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Sustainability Indicators for the Management of Brazilian Higher Education Institutions

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Abstract

This paper discusses a set of sustainability indicators applied to Brazilian Higher Education Institutions (HEINS) to serve as a tool for measuring and disclosing sustainability practices and actions. Methodologically, a qualitative study was carried out with data collected via triangulation (semi-structured interviews, documentary research, and observations) and submitted to content analysis. As a result, it proposes the creation of an academic category consisting of four subcategories – institutional, university management, financial, and social and environmental responsibility. This category and its subcategories include a set of sustainability indicators that enable the measurement and disclosure of the sustainability practices and actions of HEINS using a mixed-method design (quantitative and qualitative) and complementary evaluation strategies. From a managerial standpoint, research results provide the management of HEINS with tools to assess institutional performance quantitatively and qualitatively based on multiple evaluation criteria. Regarding the social aspect, this set of indicators provides society with means to assess the sustainability practices and actions of HEINS, as well as their economic, social, environmental, and academic implications. The proposal of such indicators is unique in the Brazilian context and it can potentially introduce practices for measurement and disclosure of sustainability practices and actions of HEINS.

Key words: Brazilian higher education; higher education institution; sustainability; sustainability indicators; disclosure.

Introduction

This paper[1] presents the results obtained from a research project that aims to investigate performance indicators of corporate social responsibility (CSR) and sustainability practices applied to Higher Education Institutions (HEINS) in Brazil. The focus is to create and propose a set of sustainability performance indicators for the measurement and disclosure of the practices of HEINS. We assume that the measurement and disclosure of such practices provide tools that allow HEINS to account for their actions to the Brazilian society and attain social legitimacy and institutional perpetuation.

The discussion on sustainability is based on stakeholder theory. Stakeholder theory aims to analyze the relationship between an organization and the economic and social actors (individually or collectively) that affect, are affected by, and have interests in, procedural and substantive aspects of corporate activities. From this perspective, one can deal more objectively with the complexity of the corporate world regarding the creation of value, the monitoring of potentially moral flaws in running businesses, and the survival of organizations in the capitalist system (Parmar *et al.*, 2010; Purnell & Freeman, 2012).

Discussions were also theoretically based on the perspective of institutional theory, which posits that organizational analysis involves the relationship between an organization and its environment or context. In this relationship, organizations interact with the cultural system and the institutionalized values in society with a view to adopt models, practices, and structures that are compatible with the system. By adopting such models, practices, and structures, organizations attain symbolical efficiency and social legitimacy to justify their endurance and survival in society (DiMaggio & Powell, 1983; Meyer & Rowan, 1977).

The compatibility and complementarity of stakeholder and institutional theories made it possible to conceptually investigate the subject of sustainability. Sustainability has become a locus of attention in the academic and corporate fields, mainly because of social concerns regarding the organizational actions and their impacts on the economy, environment, and society itself (Bell & Morse, 2008). However, despite the relevance of this topic to society, its complexity and related ideology may transform it into a void concept of doubtful application and only a few practical effects (Bell & Morse, 2008; Fortune & Hughes, 1997; Pierantoni, 2004). Therefore, this topic should be approached through performance indicators. On the one hand, indicators are used to measure and disclose, in reports, the organizations' sustainability actions, thus providing society with an instrument to assess them (Bell & Morse, 2008; Pierantoni, 2004). On the other hand, indicators serve as a way through which organizations can attain legitimacy by disclosing their practices and actions to society (DiMaggio & Powell, 1983; Meyer & Rowan, 1977).

In this study, such issues are addressed by focusing on the context of HEINS. HEINS in general, and particularly universities, have been playing an important role in transforming societies through the educational and professional preparation of leaders, decision-makers, entrepreneurs, and scholars who operate at, study, and interpret organizations. In this socially relevant process, HEINS have been considering issues that involve sustainability (Batisani & Ndiane, 2014; Lozano, Lozano, Mulder, Huisingh, & Waas, 2013).

As stated by Alghamdi, Heijer and Jonge (2017), Lozano, Llobet and Tideswell (2013), Lozano (2011), Cortese (2003), and Shriberg (2002), in the past few decades, an increasing number of HEINS have incorporated and institutionalized the topic of sustainability in their curriculums (instruction), research and extension activities, and in their managerial practices and actions. Those authors also highlight an increase in the assessment and disclosure of sustainability-related institutional practices and actions in academic management reports.

If HEINS are to assess and disclose such institutional practices and actions, it is important to create performance indicators that allow them to understand the dimensions and aspects they should

approach in their institutional efforts regarding CSR and sustainability (Lozano, 2006; Lozano, Llobet *et al.*, 2013). Accordingly, Lozano, Llobet *et al.* (2013) and Lozano (2006), using as reference existing tools for the assessment and disclosure of sustainability practices and actions, such as the Global Reporting Initiative (GRI), ISO 14.000 Series, and Local Agenda 21, among others, proposed an instrument called Graphical Assessment of Sustainability in Universities (GASU). The difference between the tools already mentioned and GASU is that the first tool did not observe the specificities of HEINS; that is, they were more appropriately applied to organizations in general and, therefore, did not cater to the unique and specific characteristics of the HEINS.

Taking the GASU (Lozano, 2006; Lozano, Llobet *et al.*, 2013) as basis, this study proposes a set of performance indicators that are able to assess and disclose the sustainability practices and actions of Brazilian HEINS. The proposal of this set of indicators applicable to Brazilian HEINS is justifiable in view of these institutions' specificities, which differentiate them from foreign institutions.

As Silva *et al.* (2014), Silva and Silva (2013), and Silva and Muniz (2004) all point out, Brazilian HEINS operate in a context of extensive governmental regulation. Within that context, public policies for higher education are related to three central axes: (a) evaluation, carried out by the National System of Higher Education Evaluation (Sistema Nacional de Avaliação da Educação Superior [SINAES]) and operated by the National Institute for Educational Studies and Research Anísio Teixeira (Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira [INEP]), responsible for articulating multiple processes intended to improve the quality of higher education; (b) regulation, carried out by the Higher Education Office (Secretaria de Educação Superior [SESu]) through administrative acts that authorize and recognize the operation of HEINS and their courses; and (c) supervision, carried out by the National Education Council (Conselho Nacional de Educação [CNE]) and the SESu, responsible for ensuring compliance of higher education services in the federal system with the applicable legislation (INEP, 2009).

