

SUSTAINABLE DEVELOPMENT AND HUMAN RESOURCE MANAGEMENT: A SCIENCE MAPPING APPROACH

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ABSTRACT

This manuscript presents a systematic review of ‘sustainable human resource management’ (HRM), highlighting its major themes and the evolution and tendencies observed in this field. It contributes to the development of this relatively new topic, offering a critical evaluation and identifying the highest impact research strands. The Web of Science database returned 111 documents spanning the period 1997-2018 and a conceptual science mapping analysis based on co-word bibliographic networks was developed, using SciMAT as an analytical tool. The motor themes (well-developed and important for the structure of the discipline) in the field of sustainable HRM are *environmental management*, *socially responsible HRM*, and *turnover*. *Employee engagement* is a specialised theme (well-developed but less important for the structure of the research field), *human resource practices* is a basic or transversal theme (important for the discipline but not developed) and *sustainable leadership* and *environmental performance* are emerging themes (both weakly developed and marginal to the field).

Keywords:

Sustainable development; sustainable HRM; bibliometrics; science mapping; SciMAT

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Sustainable Development and Human Resource Management: A science mapping approach

1. INTRODUCTION

Sustainable human resource management (HRM) is becoming increasingly important, as shown by leading academics in this field of study (Ehnert, Ina; Wes, 2012; Ehnert, 2009a; Kramar, 2014). There has been a debate around corporate sustainability for some time, but its application to HRM and the necessary shift from short-term financial profit to long-term business success (Wilkinson, Hill, & Gollan, 2001), with its comprehensive environmental, financial and social concerns, is more recent.

In the past, the debate about HRM sustainability was focused on major concerns such as the adoption of a sustainability-oriented organisational culture (Linnenluecke & Griffiths, 2010) or HRM practices supporting and driving environmental management initiatives (Jackson, Renwick, Jabbour, & Muller-Camen, 2011). It focused on the capacity of firms to build organisational value and renew wealth through the application of HRM strategies and practices by investing in human knowledge through continuous learning, and developing this knowledge through employee participation and involvement (Wilkinson et al., 2001).

As Ehnert (2009a) points out, technological developments, competition, and globalisation have caused dramatic changes within and across organisations, transforming general conditions for HRM strategy and decision-making. Guerci & Pedrini (2014) highlight the importance of the HRM function of creating sustainability-driven change in organisations through its impact on the design and implementation of sustainable practices, its role in satisfying the needs of numerous stakeholders and finally, HRM tensions between short-term and long-term effects.

Although sustainable HRM is a growing area that contributes to the achievement of a triple bottom line (TBL), prior sustainability research is characterised by its emphasis on corporate social responsibility, universalistic interpretations of sustainability and a lack of systematic links between sustainability and HRM research. This paper is relevant for research as it aims first to address the lack of structured analysis of the sustainable HRM literature and second, to suggest emerging topics that are appropriate for future research in the field.

As an introduction to the issue, this paper poses two questions: What are the key HRM topics that have been studied in the literature that link sustainability and HRM; and how have the research themes evolved?

We have chosen a bibliometric research methodology that offers a systematic review of the sustainable HRM field, identifying the most promising themes in this area, its evolution and tendencies over time. The bibliometric analysis sets out the current state of sustainable HRM, and points to a new research topic in the study of HRM, shown by the increasing number of documents, citations and impact rates included under the sustainable HRM banner in recent years.

The paper is structured as follows: the first section provides an overview of the literature on sustainable HRM; the second section explains the methodological approach used to analyse the field, bibliometrics and science mapping; the third section analyses the findings; and the fourth section presents the conclusions.

2. THEORETICAL FRAMEWORK

The sustainability framework applied to HRM is the subject of significant academic attention, as it attempts to extend beyond strategic HRM. As Kramar (2014) states, sustainable HRM consists of a set of HR strategies and practices to obtain economic, social and environmental aims, while parallelly enhancing human capital in the long

term. This perspective aims to reduce the harmful effects of organisations on the environment, individuals and societies. Indeed, the author remarks that sustainable HRM is a new approach to managing people, as it recognises that HRM can exert negative impacts that should be avoided by dealing with complexities in the workplace.

Sustainable HRM is an important area that is now being integrated into corporate sustainable practices and strategies (Ehnert, Parsa, Roper, Wagner, & Muller-Camen, 2016). It contributes to firm sustainability in many ways, including employee growth and development; improvements in working life quality and competitive performance; the construction of internal capabilities for successful continuous change; and facilitates learning and the provision of an appropriate micro-economic context for increasing employment levels (Docherty, Forslin, Shani, & Kira, 2002). Ultimately, a sustainable organisation is able to realise its potential and to add value for its stakeholders. To some extent, the sustainable approach applied to HRM is a “one way system” and is truly unique, as it proposes a commitment to moving from short-term cost-driven HRM practices that harm employees and their families, to taking proactive initiatives to develop mutually beneficial and regenerative relationships between internal and external stakeholders (Ehnert et al., 2016; Mariappanadar, 2003).

