Sustainability has a recognized importance in the corporate world that considers sustainable companies safer for investments. However, one of the biggest challenges faced to embed sustainability into business is to overcome barriers related to cultural incompatibility. Human Resources Development (HRD) emerges as a change agent that provides means of companies breaks existing cultural paradigms and promote effective commitment to sustainability. This study analyzes publications on HRD and corporate sustainability (CS) published from 2007 to 2016, with the objective of identifying the current state of the research and pointing out scientific gaps to promote and guide new studies on the subject. For this purpose, a bibliometric study was carried out in the Scopus and Web of Science databases covering the aforementioned period. The portfolio contained 81 articles that were analyzed regarding the most frequently used keywords, most cited articles, most influential authors and their heat map of cooperation, and articles recently published by these authors. It was observed that “corporate social responsibility” and “leadership” are the main research topics on HRD and CS. The scientific gaps suggest a better exploitation about the importance of human resources to the development of culture and leadership issues. The main scientific contribution of this work is the systematization of knowledge generated by relevant scientific publications on HRD and sustainability, which can help the development of further studies and the expansion of the existing theory.
XXXVIII ENCONTRONACIONALDEENGENHARIADEPRODUÇÃO
“A Engenharia de Produção e suas contribuições para o desenvolvimento do Brasil”

Maceió, Alagoas, Brasil, 16 a 19 de outubro de 2018.
1 Introduction

Globalization broken the boundaries of societies, increased trade links, financial capital and access to information bringing new business opportunities. These emerging opportunities have been followed by risks, social changes and environmental pressures that require companies to invest in new practices, programs, tools, etc. to achieve a sustainable growth (HENDERSON, 2011; WAITE, 2013).

Sustainability is focused on respecting the economic, social and environmental limits in a way that today's generation meet its needs without detriment to the capacity of future generations to meet their own needs. Companies committed to corporate sustainability (CS) plan their actions in order to mitigate impacts on the environment and society while seek financial profitability. They usually go through a period of transition from a culture of exploitation of natural resources to a culture of quality of life promotion, financial stability and environmental preservation (NGUYEN; SLATER, 2010; RENUKAPPA et al., 2012; WAITE, 2013; HOGAN; COOTE, 2014).

The development of human resources (HRD) is characterized by the process of knowledge progression through organizational development, personal development and training. HRD can be associated with sustainability because it provides means to integrate environmental, social and economic objectives with policies and practices of the organization, as well as provides increased awareness of the workforce through effective cultural changes (ARDICHVILI, 2012; BIEREMA; CALLAHAN, 2014).

The number of studies involving HRD and CS has increased and the analysis of the knowledge generated by these studies makes it possible to identify scientific gaps in the subject and boosts the development of new researches. Therefore, this study aims to perform a bibliometric analysis of the main publications on HRD and CS in the period from 2007 to 2016 in order to identify the scientific gaps and promote new studies on the subject.
The next section presents an overview of the theoretical framework. In section 3 the methodology with a description of the parameters, databases and computational tools used is presented. Finally, sections 4 and 5 presented the results and conclusions of the study.

2 Theoretical framework

This section presents a synthesis of the theoretical framework on CS and HRD.

2.1 Corporate sustainability

CS is the ability to maintain the financial results of the organization in balance with environmental and social actions. It three levels: the individual, the organization and the environment, which comprises the social, economic and environmental outcomes of the triple bottom line (TBL) (NGUYEN; SLATER, 2010).

The TBL aims at achieving sustainable development by means of a balanced attention to the three levels aforementioned. In the social dimension, the company focuses on a long-term process of commitment to work in internal and external communities, aiming at ensuring a better quality of life for everyone (ARDICHVILI, 2012; NGUYEN; SLATER, 2010; RENUKAPPA et al., 2012). In the economic dimension, the company should manage the economic aspects by aligning its strategies to achieve a responsible economic growth. In the environmental dimension, organizations should maintain policies of the valorization of natural resources in order to avoid excessive exploitation of renewable resources and depletion of non-renewable resources (ARDICHVILI, 2012; NGUYEN; SLATER, 2010; RENUKAPPA, et al. 2012).