Based on this regulation, Brazilian (public and private) HEINS adopt a systemic organizational structure that embraces two entities, both of which are liable for the management of the institution, namely the maintainer and the maintained entity. Besides influencing the organizational structure of HEINS, Brazilian governmental regulation influences some academic management practices, meaning that these institutions have their own way of being organized and managed. Moreover, the Brazilian institutional context imposes on HEINS a specific form of operation to achieve social legitimacy and justify their survival and perpetuity (DiMaggio & Powell, 1983; Meyer & Rowan, 1977).

In addition, considering the lack of studies and proposals that focus on creating sustainability performance indicators applied to Brazilian HEINS, this study gains academic relevance by encouraging discussions with theoretical and methodological implications that can contribute to the evolution and consolidation of this field of investigation. Moreover, this study has practical relevance since it offers an academic management instrument capable of providing HEINS with a means to plan, implement, and assess (control) sustainability practices and actions.

In order to reach the main goal of this paper, which is to develop a set of sustainability indicators applicable to Brazilian HEINS, it was divided into five sections besides this introduction. The second section introduces the conceptual perspective of sustainability and sustainable development. Next, sustainability is approached in the HEINS context. The fourth section presents a discussion of the sustainability indicators, especially considering their relevance in the process of assessing and disclosing such practices and actions. The fifth section brings a proposal of a set of sustainability indicators applicable to Brazilian HEINS. Finally, the sixth and last section presents the final considerations.

Sustainability and Sustainable Development

Since the concept of sustainable development gained international prominence with the presentation of the Brundtland Report **Our Common Future** (World Commission on Environment and Development [WCED], 1987), several initiatives have emerged to define sustainability and sustainable development (Ciegis, Ramanauskiene, & Martinkus, 2009; Ipiranga & Aguiar, 2014; Olawumi & Chan, 2018; Petrini & Pozzebon, 2010; Soini, Jurgilevich, Pietikäinen, & Korhonen-Kurki, 2018). Consequently, the notions of sustainability and sustainable development became complex and permeated by conceptual diversity involving multiple meanings depending on the literature used (Axelsson, Angelstam, Elbakidze, Stryamets, & Johansson, 2011; Ciegis *et al.*, 2009; Olawumi & Chan, 2018; Pierantoni, 2004; Sartori, Silva, & Campos, 2014).

In the literature, the concepts of sustainability and sustainable development are commonly considered interchangeable, sometimes even synonymous (Axelsson *et al.*, 2011; Olawumi & Chan, 2018; Sartori *et al.*, 2014). In spite of such treatment of the two concepts, authors such as Sartori, Silva and Campos (2014), Axelsson, Angelstam, Elbakidze, Stryamets and Johansson (2011), and Lélé (1991) highlight that they are not the same.

In summary, the concept of sustainability has to do with "the existence of the ecological conditions necessary to support human life at a specified level of well-being through future generations" (Lélé, 1991, p. 60). In another perspective, Sartori *et al.* (2014) state that sustainability is characterized as a principle applicable to dynamic systems that are constantly changing and require proactive measures.

According to Olawumi and Chan (2018) and Sinakou, Pauw, Goossens and Petegem (2018), however, sustainable development is a complex concept, integrated by economic, social, and environmental pillars that need to be harmonized in order to acquire a holistic approach. For Ciegis, Ramanauskiene and Martinkus (2009) and Pierantoni (2004), sustainable development is a complex, multidimensional concept involving multiple domains and a combination of efficiency, equality, and intergenerational equality in the economic, social, and environmental dimensions. The three dimensions (or pillars) are known as the triple bottom line (TBL) (Elkington, 2012).

The present study assumes that sustainability is a principle, while sustainable development has to do with a social process involving choices and decisions towards sustainability. In other words, sustainable development is the means to reach sustainability, which is the ultimate, long-term goal (Ciegis *et al.*, 2009; Lélé, 1991; Olawumi & Chan, 2018; Sartori *et al.*, 2014; Sinakou, Pauw, Goossens, & Petegem, 2018).

Ciegis *et al.* (2009) maintain that, in a broader sense, sustainable development is associated with equality in the distribution between present and future generations of possibilities for development. Putting it differently, sustainable development involves, among other aspects, better quality of life both now and for future generations. According to those authors, sustainable development does not entail a choice of economic results, environmental preservation, or social improvement; on the contrary, it relates to greater efforts so that both economic development and social development are compatible with environmental preservation, thus assuming the equality of these dimensions.

Concerns for sustainable development have been the focus of international organizations such as the United Nations (UN) and the United Nations Economic and Social Council (UNESCO). UNESCO, for example, took the initiative to promote the United Nations Decade of Education for Sustainable Development (DESD) during the 2005-2014 period. The main goal of that initiative is to integrate the principles, values, and practices of sustainable development into all aspects of education and learning. As stated in the UNESCO initiative, the educational effort proposes to encourage changes in behavior that can create a more sustainable future in terms of environmental integrity, economic viability, and a fair society for present and future generations (UNESCO, 2005).

As highlighted in the DESD Final Report, a solid foundation has been laid for Educational for Sustainable Development (ESD). This solid foundation was achieved by raising awareness, influencing policies, and generating a significant number of good practice projects in all areas of education and learning. Despite this result, the report shows that ESD and education systems have not yet been fully integrated into most countries (UNESCO, 2014).

Recently, another initiative on sustainable development was carried out by the UN. The UN approved the document **Transforming our world: the 2030 Agenda for Sustainable Development** to formalize the post 2015 international action plan for development. This agenda, which includes 17 Sustainable Development Goals (SDG) and 169 targets, sought to stimulate action at multiple fronts related to people, the planet, and prosperity (Koehn & Uitto, 2017; Trejo, 2017; UN, 2015). As stated in the document, all the 17 SDG and 169 targets demonstrate the ambition of the Agenda 2030 and are integrated to the three dimensions of sustainable development: economic, social and environmental (UN, 2015).

In this context of transnational efforts to promote sustainable development, the HEINS represent some key participants. These institutions significantly contribute to the educational process by transforming society and increasing awareness for the cause of sustainability (Batisani & Ndiane, 2014; Koehn & Uitto, 2017; Lozano, Lozano *et al.*, 2013), especially in developing economies in Latin America countries like Brazil.