Some significant contributions to the sustainable HRM field are conceptual and exploratory review papers, (Kramar, 2014; Prins, Beirendonck, Vos, & Segers, 2014; Renwick, Redman, & Maguire, 2013). Kramar (2014) identifies three categories of sustainable HRM literature: ‘Capability Reproduction’, which focuses on the internal aspects of HRM strategies such as economic outcomes and the generation of sustainable competitive advantage; ‘Promoting Social and Environmental Health’ analyses external outcomes such as environmental or social performance; and ‘Connections’, with a focus

on the relation between HRM practices and organisational, environmental, social and financial outcomes.

With regard to empirical analysis of the sustainable HRM perspective, numerous qualitative (Guerci & Carollo, 2016; Haddock-Millar, Sanyal, & Müller-Camen, 2016) and quantitative studies (Diaz-Carrion, López-Fernández, & Romero-Fernandez, 2018; Guerci, Longoni, & Luzzini, 2016; Saeed et al., 2018; Tang, Chen, Jiang, Paillé, & Jia, 2018) have been undertaken. Nevertheless, the field is somewhat fragmented, and given the growing sustainability concerns in the HRM literature, the following bibliometric analysis seeks to offer a “state of the art” snapshot of the field, to gain a better understanding of its evolution and identify future research paths.

3. METHODOLOGY

Bibliometrics is the statistical and mathematical study of patterns that arise in the publication and use of documents (Diodato, 1994). This is a robust statistical method to obtain overall conclusions from the findings of previous statistical analysis (Rosenthal, 1979). Bibliometric methods have been used to explore the impact of a research field, a group of researchers, or a particular paper (Cobo, López-Herrera, Herrera-Viedma, & Herrera, 2011a). This paper uses science mapping analysis to reflect the dynamic and structural characteristics of scientific research and show the cognitive architecture of the academic field (Cobo, López-Herrera, Herrera-Viedma, & Herrera, 2011b).

Science mapping is a visual representation of how knowledge areas, documents or authors are interrelated (Small, 1999). Different software techniques are available for bibliometric mapping analysis (Cobo et al., 2011b). SciMAT (Cobo, López-Herrera, Herrera-Viedma, & Herrera, 2012) integrates the best available science or bibliometric mapping software tools. It combines science mapping and performance analysis

techniques in order to study a research field and visualise and identify specific or general topics/themes and their thematic evolution. In this paper, therefore, SciMAT is used to analyse a conceptual science mapping analysis based on co-word bibliographic networks (Batagelj & Cerinšek, 2013).

In order to provide a rigorous analysis, we will explain each step in the process. According to Börner, Chen and Boyack (2005) and Cobo et al. (2011b), a science mapping analysis follows these steps: data search, data refinement, network normalisation, mapping, analysis and visualization and performance analysis (Table 1).

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In the data search stage, we used the Web of Science (WoS) database (www.webofknowledge.com), which provides exhaustive coverage of the social sciences literature (Norris & Oppenheim, 2007) and the greatest coverage in years (Sánchez, de la Cruz Del Río Rama, & García, 2017). The WoS search returned 111 articles on sustainable HRM up to 2018. The period of analysis in this paper is 1997 to 2018 (SciMAT does not indicate any research networks on sustainable HRM prior to 1997) and the keywords are the unit of analysis, allowing a longitudinal study of the sustainable HRM field. This study includes all the articles and reviews published on the WoS in Management, Business, Ethics, Industrial relations and labour and Environmental Studies (see Table 2 for an overview of journals on the sustainable HRM theme). The keywords incorporated into the WoS search were obtained by consulting a group of researchers in the field and observing keywords used in WoS articles referring to sustainable HRM. Three full professors, six associate professors, and two assistant professors with expertise in the field were asked to propose a list of keywords related to sustainable HRM. The final keywords were then agreed (see Table 3).

- - - - Insert Table 2 about here - - - - -

- - - - Insert Table 3 about here - - - - -

To refine and reduce the data, it was scanned to identify incorrect, duplicate or misspelled items. The network was created in the normalisation and creation stage, using a co-occurrence network, which was then filtered to eliminate non-representative items. Items were standardised using the equivalence index. We then implemented a clustering algorithm to obtain the map stage and, to obtain the science map and its clusters, we used the simple centre algorithm (Coulter, Monarch, & Konda, 1998). At the analysis stage, we detected and interpreted useful findings and connections from our data, research networks and maps, using the following steps (Cobo et al., 2011a):