The implementation of CS can follow the PDCA cycle. At the stage “plan”, the company plans the changes and predicts the expected results. At the "do" stage the company executes the plans by developing practices and procedures related to sustainability. At the "check" stage, the company evaluates the performance of the organization based on the established indicators and perform audits in the processes. At the “act” stage the company put into practice the improvement programs of CS (SEARCY et al., 2012; SINGH; SINGH, 2012).

The main barrier to CS implementation is the lack of workforce commitment. This occurs because employees are not sufficiently convinced that they are part of the sustainability
project. In addition, there are some difficulties on understanding sustainability issues in society as a whole, which may hinder the emergence of a mass culture that supports sustainable development in organizations. The efforts to reach CS, therefore, usually ends up focusing on a small group of collaborators (ARDICHVILI, 2012; CEASAR; PAGE, 2013).

2.2 Human resource development

HRD aims to improve the work environment and support people to apply their skills in the exercise of their function comprises series of organized activities conducted within a programmed period of time and designed to produce behavioral changes through personal and organizational development. Some actions usually performed by HRD are needs assessment, task analysis, evaluation and return on investment, among others (RUONA; GIBSON, 2004; BIEREMA; CALLAHAN, 2014).

This focus on organizational learning has the potential to be the hallmark of a strategic and proactive HRD that characterizes generative learning as central to creating future strategic alternatives. The main benefit of implementing HRD is that its practices produce lasting changes in employee attitudes and behavior and in the organizational value systems (RUONA; GIBSON, 2004; ARDICHVILI, 2012).

The HRD interventions contribute positively to develop innovations and continuous improvement. It promotes the involvement and motivation of the employees and leadership for the implantation of a culture of learning and development of social capital. HDR practices can also be associated with higher organizational performance, since it improves the engagement of employees at work and has a positive impact on customer satisfaction, financial performance and productivity (JABBOUR et al., 2013; JACOBS et al., 2013; SHEEHAN et al., 2014).

Among the difficulties of HRD implementation are the lack of recognition of the HDR results on solving problems and foster organizational success; the focus limited to financial goals, productivity and performance improvements; the lack of means to measure the HRD financial returns; and the creation of an atmosphere of change, so that the organization could adapt
more easily to new projects (ARDICHVILI, 2012; BIEREMA; CALLAHAN, 2014; BIEREMA; CALLAHAN, 2014).

3 Research method
This study uses the method of bibliometric analysis to analyze the articles on HRD and CS published between 2007 and 2016 in the Scopus and Web of Science databases. The bibliometric study is a measurement of the impact of scientific publications that assesses the outputs of the main articles, journals, countries, etc. of a given subject aiming at finding indicators of scientific productivity, trends and preferences for publication (TELLA et al., 2014; ZHAO et al., 2016). This paper was structured according to the steps presented in Figure 1.
After performing an initial literature review to verify the relevance of the theme, the objectives of the article were defined and the search for the papers of the bibliometric study was conducted in the Web of Science (WoS) and Scopus databases. The first filter limited the search results to articles that contained the words "Sustainability" and "Human Resource Development" or "Sustainability" and "HRD" in the titles, keywords and abstracts. Another filter limited the search results to the period from 2007 to 2016 (ten-year-period) because this period presented a significant growth in the number of articles published on the subject under study (Figure 2), thus providing a good basis for analysis. The search was also restricted to documents classified as “articles” because this type of document is peer reviewed and trustworthy.

Figure 2 – Evolution of HRD and CS research over the years
The initial search on Scopus and WoS returned 121 articles that were evaluated regarding duplicity in the software Mendeley. After that, the articles were analyzed qualitatively through the reading of titles and abstracts to eliminate those that did not addressed the subject under study. The final sample of the bibliometric study gathered 81 articles.

For the bibliographic analysis of the data it was used the Microsoft Excel and the software VOSviewer, the latter used specifically to conduct the analyses of network cooperation. After conducting all analyses described in Figure 1, the conclusions of the study were elaborated.