In Latin America, an important event was held to discuss sustainability in the context of HEINS called the Latin America Meeting of Sustainable Universities (Encuentro Latinoamericano de Universidades Sustentables [ELAUS]). In its third edition, the proposal was to strengthen the commitment of higher education to the sustainable development of the planet, including advances in the construction of sustainability indicators for Latin American universities (ELAUS, 2015). In line with this perspective, the main goal of the present paper is to propose a set of indicators applicable to Brazilian HEINS for measuring and disclosing sustainability practices and actions.

Sustainability in Brazilian Higher Education Institutions

The institutional context in Brazilian higher education forms a distinctive web, a fabric of institutions, organizations, establishments, agents, and practices in which social, economic, political, religious, and other processes hinge on one another simultaneously. These organizations create models, practices, and structures to achieve a symbolical efficiency and social legitimacy that justifies their permanence and survival in society (DiMaggio & Powell, 1983; Meyer & Rowan, 1977; Schvarstein, 1995; Silva & Silva, 2013).

According to Silva *et al.* (2014), the institutional context comprises the Ministry of Education (Ministério da Educação [MEC]), composed of agencies such as the National Education Council (Conselho Nacional de Educação [CNE]), the Higher Education Office (Secretaria de Educação Superior [SESu]), the National Institute for Educational Studies and Research Anísio Teixeira (Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira [INEP]), and others (Decreto n. 6.317, 2007; Decreto n. 6.320, 2007). The purpose of those government agencies is to regulate higher education in Brazil. In addition to the governmental structure, the context comprises the HEINS, consisting of universities, university centers, federal centers for technological education, integrated colleges, individual colleges, institutes of higher education, and the academic community of these institutions, composed of the faculty, the student body, and the technical and administrative staff. It also includes society that absorbs the results of practices and actions of HEINS (Silva *et al.*, 2014; Silva & Muniz, 2004; Silva & Silva, 2013).

Because HEINS operate in an institutionally regulated scenario, they are submitted to the phenomenon of institutional isomorphism (DiMaggio & Powell, 1983; Gantman, 2010; Silva *et al.*, 2014; Silva & Muniz, 2004; Silva & Silva, 2013). This phenomenon consists of a restrictive process

that forces a unity, in a population-based context, to be similar to other units in the same set of environmental conditions (DiMaggio & Powell, 1983). Consequently, Brazilian HEINS structure themselves as a system composed of two autonomous, but interdependent subsystems: the maintainer, a legal personality responsible for sustaining the HEINS, and the maintained institution, representing the academic center, responsible for rendering educational services, especially through activities related to instruction, research, and extension (Silva & Muniz, 2004). Such a systemic structure of the Brazilian HEINS is applied to both public and private institutions. In the case of public HEINS, the maintainer is the public entity (for example, the State), while in private HEINS, the maintainer is a private organization.

Regardless of the public or private nature of the HEINS, it is worth highlighting the conceptual and managerial perspectives of these institutions that support the present study. According to Silva and Muniz (2004) and Lamarra and Brá (2004), HEINS are configured as systems (with their subsystems) based on a relationship between the ownership structure (the maintainer) and the management structure (the maintained institution). The main actors of these systems are their founders, owners, managers, and technical-managerial staff, as well as their inner and outer social relations. The management of HEINS, in turn, involves the managerial challenge faced by the institutional actors to lead higher education institutions towards organizational performance results, according to multiple assessment criteria from the interwoven social relationships built within the higher education universe and their larger educational, political, social, economic, and environmental implications (Lamarra & Brá, 2004). Together, these aspects reveal specificities in the Brazilian case, thus justifying the customization of a series of academic management tools that are specifically applicable to HEINS in Brazil.

In the sphere of academic management, the institutional context has been pushing Brazilian HEINS to adopt practices and actions towards sustainability. An example is the still timid demands of the MEC, which has been compelling HEINS to disclose some types of information related to sustainability in documents such as the Plan for Institutional Development (Plano de Desenvolvimento Institucional [PDI]), and submit institutional assessment forms (Correa *et al.*, 2015). Moreover, society is demanding HEINS account for their acts in the economic, social, and environmental dimensions. In order to respond to these demands, whether from regulatory agencies or society, HEINS need tools for measuring and disclosing their practices and actions towards sustainability. In Brazil, however, organizations (including HEINS) have no obligation to disclose sustainability-based information, meaning that disclosure is voluntary (Fernandes, 2013; Rover, Tomazzia, Murcia, & Borba, 2012).

In the institutional context, Alghamdi *et al.* (2017), Lozano, Lukman, Lozano, Huisingh and Lambrechts (2013), Lozano, Lozano *et al.* (2013), Lozano, Llobet *et al.* (2013), Lozano (2011), Lozano (2006), Cortese (2003), and Shriberg (2002) have discussed the matter of measuring and disclosing sustainability practices and actions in HEINS. In the Brazilian academic context, a few initiatives have approached the subject. Some studies, namely those by Góes and Magrini (2016), Vasconcelos, Silva and Silva (2013), and Gonçalves-Dias, Herrera and Cruz (2013), discuss the introduction of sustainability as a topic in HEINS and higher education courses.

Considering the lack of proposals and studies on creating sustainability performance indicators applied to Brazilian HEINS, it is essential to encourage discussions with theoretical and methodological implications that can contribute to the evolution and consolidation of this field of investigation. The next sections present a discussion on sustainability indicators and their introduction as an instrument of academic management capable of providing HEINS with the means to plan, implement, and assess sustainability practices and actions.

Sustainability Indicators: Measurement and Disclosure

One of the crucial reasons to discuss the creation of sustainability indicators is that organizations in general – and HEINS specifically – need to provide society with information on their practices and

actions. This crucial reason is known as disclosure, which, according to Fernandes (2013), refers to the availability of data and information needed to assess the performance of an organization (including HEINS) in a clear, useful, and timely manner.

According to Fernandes (2013), there are three modalities of disclosure in literature: compulsory, voluntary, and involuntary. Compulsory disclosure is the disclosure required by law and regulatory agencies. Voluntary disclosure is the spontaneous disclosure by the organization when there is no law or regulation to enforce it. Finally, involuntary disclosure is a form of disclosure by third parties without the organization's consent or agreement, such as through the different modalities of mass media (Fernandes, 2013; Skillius & Wennberg, 1998).