1. Detection of research themes. The corresponding academic topics are identified by applying a co-word analysis (Callon, Courtial, Turner, & Bauin, 1983) for all the published articles and reviews in the WoS in the research field, followed by a clustering of keywords around topics/themes (Coulter et al., 1998), which detect strongly related keyword networks and which correspond to centres of interest or research problems of significant research interest.
2. Visualisation of academic themes and thematic networks. In this stage, the themes identified are represented through two different graphical tools: strategic diagrams and thematic networks (Cobo et al., 2011a). Each theme can be characterised by two measures (Callon, Courtial, & Laville, 1991): centrality and density. Centrality measures the degree of interaction of a network with other networks and can be seen as a measure of the importance of a theme in the development of the entire research field. Density, on the other hand, measures the internal strength of the network, and should be interpreted as a measure of the theme's development. Given both measures, a research field can be visualised as a set of research themes, mapped in a two-

dimensional strategic diagram and classified into four groups (see Figure 1): motor themes (well-developed and important for the structure of the research field); specialised or peripheral themes (well-developed but unimportant for the development of the entire field); emerging or disappearing themes (both weakly developed and marginal); and basic or transversal themes (important for a discipline but not developed). Observation of the evolution of these themes over time indicates whether they are emerging or disappearing.

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According to Cobo et al. (2011a), the keywords in a research theme (see Fig. 2a) and their links create a network graph, known as a thematic network. The most central keyword in the related theme is used to designate each thematic network (see Fig. 2b).

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3. Identification of thematic areas. In this stage, the development of the research themes over a specified period is detected and analysed to identify the main general areas of evolution in the field, their origins, and their interrelationships. The conceptual, intellectual or social evolution of the field can then be identified. SciMAT also allows an academic field to be visualised through an evolution map (Cobo et al., 2011a).
4. Performance analysis. In this stage, the relative contribution of the research topics to the entire knowledge area is measured (quantitatively and qualitatively) and used to identify the most salient, most prolific and highest-impact sub-fields. Bibliometric indicators include the number of published documents, citations, and different types of h-index.

4. RESULTS

The number of publications in international journals points to an increase in academic interest in the sustainable HRM field. In the sub-period 2013-2018, 85 articles were published on sustainable HRM, a significant number compared to the sub-periods 2007-2012, (19 publications), or 1997-2006 (only 7 publications (see Fig.3).

----- Insert Fig. 3 about here -----

4.1 Visualising sustainable HRM themes and performance analysis

A strategic diagram for the period 2013-2018 (see Fig. 4) sets out the most important themes in the field of sustainable HRM. The circle size is proportional to the number of published documents linked to each research theme, and the thickness of the link between two circles is proportional to their equivalence index. Table 4 sets out the performance measures analysis, showing the number of documents, citations and h-index per theme.

----- Insert Fig. 4 about here -----

----- Insert Table 4 about here -----

In the period 2013 to 2018, *environmental management* (EM) is a motor theme in the sustainable HRM (Fig. 4). As defined above, a motor theme is well-developed and important for the structure of the research field. A significant number of documents (43) and citations (347) correspond to this term, which also achieved the highest h-index (see Table 4). Although, the link between strategic human resource management (SHRM) and EM is a relatively new topic (Paillé, Chen, Boiral, & Jin, 2014), organisations are increasingly concerned about the consequences of environmental deterioration and are taking actions geared towards environmental responsibility (Zoogah, 2018). Despite the increase in the number of documents related to this topic, more EM studies in HRM are needed (Jackson et al., 2011; Zoogah, 2018), to understand how HRM strategies can contribute to EM practices such as waste reduction, sustainability or ecological and

energy protection. Indeed, the alignment of HRM practices with environmental objectives can positively contribute to EM (Daily & Huang, 2001; Charbel José Chiappetta Jabbour, Jabbour, Govindan, Teixeira, & Freitas, 2013). Environmental management covers the important theme of *green HRM* (GHRM). According to Renwick, Redman, and Maguire (2013), GHRM is a group of specific practices that encourage a proactive approach to environmental management and the achievement of high performance results relating to environmental sustainability and other organisational aims. GHRM differs from strategic HRM because it focuses on preserving the environmental effects of company HR actions, while the traditional concept of SHRM pursues organisational strategic goals mainly grounded in improving profit or organisational performance (Delery & Doty, 1996; Tang et al., 2018). According to Tang et al. (2018), most GHRM studies cover the theoretical and qualitative level and there is an urgent need to develop quantitative research.

Another motor topic in the literature is *socially responsible HRM*. From 2013 to 2018, 32 documents and 315 citations correspond to this term in relation to sustainable HRM. This concept was developed by Shen and Jihua Zhu (2011), based in the literature from fields of study such as corporate social responsibility (CSR) and ethics and organisational behaviour (Newman, Miao, Hofman, & Zhu, 2016). The integration of CSR into the HRM function encompasses aspects such as transparency, ethical values or honesty in business management, beyond the traditional maximisation of companies' economic objectives (Barrena-Martínez, López-Fernández, & Romero-Fernández, 2017). In this sense, socially responsible HRM has positive effects on employees' performance when measured using variables such as a sense of organisational identification, employee commitment or organisational citizenship behaviour (Newman et al., 2016; Shen & Benson, 2016).