4 Bibliometric analysis

The number of researches on HRD and CS has grown in recent years, as previously shown in Figure 2. The researches have presented a great focus on business, management and accounting (40 articles), social sciences (42 articles) and environmental sciences (12 articles) areas, as can be seen in Figure 3. The total number of articles in Figure 3 is greater than the number of articles of the sample due to some articles are classified in more than one area.

Figure 3 – Concentration areas of the analyzed studies
The three areas of greater concentration of the articles are related to the TBL dimensions: business, management and accounting (economic dimension); Social sciences (social dimension); and environmental sciences (environmental dimension).

Keywords are representations of a text that allow readers to previously identify the importance of a given subject (ERCAN; CICEKLI, 2007). The analysis of the most frequently used keywords (Figure 4) allowed to identify the topics most approached in the literature analyzed.

Figure 4 – Most used keywords
The results of the keyword analysis showed that the keyword "Corporate Social Responsibility" is the most used keyword, accounting for 10% of the total of keywords and is followed by "Knowledge Management", the second most used that accounts for 7% of the total.

The keywords "knowledge management", "training", "education", "learning" and "training" represent key elements for the development of new skills, one of the main functions of HRD. These keywords also correspond to elements that favor the development of CS once that the implementation of sustainability requires acquisition of new competencies (BIEREMA; CALLAHAN, 2014; UBEDA-GARCÍA et al., 2013). Table 1 presents the ten most cited articles from 2007 to 2016.
# Table 1 – Most cited articles

<table>
<thead>
<tr>
<th>#</th>
<th>Title</th>
<th>Cited by</th>
<th>Authors</th>
<th>Year</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Toward mature talent management: Beyond shareholder value</td>
<td>17</td>
<td>Collins, D.G.</td>
<td>2014</td>
<td>Human Resource Quarterly</td>
</tr>
<tr>
<td>6</td>
<td>Role of HR in the new world of sustainability</td>
<td>17</td>
<td>Rimaczy, I., Pearson, T.</td>
<td>2010</td>
<td>Industrial and Commercial Training</td>
</tr>
<tr>
<td>7</td>
<td>An Evidence-Based Perspective on HRD</td>
<td>17</td>
<td>Hamlin, R.G.</td>
<td>2007</td>
<td>Advances in Developmental Human Resource Management</td>
</tr>
<tr>
<td>8</td>
<td>Promoting corporate social responsibility and sustainable development through management development: What can be learned from international service learning programs?</td>
<td>16</td>
<td>Pless, N.M., Maak, T., Stahl, G.K.</td>
<td>2012</td>
<td>Human Resources Review</td>
</tr>
<tr>
<td>9</td>
<td>Developing knowledge innovation culture of libraries</td>
<td>16</td>
<td>Sheng, X., Sun, L.</td>
<td>2007</td>
<td>Library Management</td>
</tr>
<tr>
<td>10</td>
<td>The Role of HRD in CSR, Sustainability, and Ethics: A Relational Model</td>
<td>14</td>
<td>Ardichvili, A.</td>
<td>2013</td>
<td>Human Resource Review</td>
</tr>
</tbody>
</table>

Source: Authors
The analysis of the most cited articles corroborates that "Corporate Social Responsibility" was the most discussed topic, being approached in five of the ten most cited articles. This fact shows that CSR is the most important topic when it comes to DRH in CS. Fenwick and Bierema (2008) explored the involvement of HRD professionals in CSR by examining how these professionals perceive their role and challenge in implementing it. The authors stated that there is a need for greater involvement of HRD in CSR and suggests future research for this purpose.

Garavan and Macguire (2010) argue that HRD can act with policies and practices that facilitate CSR, CS and ethics. The authors highlight the importance of developing skills to build relationships with stakeholders, understand the impact of the organization on society and develop leadership and teamwork.

Garavan et al. (2010) point out that the actions of awareness, education and training promote behavior changes and adds values to employees. The organizational and social learning is seen by the authors as a contribution to eliminating organizational and institutional barriers.