In Brazil, sustainability disclosure is not compulsory, that is, organizations or a third party discloses such information. Therefore, the disclosure of sustainability information occurs voluntarily or involuntarily. Considering the purpose of this study, the focus will be specifically on the voluntary disclosure of sustainability practices and actions (Fernandes, 2013; Skillius & Wennberg, 1998).

One way to disclose sustainability practices and actions is the creation of measurement and disclosure indicators. An **indicator** can be defined as a measure used to reflect the behavior of a system with respect to its broadly observable attributes. Thus, an indicator can gather information about a certain system and transform it into measurements that may vary in time and place. In other words, the role of an indicator is to inform and measure the behavior of systems through their observable attributes (Hammond, Adriaanse, Rodenburg, Bryant, & Woodward, 1995; Holling, 1978).

With regard to sustainability indicators specifically, Harger and Meyer (1996) identify their characteristics (or properties) as follows: (a) simplicity; that is, indicators must be direct and devoid of artifice or extravagance; (b) scope, meaning they are supposed to cover a wide range of aspects, whether economic, social, and environmental, without overlaps; (c) qualification, meaning they must enable the measurement of behavior and/or observed phenomenon; (d) assessment, which means they must show signs of tendencies in a period of time to be established; (e) sensitivity; that is, indicators must be sensitive to changes; and (f) timeliness, meaning indicators must allow the timely identification of tendencies. The characteristics or properties of sustainability indicators as presented by Harger and Meyer (1996) comprehend simultaneously informational and measurement roles, thus enabling comparisons in temporal as well as spatial dimension, *i.e.*, in a historical and geographic context.

In the process of creating indicators, Jannuzzi (2005) points out that good practice recommends the observance of clarity and transparency criteria and the support and justification of all methodological decisions. Furthermore, Armani (2001) recommends, for the creation of a system of indicators towards social projects (including environmental projects), the observance of at least four factors: (a) the establishment of a limited number of indicators capable of providing relevant information to stakeholders; (b) the use of participative methodology in the creation of indicators, *i.e.*, collective process of creation; (c) the promotion of periodic reflections to assess the usefulness and effectiveness of indicators and, if necessary, the use of remedial measures; and (d) the disclosure of data collection and verification methods, as well as the people responsible for the activity.

All these considerations served as groundwork for the creation of sustainability indicators applicable to the context of Brazilian HEINS. The set of indicators is presented and discussed in section six of this paper.

Methodological Procedures

Qualitative research was conducted to achieve the main objective of this study, which is to develop a set of sustainability indicators applicable to Brazilian HEINS (Denzin & Lincoln, 2008). According to Denzin and Lincoln (2008, p. 4), "qualitative research is a situated activity that locates the observer in the world" and "involves an interpretive, naturalistic approach to the world" that allows

"qualitative researchers to study things in their natural setting, attempting to make sense of, or interpret, phenomena in terms of the meanings people bring to them".

Data were collected using within-method triangulation (Casey & Murphy, 2009; Denzin, 2009). This type of triangulation uses two or more data collection procedures in a single methodological strategy, whether qualitative or quantitative. In the present study, we used semi-structured interviews, documentary research, and observation with a qualitative approach (Denzin & Lincoln, 2008). All data collection procedures followed a research protocol that addressed issues related to sustainability and sustainable development existing in the Brazilian higher education institutional context and, more specifically, to Brazilian HEINS. The research protocol enabled the creation of a set of sustainability indicators applicable to Brazilian HEINS.

The semi-structured interviews were conducted within the higher-education academic community, such as with professors, university managers, technical and administrative employees, and students from two public and two private HEINS in southeast Brazil. Sixteen interviews were conducted, each lasting approximately 50 minutes. Participants signed an informed consent statement containing specific information about the study and the ethical standards of qualitative research. With the participants' permission, all the interviews were recorded.

For the documentary research, two types of documents were used: (a) public documents, comprising (a1) documents related to sustainability and sustainable development, such as GRI guidelines (GRI, 2015), UNESCO documents (UNESCO, 2005, 2014), the 2030 Agenda for Sustainable Development (UN, 2015), and (a2) Brazilian regulatory documents for higher education, such as documents related to the institutional evaluation process, implemented by the National System for the Evaluation of Higher Education (Sistema Nacional de Avaliação da Educação Superior [SINAES]), among others; and (b) institutional documents of the four HEINS (two public and two private HEINS), such as the Plan for Institutional Development (Plano de Desenvolvimento Institucional [PDI]), the Institutional Evaluation Report (Relatório de Avaliação Institucional [RAI]), and management (or sustainability) reports. It should be noted that only one of the four HEINS publishes sustainability reports, whereas the others publish management reports with sections related to sustainability.

Observation was carried out during the research process by means of on-site visits to the four HEINS. Procedures such as informal conversations and the observation of physical facilities and consumption of natural resources, among others, were performed and registered in a field diary. During the visits, we verified the institutions' sustainability practices and actions, as well as how such information is disclosed on the institutional reports. The observation provided deeper understanding of the context, especially as it enabled us to confront results with other sources of collected data.

The collected data were submitted to content analysis (Bardin, 2011). In accordance with recommendations of Bardin (2011), content was analyzed in three phases: (a) prior analysis, identified as an organizational phase that consists of skim reading the material, based on the rules of completeness, representativeness, homogeneity, relevance and exclusivity as reference; (b) examination of the material, involving codification, decomposition and enumeration, according to previously formulated criteria; and (c) treatment of results, with the categorization of constituent elements according to differentiation and regrouping according to analogy, which allows the inference and interpretation of results.

The material was categorized using the two processes specified by Bardin (2011) for content analysis: (a) categorization by **boxes**, in which the material is organized at the beginning of the operation as a result of the theoretical foundations; and (b) categorization by **mile**, in which the material is organized at the end of the operation, since the conceptual title of each category is derived from the data. Such processes led to the identification of five categories: (a) sustainability and sustainable development in Brazilian HEINS; (b) institutional sustainability indicators; (c) sustainable academic management indicators; (d) financial sustainability indicators; and (e) social and environmental responsibility indicators. Through the analytical procedures, it was possible to identify and develop a set of sustainability indicators applicable to Brazilian HEINS.