Moreover, the relationship between the organisational adoption of a sustainable HRM and its organisational outcomes, such as *turnover* intentions or *employee engagement*, is receiving attention in the sustainable HRM literature (see Fig. 4). *Turnover* is a third motor research theme within this field. From 2013 to 2018, 28 documents and 136 citations address this theme in relation to sustainable HRM (see Table 4). Organisations that ignore the need to balance individual and organisational agendas with sustainability experience high levels of conflict, which may lead to poor HRM outcomes such as high staff turnover, absenteeism or low workforce engagement (Guerci & Carollo, 2016). The importance of workforce turnover as a sustainability issue has been recognised by the Global Reporting Initiative (GRI), which includes turnover as a core social performance indicator in its Sustainability Reporting Guidelines (Global Reporting Initiative, 2002, p.52). Guerci, Decramer, Van Waeyenberg, & Aust (2018) find that HR professionals adopting sustainable HRM reduce turnover intention because their wider and meaningful goals go beyond the economic targets and achieve positive societal and ecological effects.

Employee engagement is a specialised research theme, found in 15 documents and 49 citations. As described above, a specialised theme is well-developed but unimportant for the entire discipline. Well-defined HRM practices may contribute to job satisfaction, engagement and a positive psychological contract (Albrecht, Bakker, Gruman, Macey, & Saks, 2015; Kramar, 2014) and sustainable HRM can encourage employee engagement in environmental practices, creating an atmosphere of belongingness and motivation towards work (Tang et al., 2018). In her research, King (2017) advocates a climate of sustainability that fosters talent outcomes. Indeed, sustainable policies can increase employees' sense of belongingness and organisational pride, encouraging them to work harder (Tang et al., 2018; Zhou, Luo, & Tang, 2018). However, many companies have

not determined how best to use responsible and sustainable activities as part of their employee engagement strategy (Bhattacharya, Sen, & Korschun, 2008).

Moving on to basic themes that are important for a research field but not developed, *HRM practice* is a basic or transversal theme in sustainable HRM. From 2013-2018, 41 published documents and 199 citations correspond to this term (see Table 4). According to Prins et al. (2014), HRM practices relating to talent, engagement, empowerment, health and wellbeing or employee participation are directly connected to respect for employees. HRM practices that consider diversity, ageing, work-life balance, ecology, stakeholders or labour markets are related to the environmental and outside-in perspectives of HRM. Lastly, employability, careers, succession, learning organisations or workplace innovation relate to a long-term view of economic and societal sustainability as well as employability. Academics have developed new initial approaches to a set of sustainable HR practices from a social perspective (Barrena-Martinez, López-Fernández, & Romero-Fernández, 2018; Diaz-Carrion et al., 2018) and even compiled systems of green HRM practices from an environmental perspective. These include green training and development, hiring or performance management (Guerci et al., 2016; Renwick et al., 2013; Tang et al., 2018). Green training consists of a set of practices that encourage individuals to be aware of environmental concerns and to acquire environmental protection abilities, which are crucial for achieving environmental or green goals (e.g. comprehensive training to encourage an emotional engagement in EM, using workers' tacit EM knowledge, green MBAs) (Jabbour, 2011; Renwick et al., 2013). Green hiring implies that firms attract and select candidates who will engage in environmental activities (e.g. the job description includes green aspects, candidates use green criteria to choose prospective employers, firms hire 'green aware' employees) (Jabbour, Santos, & Nagano, 2008; Renwick et al., 2013). Green performance management represents a set of

employee performance appraisals in relation to EM activities (e.g. incorporating green performance indicators in appraisals, variable pay based on EM appraisals) (Guerci et al., 2016; Jabbour et al., 2008; Renwick et al., 2013). Furthermore, scales have been developed in relation to sustainable HRM practices, such as a scale to measure GHRM that includes five dimensions (green recruitment and selection, green training, green performance management, green pay and reward, and green involvement) (Tang et al., 2018), or a health harm of work scale from the sustainable HRM perspective (Mariappanadar, 2016).

Sustainable leadership is the first emerging theme. These are weakly developed and marginal themes, as defined in the methodology. Twenty-three documents and 96 citations correspond to this term in the sustainable HRM field from 2013-2018 (Table 4). Academics advocate significant leadership changes to enable firms to face a variety of external challenges and achieve sustainability. Sustainable leadership covers research sub-themes such as *ethical leadership*, *transformational leadership* or *job satisfaction* (Jia, Liu, Chin, & Hu, 2018; McCann & Sweet, 2014) and refers to ‘achieving futures in which humans live within their ecological and social means, without exploiting other parties’ (Avery & Bergsteiner, 2010, p.30). Employees’ perception of leadership today is that it has to be focused on sustainable behaviour (McCann & Sweet, 2014). Suriyankietkaew & Avery (2016) find that sustainable learning practices such as amicable labour relations, valuing employees, social responsibility, and a strong shared vision have a positive influence on a company’s performance. McCann & Holt (2010) developed the Sustainability Leadership Questionnaire, which can be used to monitor improvements in sustainable leadership behaviours. However, more research is required on this topic.

