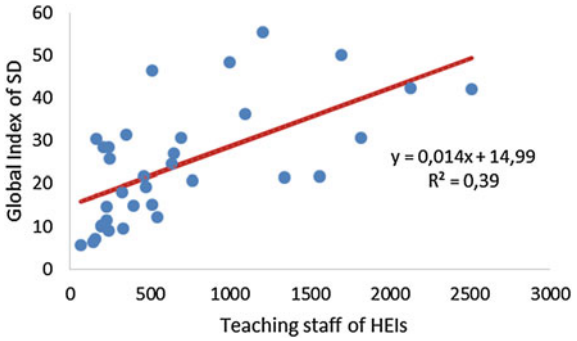

Fig. 2 Teaching staff versus global index of SD

For testing the relationship between the size of HEIs and the SD practices formally communicated in websites, we adopted as a proxy for HEIs' size, the number of students, and the number of teaching staff in each HEI. This information was obtained at DGEEC—Direção-Geral de Estatística da Educação e Ciência (2015), namely (a) the number of registered students during the 2013/2014 academic year and (b) the number of registered teachers during the 2012/2013 academic year.

Figures 1 and 2 represent the relationship between the number of students and the number of teaching staff and the global index of SD, respectively. There is a positive significant relationship between the size of HEIs and number of SD practices, measured both through the number of students ($b = 0.0008$, $p < 0.001$; $R^2 = 0.36$) and the number of teaching staff ($b = 0.014$, $p < 0.001$; $R^2 = 0.39$). The larger the size of the HEI, the greater the number of SD practices reported on the websites. There is evidence for H1.

Results show that there is a difference in disclosure between the practices of Universities and Polytechnics. A higher percentage of SD practices in Universities was observed (Global index of SD = 31 %) than in Polytechnics (Global index of SD = 20 %) in all dimensions (Table 3). So there is evidence for H2.

Table 3 Global indexes of SD by type of HEIs

	Mean of universities' global index (%)	Mean of polytechnics' global index (%)	Global mean of global index (%)
Environmental index	17	8	11
Economic index	45	34	39
Social index	42	28	33
Institutional index	20	10	14
Global SD index	31	20	24

The data analysis continued with a cluster analysis (for the global SD index). Through the observation of the dendrogram, only four clusters emerge. Because the maximum global index obtained in the Portuguese HEIs was 56 %, in practical terms, we considered that there are no HEIs on the innovative stage of SD (García et al. 2006; Lozano 2006; Lozano et al. 2013; Rogers 1995). Consequently, we considered that there are HEIs only in the remaining four stages (laggards, late majority, early majority, and early adopter).

The Universities of Minho, Coimbra, Polytechnic of Leiria, University of Trás-os-Montes and Alto Douro, University of Lisboa, University of Porto, and University of Aveiro were in cluster 1 (early adopters cluster), and they represent the HEIs with more practices developed in all dimensions. The global SD index in this cluster ranges between 56 and 36 %.

In the cluster 2 (early majority cluster), Polytechnic of Viana do Castelo, University of Beira Interior, New University of Lisbon, Nursery School of Porto, Polytechnic of Portalegre, Polytechnic of Guarda, University of Évora, Polytechnic of Beja, and Polytechnic of Coimbra were present. In this group, we identified at least one dimension less developed (in most of the cases the environmental one). The global SD index in this cluster ranges between 32 and 25 %.

In cluster 3 (late majority cluster), Polytechnic of Viseu, Polytechnic of Porto, Polytechnic of Lisboa, Polytechnic of Santarém, Polytechnic of Castelo Branco and Polytechnic of Bragança, ISCTE-University Institute of Lisbon, University of Algarve, and University of Madeira were present. The global SD index in this cluster ranges between 22 and 15 %.

In the fourth and last cluster (laggards cluster), Polytechnic of Setubal, Polytechnic of Cavado and Ave, Polytechnic of Tomar, Nursing School of Coimbra, Nursing School of Lisboa, University of Azores, University Aberta, School of Nautica, and Estoril Higher Institute for Tourism and Hotel Studies were present. The global SD index in this cluster ranges between 12 and 4 %.

More than 50 % of the HEIs are in early stages (laggards and late majority) of SD implementation. There is evidence for H3.

6 Discussion

Larger HEIs are of great importance and visibility for society (Jorge et al. 2015) and this work clearly indicates that the larger the size of HEIs, the greater the number of SD practices reported on the websites. These results are consistent with Gallego et al. (2011) who also reported this size effect. Large institutions reach a wide audience and need to maintain a good image to attract and recruit students (Gallego et al. 2011). The ongoing process of consortia in HEIs in Portugal will, probably, consolidate this tendency.

Comparing the results of Universities versus Polytechnics, it was verified a higher percentage of SD practices in Universities for all dimensions. The dual system of Polytechnics and Universities created and maintained different organizational and educative contexts that gave rise to somehow different positions on disclosure policies and strategies, which possibly explains this difference in our results. However, some exceptions could exist. For example, one of the polytechnics is in the adopter stage (cluster 1; Polytechnic Institute of Leiria).