We should highlight that the methodological approach adopted in the present study resembles the approach used in studies conducted by Machado, Matos, Sena and Ipiranga (2016, 2017), and Machado, Matos, Sena and Ogasavara (2017), involving the development and application of a Framework for Innovation and Sustainability Analysis (Quadro de Análise da Inovação e Sustentabilidade [QUAIS]) for HEINS. In those studies, the authors conducted qualitative research applying the QUAIS in a university in northeast Brazil.

Sustainability Performance Indicators in Brazilian Higher Education Institutions

Before proceeding with the presentation of our proposal of a set of sustainability indicators applicable to Brazilian HEINS, it is relevant to make some comments about the evaluation process and previous studies, and how they contributed to the creation of this proposal. For Koehn and Uitto (2015, p. 2) "evaluation involves a rigorous, systematic, and evidence-based process of collecting, analyzing, and interpreting information to answer specific questions" and "is carried out for several purposes, including accountability for results achieved and resources used, program improvement, and shared learning". The authors highlight that academia has not developed an accepted framework for evaluating sustainable development in the context of HEINS.

Despite the absence of a widely accepted framework (Koehn & Uitto, 2015), some specific initiative and tools for measuring and disclosing the sustainability practices and actions of HEINS have been presented by researchers. As stated by Lozano (2006), some of the different measurement and disclosure tools were specifically developed for academic institutions, while others were created for corporations and later adapted to educational institutions.

Lozano, Llobet *et al.* (2013) and Lozano (2006) highlight that, among the tools created for the corporate world, the sustainability report developed by GRI as one of the most relevant and internationally comprehensive initiatives. GRI, which is now in the G4 version of guidelines for the disclosure and measurement of sustainability, proposes a structure for a sustainability report consisting of three categories (or dimensions): economic, social, and environmental (GRI, 2015).

The first category included in the report is the economic category. It concerns the organizations' impact on the economic conditions of stakeholders and the economic systems at local, national, and global level. In other words, this category illustrates the flow of capital between different stakeholders and the main economic impact of the organization on society as a whole (GRI, 2015).

The social category in the sustainability report refers to the organizations' impact on the social systems in which they operate. This category comprises four subcategories: (a) labor practices and decent work; (b) human rights; (c) society; and, (d) product liability. Most of the content in the subcategories of this category is based on internationally recognized universal rules or on other relevant international references (GRI, 2015).

The third sustainability category included in the report is the environmental category, which refers to the organizations' impact on ecosystems (soil, air, and water). Therefore, it encompasses matters such as impacts associated with input (water and energy), output (emissions, effluents, and residue), biodiversity, transportation, products, and services, as well as conformity to environmental rules and expenses and investments in the environmental area (GRI, 2015).

Among the tools developed for HEINS, Lozano, Llobet *et al.* (2013) and Lozano (2006) highlight GASU, a contribution of these same authors. The GASU, originally created by Lozano (2006), is based on the GRI report. This tool was adapted for the context of HEINS and adds a new educational category to the three categories of the GRI (economic, social, and environmental). In 2001, the GASU was updated to adjust it to the G3 version of GRI guidelines. The educational category included in GASU refers to the impact of HEINS on the educational process and it encompasses three subcategories: curriculum, research, and services (Lozano, Llobet *et al.*, 2013).

Despite the structural range of the G4 version of the GRI and the GASU (GRI, 2015; Lozano, Llobet *et al.*, 2013), these two tools do not sufficiently address the specificities of HEINS and Brazilian higher education for two reasons. First, they do not consider the Brazilian institutional context. Secondly, they focus predominantly on quantitative measurement and neglect the qualitative aspects of the evaluation process.

With regard to the institutional context, Silva and Muniz (2004) state that Brazilian HEINS have their own characteristics, as shown in Figure 1 below, which illustrates the Structural and Dynamics Model of Brazilian HEINS. This model contemplates all the characteristics of HEINS anchored on the Brazilian legal framework and other institutional issues.

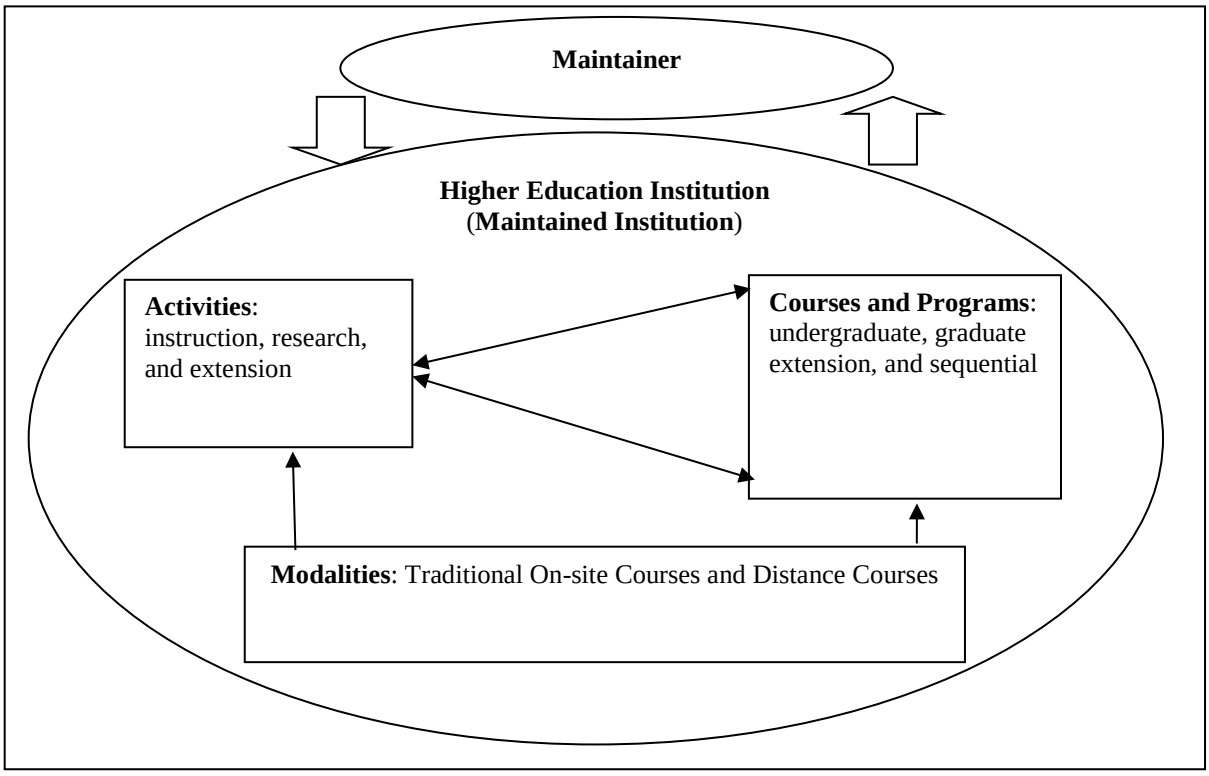


Figure 1. Structural and Dynamics Model of Brazilian HEINS
Source: Adapted from Silva, A., Jr., & Muniz, R. M. (2004). A regulamentação do ensino superior e os impactos na gestão universitária (p. 9). *Anais do Colóquio Internacional sobre Gestão Universitária nas Américas*, Florianópolis, Brasil, 4.