Environmental performance is the other emerging research theme. From 2013-2018, 11 documents and 155 citations match this term in the sustainable HRM field.

Environmental performance monitors firms' commitment to protecting the environment (Paillé et al., 2014), measured by indicators such as pollution prevention, recycling or waste reduction (Lober, 1996). Indeed, some HRM practices are positively related to organisational environmental performance (Renwick et al., 2013). Guerci et al. (2016) observe how different GHRM practices influence the relationship between pressure from external stakeholders regarding environmental issues and environmental performance. These authors suggest that future research should analyse possible interactions between GHRM practices to identify any additive, substitutive or synergistic effects on environmental performance.

4.2 Analysis of the evolution detected throughout the different sub-periods

There are variations in the meaning and number of keywords during each sub-period: 1997-2006, 2007-2012 and 2013-2018 (Fig. 5). The sustainable HRM terminology evolves over time, using different keywords to describe the content of the documents. New topics and their associated keywords appear in the field (e.g. environmental management, socially responsible HRM or sustainable leadership) and other themes disappear (performance or organisational culture). On the other hand, a keyword such as *HRM practices* has remained unchanged over two consecutive sub-periods (2007-2012, 2013-2018), indicating the increasing need to understand how these practices contribute to HRM. However, the main outcome is that sustainable HRM is a relatively new research area, as the evolution map shows. This field has undergone greater development in the last sub-period, 2013-2018, with the emergence of further, related themes.

-----Insert Fig. 5 about here-----

Themes such as *performance*, *organisational culture* or *HRM practices* can be observed in the sub-periods 1997-2006 and 2007-2012 (see Fig. 6, 7a, 7b). There are

fewer research themes than in the sub-period 2013-2018; and *performance* was the motor theme in the first sub-period, 1997-2006. The sustainability debate was focused on operational efficiencies for pursuing long-term sustainable strategies in environmental management (Daily & Huang, 2001) and on the development of the operations management capabilities and HRM (Wilkinson et al., 2001). In 2006, Orlitzky & Swanson coined the term ‘socially responsible HRM’, leading to discussions around a ‘new territory’ grounded in the corporate social responsibility framework. In the sub-period 2007-2012, *organisational culture* and *HRM practices* were motor themes. *Organisational culture* covers areas such as *green HRM*, *integration* or *performance* (Fig. 7a), while *HRM practices* include aspects of *leadership* or *innovation* (Fig. 7b). This was a crucial sub-period, as *sustainable HRM* started receiving attention in the seminal works of the time (Ehnert, 2009a, 2009b, 2009c). *Green HRM* was further developed in 2011, in a Special Issue of the German Journal for HRM, intended to enhance green HRM literature. Despite the evolution described during this period, the the debate was centred around the conception of human resource sustainability in terms of a firm’s capacity to build organisational value and renew wealth through the implementation of HR strategies and practices. This was to be achieved by investing in human knowledge through continuous learning and developing knowledge through employee participation and involvement (Wilkinson et al., 2001). Indeed, the debate during these sub-periods focused on major concerns such as the adoption of a sustainability-oriented organisational culture that brings members together and encourages commitment and belongingness to shared firm environmental goals (Dodge, 1997). This in turn produces corporate sustainability principles (Linnenluecke & Griffiths, 2010) or HRM practices supporting and even driving environmental management initiatives (Jackson et al., 2011). However, in the

initial sub-periods 1997-2006 and 2007-2012, the sustainable debate was about long-term business success, with no real awareness of environmental issues.

-----Insert Fig. 6, 7a and 7b about here-----

From 2007-2012, sustainability was something that an organisation had the option of incorporating into its culture (Linnenluecke & Griffiths, 2010). However, from 2013-2018, organisational culture research moved towards a variety of well-developed themes such as *environmental management*, *socially responsible HRM* or *turnover* (see Fig. 5). The theme of *HRM practices* also continued to develop, under the same name, from 2013-2018.

5. CONCLUSIONS, LIMITATIONS AND FUTURE RESEARCH

This research makes two main contributions to the development of the relatively new research field of *sustainable HRM* and offers a critical evaluation.

Firstly, this paper demonstrates that sustainable HRM has become a field of study in itself, as demonstrated by the growth in the number of documents (see Fig.3). The most promising future research strands relate to *environmental management*, *socially responsible HRM* and *turnover*. *HRM practices* (green and socially responsible HRM practices) are a basic or transversal research theme; *environmental performance* and *sustainable leadership* are emerging themes; and *employee engagement* is a specialised theme.