Pless et al. (2012) discussed how HRD can support CS strategies and CSR through development of projects and implementation of leadership development programs. It is argued that leaders should raise awareness to sustainable issues and develop skills required for corporate sustainability and CSR.

Ardichvili (2013) suggests that CSR, CS and ethics are part of the same organizational subsystem shaped by the interaction between employees and organizational culture. DRH influences this subsystem through promoting efforts for achieving cultural changes, education and training at all levels of the organization.

It is worth noting that most of the most cited articles were published in 2010 (4 articles) and the author Garavan is author of two of the ten most cited articles.

By analyzing the journals, it was verified that "Advances in Developing Human Resources" is the journal with the greatest number of publications (13 publications, among which three are in the most cited list). This journal that has a considerable international scientific impact, especially in the areas of Business, Management and Accounting; Organizational Behavior; and Human Resource Management.

The second and third journals with a higher number of publications are the "European Journal of Training and Development", and the "Human Resource Development Review", with 4 and 3 publications, respectively. All other journals have one or two publications in the list of the
most cited. The areas of expertise of the “European Journal of Training and Development” are “Business, Management and Accounting” and "Social Sciences" and the areas of expertise of "Human Resource Development Review" are “Management, Business and Accounting”, “Organizational behavior” and “Human Resource Management”. Figure 5 shows a heat map of the most cited authors elaborated with the aid of the software VOSviewer.

![Figure 5 – Heat map of the most cited authors](image)

Source: Authors

Each point on the map in Figure 5 is associated with a color located within the spectrum ranging between red and blue. The heat map shows some similarities among the most cited authors. The network analysis showed that both Pless (Australia), Maak (Australia) and Stahl (Austria) and Hamlin (United Kingdom), Garavan (United Kingdom) and Ardichvili, (United States) form two hot research groups focused on leadership and corporate social governance. The gap analysis is presented in Table 2.
Table 2 – Identification of gaps and suggestions for future studies

<table>
<thead>
<tr>
<th>Author</th>
<th>Other authors</th>
<th>Last paper published</th>
<th>Year</th>
<th>Journal/Score (Scopus in May 2017)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ferns, T.</td>
<td>Dahlgren, M.A.</td>
<td>Towards socio-material approaches in simulation-based education: Lessons from complexity theory</td>
<td>2015</td>
<td>Medical Education (1,50)</td>
</tr>
<tr>
<td>Mask, T.</td>
<td>Pless, N.M. Vogtlin, C.</td>
<td>Business Statesman or Shareholder Advocate? CEO Responsible Leadership Styles and the Microfoundations of Political CSR</td>
<td>2016</td>
<td>Journal of Management Studies (2,23)</td>
</tr>
<tr>
<td>Pless, N.M.</td>
<td>Vogtlin, C.</td>
<td>Global Governance: CSR and the Role of the UN Global Compact</td>
<td>2014</td>
<td>Journal of Business Ethics (2,23)</td>
</tr>
<tr>
<td>Sierpina, L.</td>
<td>-</td>
<td>Women’s Leadership: Troubling Notions of the “Ideal” (Male) Leader</td>
<td>2016</td>
<td>Advances in Developing Human Resources (1,13)</td>
</tr>
<tr>
<td>Ardichvili, A.</td>
<td>Natter, J.K. and Manderscheid, S.</td>
<td>Leadership Development: Current and Emerging Models and Practices</td>
<td>2016</td>
<td>Advances in Developing Human Resources (1,13)</td>
</tr>
<tr>
<td>Hamlin, R.G.</td>
<td>Kim, S., Choi, D.S. Kim, J., Jeong, S.</td>
<td>Perceived Managerial and Leadership Effectiveness Within South Korean and British Private Companies: A Derived ERG Comparative Study</td>
<td>2016</td>
<td>Human Resource Development Quarterly (1,53)</td>
</tr>
</tbody>
</table>

Source: Authors
Table 2 presents the most recent article of the 10 most cited authors in order to ensure the originality of the scientific gaps that will be explored in the sequence. As the most recent article of Pless, N.M was also the most recent article of Maak, T., the next most recent article of these authors was analyzed. An in-depth content analysis of the articles listed in Table 2 gave rise to a conceptual map of research trends for the DHR in CS (Figure 6). The conceptual map presents the main concepts that need to be studied in a schematic way in order to facilitate the compression of how they are related.