As shown in the model, HEINS structure themselves as a system with two autonomous but interdependent subsystems: the maintainer and the maintained institution (the academic center, that is, the HEINS itself). The academic center is responsible for instruction, research, and extension activities. These activities are materialized as undergraduate, graduate, extension, and sequential courses and programs, and as services for society (Silva & Muniz, 2004).

The proposal of sustainability indicators applicable to Brazilian HEINS takes into account the model by Silva and Muniz (2004) and the set of rules (legal and infralegal) that regulate higher education in Brazil. Similar to the proposal by Lozano, Llobet *et al.* (2013) and Lozano (2006) when introducing GASU, this proposal is also an adaptation of the G4 version of the GRI, with a view to include a fourth category classified here as academic.

Given its structure, the academic category is broader and more comprehensive than the educational category in the GASU (Lozano, 2006; Lozano, Llobet *et al.*, 2013). This is because the GASU is limited to aspects such as curriculum, research, and services, while the proposal presented here includes these aspects and others needed to measure and disclose the institutional characteristics of the Brazilian context, as well as aspects related to academic management, finance, and social and environmental responsibility.

In addition, as recommended by Koehn and Uitto (2015), the proposal covers quantitative and qualitative aspects to evaluate sustainable development in the context of HEINS. In this case, the evaluation process involves a mixed-method design and complementary evaluation strategies that articulate quantitative and narrative data, transforming the evaluation process into a valuable collective learning experience.

The proposal starts with a definition of the academic category and subcategories. Next, the proposal presents a set of quantitative indicators of the academic category. Finally, it indicates the qualitative (narrative) approach of the evaluation process of sustainable development in the context of HEINS.

The academic category aims to measure and disclose the impact of instruction, research, and extension activities on society. This dimension comprises four subcategories: institutional, academic management, financial, and social and environmental responsibility.

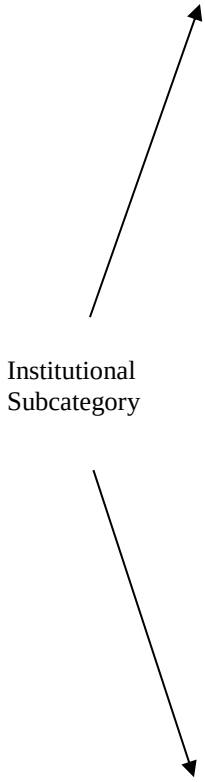
The institutional subcategory covers aspects regarding an institution's regulatory acts (accreditation and reaccreditation) and courses (authorization, recognition, recognition renewal). It also includes more general indicators of the institution, such as the number of campuses, the number of courses (undergraduate, graduate, etc.), the number of faculty members (doctors, masters, specialists, bachelors), the number of faculty members per work regime (full-time, part-time, and hourly-earner), the number of technical and administrative employees, and the number of students. This subcategory provides data and information for the other subcategories.

The academic management subcategory includes aspects regarding the institution's managerial dynamics, capable of suggesting institutional directions through the indicators. The indicators in this subcategory are the quantitative proportion of courses and available space; the number of applicants in the admission process; the proportion of applicants and space availability; the number of faculty members and technical and administrative employees per course; the dropout rates; the success rates; and the vacancy rates, among others.

The financial subcategory covers financial aspects directly related to instruction, research, and extension activities. This dimension comprises indicators such as revenue, expenses, and global results per course; percentage of revenue for staff (faculty members and technical and administrative personnel), physical structures and capacity installed and reinvested in HEINS; and public and private funding from research and extension activities, among others.

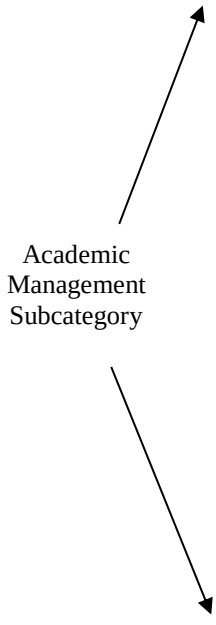
The social and environmental responsibility subcategory includes aspects related to the education of students, and their developing social and environmental competencies. In other words, this subcategory seeks to verify the approach of curriculum content contributing to the development of students' social and environmental competencies. The subcategory comprises indicators such as the number of disciplines that approach topics regarding SR and sustainability in their syllabus, and the number of research and extension projects concerning the topics of SR and sustainability.

Figures 2, 3, 4, and 5 below show the set of indicators of the academic category subdivided into its four subcategories (institutional, academic management, financial, and social and environmental responsibility). The development of this proposal also considered the recommendations of (a) Harger and Meyer (1996), concerning the properties of indicators (simplicity, scope, qualification, assessment, sensitivity, and timeliness); (b) Jannuzzi (2005), regarding the clarity and transparency criteria and methodological justification of indicators; and (c) Hammond, Adriaanse, Rodenburg, Bryant and Woodward (1995) and Holling (1978), regarding the informative and measurable role of indicators.