Nevertheless, and in spite of this evidence, the consideration of sustainable HRM as a new research field in the HRM thematic requires robust academic debate. Freitas, Jabbour and Almada-Santos (2011) refer to sustainable HRM as an emerging paradigm, but academics have to make significant efforts to demonstrate its

contributions and how they differ from strategic HRM. There has certainly been debate in the HRM field around sustainability (Pfeffer, 2010; Wilkinson et al., 2001), but this area is now more developed and sustainable HRM is a new term and an emerging topic in the field, which developed as a sub-theme of HRM with its own essential nature (Ehnert, 2009a; Kramar, 2014). Its emphasis is on the preservation of the ecological and social effects of organisational HR actions, whereas traditional strategic HRM pursues company strategic targets largely aimed at improving profit or organisational performance (Delery & Doty, 1996; Tang et al., 2018). For instance, the focus of sustainable HRM is on practices that are specifically and comprehensively designed to better achieve ecological, social and economic organisational goals. These goals include training that encourages emotional engagement in EM (green MBAs, job descriptions that list green credentials, the appointment of ‘green aware’ employees, the incorporation of green performance indicators in appraisals, variable pay based on EM appraisals); gender equality; compensation contracts that promote equality and diversity throughout the company; work-life balance practices; flexible working-hours for disabled employees; or occupational health monitoring to improve health and safety at work (Diaz-Carrion et al., 2018; Guerci et al., 2016; Jabbour, 2011; Jabbour et al., 2008; Renwick et al., 2013).

Organisations may encounter difficulties when adopting sustainable HRM. Most committed firms incorporate Global Reporting Initiative (GRI) standards into their policies, but it is difficult to decide which practices to include. One practical contribution of this paper is that our bibliometric analysis allows us to identify the sustainable HRM practices cited in recent published articles (Barrena-Martínez et al., 2017; Diaz-Carrion et al., 2018; Guerci et al., 2016; Jabbour, 2011; Jabbour et al., 2008; Renwick et al., 2013; Tang et al., 2018). Table 5 sets out a menu of sustainable HRM

practices, which we anticipate will serve as a preliminary guide for practitioners aiming to implement sustainable policies in their companies.

-----Insert Table 5 about here-----

The second main contribution of this study is to highlight the need for a comprehensive development of sustainable HRM measures, encompassing the environmental, social and economic approaches. While some validity scales and measures have been developed around this concept, more significant research is needed into green HRM (Guerci et al., 2016; Renwick et al., 2013; Tang et al., 2018), health harm of work (Mariappanadar, 2016) or socially responsible HRM (Barrena-Martínez et al., 2017; Diaz-Carrion et al., 2018; Shen & Jiuhua Zhu, 2011). Indeed, Cohen, Taylor & Muller-Camen (2012) emphasise the importance of developing action plans, scorecards and metrics to measure the progress and outcomes of HRM's contribution to organisational sustainability.

The main limitation of this paper is that we have only analysed WoS articles and reviews in English from the areas of business, management, industrial relations and labour, ethics and environmental studies. However, we consider that these best represent the sustainable HRM field. Another limitation of this research is that sustainable HRM and its literature is a developing field (as the increasing number of publications shows). Nevertheless, this limitation is also a potential future strength. As the field develops, we expect an increase in research in the field.

With regard to future research, despite a significant number of publications relating to the environmental or social approach to sustainable HRM, further investigations into its measurement are needed. Indeed, contributions that address the challenges of work in the 21st century must acknowledge not only economic security but

also many of the environmental and social issues that people relate to (family, neighbourhood, community, decompression from work, recreation, culture, job polarisation, talent, pollution, etc.) (Goos, Manning, & Salomons, 2014; King, 2017; Roseland, 2000). Consequently, contributions such as Cohen et al.'s (2012) measurement of a sustainable HRM system could provide a good starting point, but further work is required to gain a clear understanding of the challenges and effects of this domain: sustainable strategies and practices (national and international), sustainable employment relations, and wellbeing. Only a few studies have attempted to explain sustainable HRM and its outcomes, such as turnover or employee engagement (Guerci et al., 2018; Shen & Jiu Hua Zhu, 2011). More studies are needed that analyse sustainable HRM practices and its outcomes relationship, particularly considering that these practices contribute to the development of a firm's reputation, reduce stakeholder pressure and improve conditions for future generations (Tang et al., 2018).

Scales to measure green outcomes of HRM have been developed (Guerci et al., 2016; Tang et al., 2018), but more research is required to create valid instruments to measure sustainable HRM that integrates the triple bottom line. Furthermore, metrics are needed to measure outcomes of sustainable HRM, or studies that can identify the strategic leeway held by sustainable leaders in different national contexts. Some new approaches have been published that measure the behaviour required to develop a sustainable leadership style (Avery & Bergsteiner, 2011; McCann & Holt, 2010), but further research is still needed.