All the Portuguese HEIs use webpages to disseminate SD practices. A similar scenario was reported in the Lithuanian HEIs by Katiliūtė et al. (2014). Some Portuguese HEIs webpages have specific sections for SD and Social Responsibility issues, however, without developing specific topics in the majority of cases. Nevertheless, 47 % of HEIs presented practices in the four dimensions of SD and 50 % in three of these dimensions, the Economic and Social dimensions of SD taking a greater weight, followed by the Institutional and Environmental dimensions. Some studies stated a larger number of Environmental dimension practices (Clugston and Calder 1999; Lozano 2011; Velazquez et al. 2006), which is not the case in our study where Economic and Social dimensions take the lead. As published by Jorge et al. (2015), "the slowing economy has affected higher education institutions, and they have had to cut budgets reducing expenditures" (p. 42) making the economic issues more relevant in that context. However, Lozano (2011) highlighted that the communication of the economic dimension might be a result of the analysis of the information available in HEIs annual reports, which are mandatory to have and to publish. It is possible that the higher evidence of economic SD practices could be a consequence of the required communication, rather than a result of more "real" practices in that dimension.

Katiliūtė et al. (2014) pointed out that the most relevant sustainability issues are those linked to the general characteristic of HEIs profiles, namely academic history, mission and vision statements, value and financial statement, and institutional structure and governance. In this study, it is a positive point that most of the Portuguese HEIs (25 HEIs, mission and vision statements clearly report SD issues) have mission statements related to SD in their documents and website information disclosure following a general international trend (e.g., Alonso-Almeida et al. 2015; Sedlacek 2013). Even though there is still a long way for the Portuguese HEIs to mainstream their sustainability functions and practices, in other countries, the HEIs

systems have a similar development path since most HEIs are in the early adopter stage (Alonso-Almeida et al. 2015; Jorge et al. 2015).

From this study, we conclude that the Portuguese Public HEIs are predominantly at an early stage of SD and, based on their policies and strategies, SD seems to be incremental. Portuguese Public HEIs show, in the first place, awareness in the way they communicate, whether through institutional documents or websites.

The University of Minho is in a SD implementation phase, namely through sustainability reports that have been targeted to improve their implementation, as an early adopter. In this study, only one HEIs published their sustainability reports under the GRI Framework (University of Minho), the outcome that drives toward Alonso-Almeida et al.'s (2015) results about diffusion of sustainability reporting universities. As stated by Alonso-Almeida et al. (2015), sustainability reporting is a very useful tool in the analysis of SD stage of incorporation in HEIs. This suggests that sustainability reporting is not a common practice in HEIs (e.g., Alonso-Almeida et al. 2015; Disterheft et al. 2012). As reported by Velazquez et al. (2005), HEIs conservative organizational restructure, the lack of awareness of HEIs community, and lack of sustainability policies seem to be the greatest obstacles to SD.

7 Conclusions

The main contribution of this study was an overarching analysis of HEIs websites about the communication of SD practices or SD issues. Websites offer Portuguese HEIs a way to disclose their current situation with regards to practices of SD and helps to communicate with their stakeholders.

We first aimed to describe the content of the main websites of Public Portuguese HEIs, in regard to the four SD dimensions: (i) environmental, (ii) economic, (iii) social/cultural, and (iv) institutional/educational/political. Our findings reveal that the websites communicate mainly the economic and social/cultural practices of the Portuguese HEIs. We observed a positive association between communication of SD practices and (a) institution size and (b) type of institution. More than 50 % of the Portuguese HEIs are in the early stages of SD implementation and communication. Therefore, ours results suggest that despite the literature review noted the importance of the environmental dimension has to HEIs, and on its use often associated to greenwashing, this study indicates that the economic and social dimensions are more emphasized by the Portuguese HEIs.

With these results, the role of HEIs for SD becomes clearer, as does its social responsibility to society "University social responsibility" (Godemann et al. 2014, p. 221). However, it is important that the transformative role through SD and sustainability should be put into practice effectively, being integrated in HEIs agendas and strategies. It is important to promote SD in HEIs through best practices. As suggested by Lozano and Huisingh (2011), we consider that the long-term

environmental/societal horizons must be addressed along with the economic dimensions because the efforts focused especially on efforts to solving problems on short-term, unilateral, or compartmentalized approaches can lead to catastrophes and societal problems.

The sustainability issues should be prioritized in Portuguese HEIs agenda for them to have a better relationship with their stakeholders (e.g., for international rankings, for fundings from the stakeholders, and for a better image and competitiveness with the others). So, despite all the guidelines for the promotion of SD and the recognized role of HEIs in this way, the international and Portuguese economic situation probably had a negative effect on the role of HEIs for these goals. Moreover, they have to meet challenges in their day-to-day life, and do not have time to identify a medium and long-term strategy which includes SD as a competitive advantage to competitiveness and to educate and inform the society for sustainability.

We hope that this study will allow, as considered by Lozano (2006), that "the SD incorporation and institutionalization can be accelerated with multiplier effects, guided by the SD champion" (p. 796). As already noted, future research should focus on the barriers of implementation for SD and the perception of stakeholders of HEIs a their commitment to SD.

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