Accreditation and Reaccreditation of HEINS	% Faculty Members with Master's Degree
Total Number of Undergraduate Courses	% Faculty Members who are Specialists
Total Number of Graduate Courses	% Faculty Members who are Bachelors
Total Number of Extension Programs	% Full-Time Faculty Members
Total Number of Sequential Programs	% Part-Time Faculty Members
Number of Authorized Undergraduate Courses	% Hourly-Earning Faculty Members
Number of Recognized Undergraduate Courses	Total Number of Students
Number of Undergraduate Courses whose Recognition was Renewed	% Students in Research Projects
Number of Master's Programs Accredited by CAPES	% Students in Extension Projects
Number of Doctoral Programs Accredited by CAPES	Number of Titles in the Bibliographic Collection
CAPES Assessment of Graduate Programs (Course Scores)	Scientific Production by Faculty Members
Number of Research Centers	Scientific Production by Students
Number of Extension Centers	Number of Scientific Journals
Total Number of Faculty Members	Number of (computer and specialized) Laboratories
Total Number of Course and Program Coordinators	External Institutional Assessment Reports
Total Number of Technical and Administrative employees	Institutional Self-Assessment Reports
% Faculty Members with Doctor's Degree	Qualification of Main Managers

Figure 2. Set of Indicators in the Academic Category Applicable to Brazilian HEINS – Institutional Subcategory

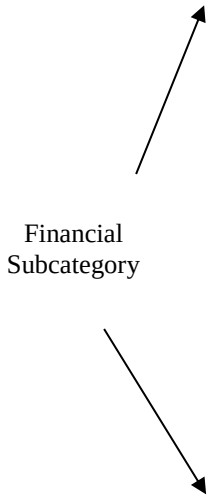


Number of Courses or Programs	Success Rate in Undergraduate Courses (SRUG)*
Number of Professors per Course or Program	Success Rate in Graduate Courses (SRGC)**
Number of technical and administrative employees per Course or Program	Rate of Vacancies per Course or Program ***
Number of Student Admissions per Course or Program	Permanence Rate per Course or Program ****
Space Availability in the Admission Process (AP) per Course or Program	Number of Scholarship Holders per Course or Program
Applicants for the AP per Course or Program	Number of Students in Scientific Initiation (SI) per Course or Program
Proportion Applicant X Space Availability in AP per Course or Program	Number of Vivaed and Approved Monographs (theses, monographic dissertations) per Course or Program
Number of Graduates per Course or Program	Number of Academic Extension Projects
Average Time for Conclusion per Course or Program	Number of Instances of Community Service (Extension Projects)
Dropout Rate per Course or Program	Number of Research Projects (funded and unfunded)

Figure 3. Set of Indicators in the Academic Category Applicable to Brazilian HEINS – Academic Management Subcategory

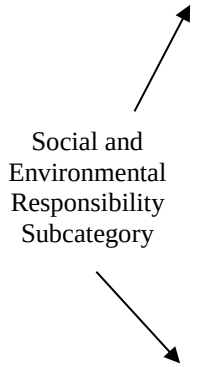
*Success Rate in Undergraduate Courses (SRUG) – indicates the institution's capacity to guide students to the successful conclusion of their undergraduate courses and considers seniors in relation to all freshmen per year. It is measured by dividing the number of seniors by the number of freshmen approved in the admission process and then multiplying the result by 100.
**Success Rate in Graduate Courses (SRGC) – it shows the success rate in graduate programs and represents the total number of approved theses and dissertations, and the total number of admissions in masters and doctoral programs. It is measured by dividing the number of masters and/or doctors by the number of admissions through the admission process and then multiplying the result by 100.

*** Rate of Vacancies per Course of Program – it shows the number of remaining vacancies in courses and programs after admissions processes and transfers.
****Permanence Rate per Course or Program – it shows the capacity of keeping students in courses or programs, thus avoiding dropout and vacancies.



Annual Revenue	Average Financial Result per Month
Average Monthly Revenue	% Revenue Committed to Faculty Members' Remuneration
% Revenue from Instruction (enrollments)	% Revenue Committed to Technical and Administrative Personnel's Remuneration
% Revenue from Research	% Invested in Human Resources
% Revenue from Extension	% Invested in Facilities
% Revenue from other Sources	% Invested in Bibliographic Collection
Annual Expenses	% Invested in HEINS Enlargement
Average Monthly Expenses	% Invested in Research
% Revenue Destined to Instruction	% Invested in Extension
% Revenue Destined to Research	% Invested in Social and Environmental Projects
% Revenue Destined to Extension	% Stakeholders' Remuneration (exclusively for for-profit HEINS)
Annual Financial Result	Profit Distribution (exclusively for for-profit HEINS)

Figure 4. Set of Indicators in the Academic Category Applicable to Brazilian HEINS – Financial Subcategory



Number of SR Disciplines	Number of Innovation Projects on Sustainability and/or SR and/or CSR
Number of CSR Disciplines	Number of Patents for Products derived from Innovation Projects on Sustainability and/or SR and/or CSR
Number of Sustainability Disciplines	Number of Extension Projects on Sustainability and/or SR and/or CSR
Number of Disciplines with contents of social and environmental responsibility	Number of Support Instances in Extension Projects on Sustainability and/or SR and/or CSR
Number of Sustainability and/or SR and/or CSR Research Projects	Number of Institutional Interventions of Social and Environmental Impact
Number of SR and CSR students guided by research advisors	Number of Sustainability students guided by research advisors

Figure 5. Set of Indicators in the Academic Category Applicable to Brazilian HEINS – Social and Environmental Responsibility Subcategory

In order to carry out the mixed-method design, this set of quantitative indicators of the academic category must be submitted to a qualitative (narrative) approach. In this case, the analysis and interpretation of quantitative data will be complemented with qualitative methods that involves interviews, focus groups, document analysis, and site visits (Koehn & Uitto, 2015).

Therefore, the evaluation of sustainable development will use criteria of quality, efficiency, effectiveness, impact, and sustainability applied to key results areas of the HEINS such as research, teaching, extension, human resources development, infrastructure, and mobilization of additional resources (Koehn & Uitto, 2015). This qualitative process is unique and idiosyncratically addresses the particular characteristics of HEINS and their institutional context (DiMaggio & Powell, 1983; Meyer & Rowan, 1977); therefore, it cannot be treated as a standard process.

New indicators can be added to (or excluded from) the subcategories and new subcategories may be added to (or excluded from) this category. Such a possibility reveals this is a proposal under construction (maybe under permanent construction) that intends to evolve gradually through criticism and revision by the academic community itself. Moreover, institutional specificities may also be included since there can be inclusions in and exclusions from the category and its subcategories.

In addition to preserving the measurement and disclosure of sustainability information, the inclusion of the academic category in the G4 version of the GRI report allows the assessment of the actual operational results of activities in HEINS and their contribution to sustainability. Furthermore, by adopting the set of indicators in the academic dimension, academic managers can compare the evolution of the sustainable performance of the HEIN and compare their HEINS with other institutions. Moreover, the inclusion of the academic category in the context of the G4 version of the GRI sustainability report triggers the need to enlarge the tridimensional sustainability perspective (Elkington, 2012), which would become a quadruple bottom line comprising the economic, social, environmental, and academic dimensions.