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TABLES AND FIGURES

Table 1. Science Mapping Stages

Data search	<ul style="list-style-type: none"> • WoS, Principal collection 2006-2018 • Keywords corresponding to the sustainable HRM field (Experts and review of WoS articles)
Data refinement	<ul style="list-style-type: none"> • Data refinement of duplicate and misspelled data
Normalisation and creation of the network	<ul style="list-style-type: none"> • Network creation: co-occurrence • Network reduction • Similarity measures to standardise the network. Equivalence Index.
Map creation	<ul style="list-style-type: none"> • Implement a clustering algorithm to obtain the map stage: Simple centres
Analysis and visualisation	<ul style="list-style-type: none"> • Identification of the research themes • Visualisation of academic themes and thematic networks –strategic diagram– • Longitudinal analysis –evolution map–
Performance analysis	<ul style="list-style-type: none"> • Measure the contribution of the research themes to the entire field • Identify the most cited, most prolific and highest-impact sub-field

Table 2. WoS Journals where sustainable HRM research themes are published

Number of Journals	Journal	5 year impact factor (2017)
1	CORPORATE SOCIAL RESPONSIBILITY AND ENVIRONMENTAL MANAGEMENT	5.856
2	JOURNAL OF BUSINESS ETHICS	3.955
3	SUSTAINABILITY	2.177
4	ASIA PACIFIC JOURNAL OF MANAGEMENT	2.893
5	GROUP & ORGANIZATION MANAGEMENT	3.394
6	PERSONNEL REVIEW	1.942
7	HUMAN RESOURCE DEVELOPMENT INTERNATIONAL	ESCI
8	HUMAN RESOURCE MANAGEMENT	3.361
9	ASIA PACIFIC JOURNAL OF HUMAN RESOURCES	1.563
10	BUSINESS ETHICS-A EUROPEAN REVIEW	2.59
11	MANAGEMENT REVUE	ESCI
12	HUMAN RESOURCE MANAGEMENT JOURNAL	3.1
13	INTERNATIONAL JOURNAL OF OPERATIONS & PRODUCTION MANAGEMENT	4.371
14	JOURNAL OF MANAGEMENT DEVELOPMENT	ESCI
15	INTERNATIONAL JOURNAL OF ORGANIZATIONAL ANALYSIS	ESCI
16	SUSTAINABILITY ACCOUNTING MANAGEMENT AND POLICY JOURNAL	2.2*
17	INDUSTRIAL AND COMMERCIAL TRAINING	ESCI
18	INTERNATIONAL JOURNAL OF PRODUCTIVITY AND PERFORMANCE	ESCI
19	COGENT BUSINESS & MANAGEMENT	ESCI
20	JOURNAL OF MANAGEMENT	12.043
21	LEADERSHIP	2.379
22	ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES	ESCI
23	INTERNATIONAL JOURNAL OF HUMAN RESOURCE MANAGEMENT	2.709
24	ASIA-PACIFIC JOURNAL OF BUSINESS ADMINISTRATION	ESCI
25	INTERNATIONAL JOURNAL OF MANPOWER	1.085
26	BENCHMARKING-AN INTERNATIONAL JOURNAL	ESCI
27	EMPLOYEE RELATIONS	1.606
28	SCANDINAVIAN JOURNAL OF MANAGEMENT	2.026
29	HUMAN RESOURCE MANAGEMENT REVIEW	4.201
30	INTERNATIONAL JOURNAL OF MANAGEMENT REVIEWS	8.941
31	EUROPEAN MANAGEMENT JOURNAL	3.412
32	ORGANIZATION STUDIES	5.028
33	ZEITSCHRIFT FUR PERSONALFORSCHUNG	1.196
	ESCI= Emerging Sources Citation Index	
	*SAMPJ was accepted into Clarivate's SSCI in 2017/ Impact Factor of 2017: 2.200	

Table 3. Sustainable HRM's keywords used to search in the WoS

TS = ("sustainable leadership" or "sustainable HRM" or "sustainable HR" or "sustainable human resource management" or "sustainable HRM strateg*" or "sustainable human resource management strateg*" or "green HRM" or "green human resource management" or "green HRM practices" or "green human resource management practic*" or "sustainable HR practic*" or "sustainable human resource practic*" or "HR values" or "human resource valu*" or "HR sustainability" or "human resource sustainability" or "socially responsible human resource management" or "socially responsible HRM" or "socially responsible HR practic*" or "socially responsible human resource practic*" or "corporate social responsibility in human resource management" or "CSR in HRM" or "sustainable HRM innovation" or "environmental HR strateg*" or "social HR strategy" or "social human resource strategy" or "social HRM strategy" or "social human resource management strategy")