![Conceptual map of scientific gaps](source: Authors.)

The scientific gaps of HRD and CSR are both related to leadership, as shown in Figure 6. Leadership plays an important role in corporate sustainability since its actions and practices can influence the entire chain, thus enhancing or hindering the emergence of a sustainable culture (HAMLIN et al., 2016; WITT; STAHL, 2016).

There is a need to develop the leadership in a way that understands its moral obligations with all the stakeholders (MAAK et al., 2016). It is also necessary to include in the organizational culture actions that sustain and facilitate the implementation of sustainable practices at all organizational levels (PEREIRA et al., 2014).

The absence of inclusive environments draws attention to the need of creating environments that promote diversity in terms of gender, race and beliefs (BIEREMA, 2016). Regarding
“leadership, culture and CSR”, it is needed to assess the interface between the United Nations Global Compact and responsible leadership, investigating how it should be the development of a responsible leadership, i.e., a leadership able to deal with the challenges of CSR (MAAK et al., 2016). Gaps related to "culture and leadership" are linked to the need to explore more about how DHR can help prepare leaders to implement sustainability actions in all dimensions (social, economic and environmental) and about means to disseminate this involvement in a way to promote a cultural engagement with sustainability at all levels of the company.

For “leadership selection”, it is suggested to examine the personal and professional characteristics required to fulfill leadership positions; to analyze leadership selection methodologies and to define values and competencies required for leadership in the selection processes (BIEREMA, 2016; MAAK et al., 2016). In relation to the “development of leadership”, it is suggested to examine the influence of learning and motivation in the development of leadership (GARAVAN et al., 2016); verify the role of managers in the development of intermediate leadership (GARAVAN et al., 2016) and create methods for evaluate programs of development and leadership management (HAMLIN et al., 2016).

For “leadership and performance” the opportunities of study are: establishing the specific and detailed knowledge for an effective and non-effective managerial behavior; checking what distinguishes the behavior of effective and ineffective leaders (HAMLIN et al., 2016); examining how the values and the guidance of the leaders affect the well-being of the team; checking the relationship of values and orientations of the leaders with the local and organizational culture; analyzing the results of senior management, intermediate leadership and subordinates before and after the implementation of performance management practices; and verifying the relationship between leadership development practices and employee engagement (ARDICHVILI et al., 2016).

In order to improve the effectiveness of HR practices it is suggested examining the relationship between performance management and organizational management (MELLAHI et al., 2016); analyzing the use of learning methods to aid decision making (FENWICK; DAHLBERG, 2015); and evaluating the relationship between organizational culture and process performance (PEREIRA et al., 2014).
5 Conclusions

Through this study it was possible to characterize the research on HRD and CS from 2007 to 2016. The articles analyzed are concentrated in the areas of business, management and accounting, social sciences and environmental sciences, which are related to the dimensions of the TBL. The analysis of the most cited keywords showed that the most occurring topics of research approach CSR and knowledge management. The importance of CSR was also verified in the analysis of the most cited articles, since this subject was addressed in five of the ten most cited articles. “Advances in Developing Human Resources” is the most influential journal on HRD and CS.

Regarding the gaps and opportunities of study on this subject, it was noted that the relationship between leadership and HRD should be better explored in order to foster CS. For this, future researches on the contributions of leadership selection, leadership development and performance to CS are suggested. Is it also recommended to investigate how HRD can act as a change agent to promote CS, exploring for example its role in assisting the development of practices focused on personal and behavioral development. This study has a limitation because it was necessary to arbitrate some search parameters used in the databases. Therefore, it is possible that some relevant articles were not considered.

The main scientific contribution of this article is the identification and systematization of the knowledge generated by relevant scientific publications and the identification of scientific gaps on HRD and CS that may promote and guide new studies on this subject.

Acknowledgments

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