Since one of the goals for the creation of this set of indicators is the measurement and disclosure of information from HEINS, *i.e.*, the behavior of the academic system through its observable attributes (Hammond *et al.*, 1995; Holling, 1978) in academic management reports regarding sustainability, this study also proposes a criterion for the measurement and disclosure of that information in the report. The creation of this criterion observed the recommendations that Lozano, Llobet *et al.* (2013) and Lozano (2006) used in the GASU. In order to assess the disclosure of information, a scale of five points is suggested, starting at 0 (zero) and finishing at 4 (four), as follows:

- 0 (zero) is used in cases of complete lack of information for the indicator.
- 1 (one) information presented is of minimal performance, equivalent to 25% of the otherwise full information.
- 2 (two) information presented is of average performance, equivalent to 50% of the otherwise full information.
- 3 (three) information presented is of good performance, equivalent to 75% of the otherwise full information.
- 4 (four) information presented is of maximum (or excellent) performance, equivalent to 100% of the full information.

As a whole, the measurement of each indicator will generate a score for each subcategory. The sum of these scores will provide the final score for the disclosure of the academic category information. Taking into consideration the characteristics of the sustainability concept proposed by Ciegis *et al.* (2009), which assumes an equitable relationship between the economic, social, and environmental dimensions, each of the four subcategories (institutional, academic management, financial, and social and environmental responsibility) in the academic category will eventually represent 25%. Thus, the set of four subcategories will represent 100% of the assessment of the academic category.

The quantitative and qualitative analysis (Koehn & Uitto, 2015) of the set of indicators in the academic category will enable, for instance, the identification of the sustainable paths followed by HEINS. As an example, and based on a hypothetical situation, a HEINS that targets a high percentage of its revenue to the remuneration of faculty members and has high vacancy rates, low success rates (in

both undergraduate and graduate courses), and low student permanence rates shows that its academic management is not sustainable. This happens because the high investments on faculty are not producing effective social results regarding the occupation of space available in the institution and the preparation of new professionals for the labor market and society. In other words, data indicate that the use of resources (human, physical, and organizational) is not producing effective economic, social, and environmental results as expected.

Final Considerations

The main proposal of this study was to present a set of sustainability indicators applicable to the context of Brazilian HEINS. The discussions presented here were based on stakeholder theory and institutional theory, which complement one another by simultaneously exposing an organization's relationship with its stakeholders and with the institutional context surrounding them.

The grounds for discussing sustainability through indicators is that such indicators enable organizations to measure and disclose their practices and actions so as to provide society with a tool for assessing these practices and actions. Furthermore, indicators are considered useful because they enable organizations to attain legitimacy and disclose their practices and actions to society (Bell & Morse, 2008; DiMaggio & Powell, 1983; Meyer & Rowan, 1977; Pierantoni, 2004).

The proposal of the set of indicators was anchored in the theoretical foundation as well as the methodological procedures adopted in the study. With regard to its theoretical foundation, the proposal was based on the G4 version of the GRI sustainability report (GRI, 2015), GASU (Lozano, 2006; Lozano, Llobet *et al.*, 2013); the Brazilian Structural and Dynamics Model for HEIN (Silva & Muniz, 2004); the institutional context of Brazilian higher education (Silva & Muniz, 2004; Silva *et al.*, 2014; Silva & Silva; 2013); the recommendation by Koehn and Uitto (2015) to use a mixed-method design (quantitative and qualitative); and complementary evaluation strategies. As to the methodological procedures, the proposal was also based on the results of qualitative research (Denzin & Lincoln, 2008) carried out in four HEINS located in southeast Brazil, in which data were collected via within-method triangulation (Casey & Murphy, 2009; Denzin, 2009) and analyzed with content analysis techniques (Bardin, 2011).

All theoretical and methodological contributions enabled the proposal of a new category to be added to the three categories already encompassed in the GRI report (GRI, 2015). Thus, the present proposal enlarges the tridimensional sustainability perspective of Elkington (2012) and transforms it into a kind of quadruple bottom line (QBL), which comprises the economic, social, environmental, and academic dimensions.

The academic category proposed in this study has four subcategories, namely, institutional, academic management, financial, and social and environmental responsibility. The main goal of this new category is to measure and disclose the impact of instruction, research, and extension activities of HEINS on society.

The results of this study have implications for management as a whole, specifically the management of HEINS, and for society. Regarding the implications for management in general and the management of HEINS (Lamarra & Brá, 2004), the set of academic indicators serves as an important managerial mechanism that can guide the main institutional actors (founders, owners, managers. and technical-managerial staff) through the development and implementation of strategies for achieving organizational performance anchored in multiple assessment criteria. In terms of the social implications, the disclosure of this set of indicators is a powerful mechanism for the accountability of HEINS to society when it comes to the adoption of sustainability practices and actions in terms of the economic, social, environmental, and academic impact.

This proposal is still under construction and development. Therefore, criticism by the academic community is relevant, especially in the form of suggestions for the inclusion or exclusion of indicators, subcategories, and categories. Such an evolution depends, at least to some extent, on its practical application in order to be theoretically and methodologically validated.

We hope that the set of indicators proposed here may enable academic managers to disclose their institutions' sustainable practices and actions to society in order to attain social legitimacy and institutional permanence. It is our belief that this proposal may also help those responsible for public policies in higher education when considering the sustainable directions that Brazilian HEINS and education might be taking.

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Contributions

1st author: Conceptualization and research design, data collection, analysis of results, participated in manuscript writing, final revision and final approval of the paper.
2nd author: Conceptualization and research design, data collection, analysis of results, participated in manuscript writing, final revision and final approval of the paper.
3rd author: Conceptualization and research design, data collection, analysis of results, providing contributions to the composition review and editing and final approval of the paper.
4th author: Conceptualization and research design, data collection, analysis of results, providing contributions to the composition review and editing and final approval of the paper.
5th author: Conceptualization and research design, analysis of results, providing contributions to the composition review and editing and final approval of the paper.
6th author: Conceptualization and research design, analysis of results, providing contributions to the composition review and editing and final approval of the paper.

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