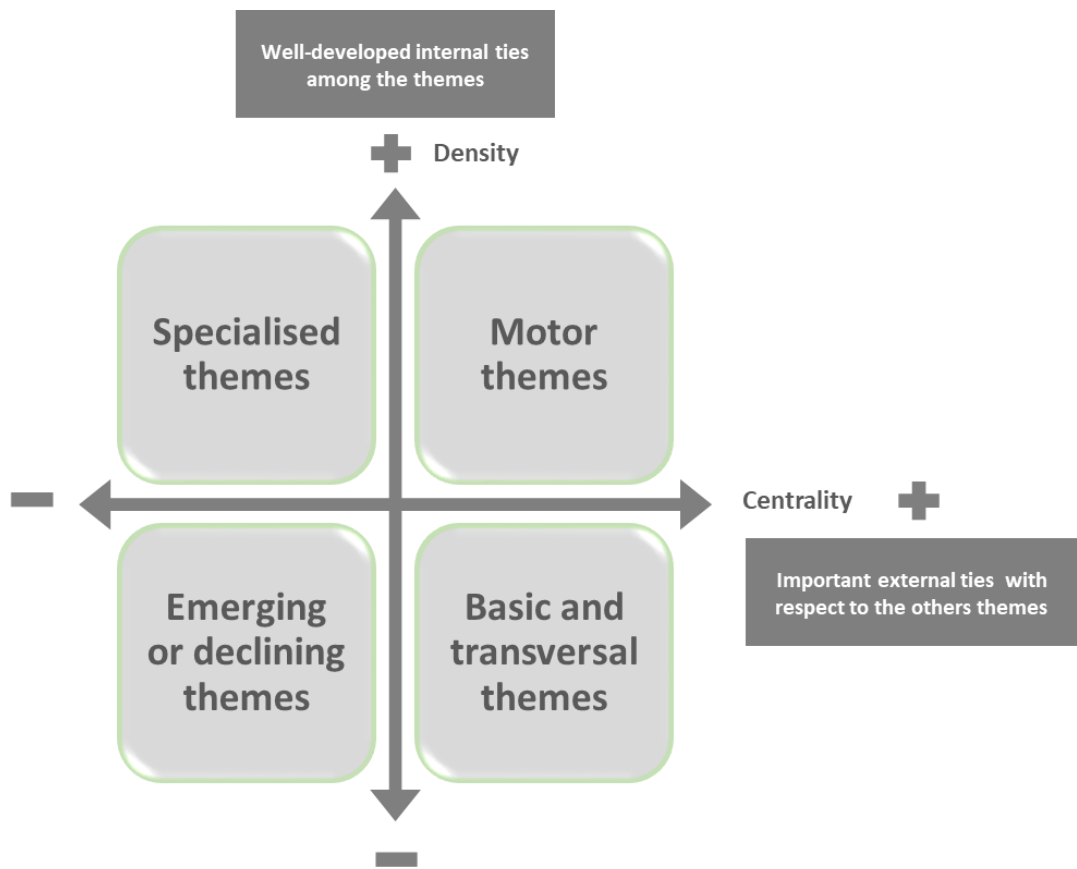


Fig.1. Strategic diagram

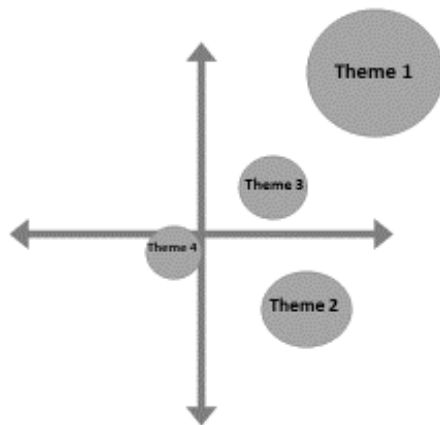


Fig.2a. Picturing of themes in the strategic diagram

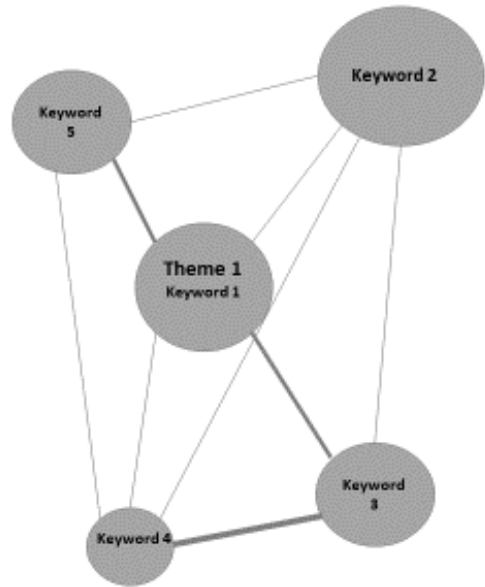


Fig 2b. Thematic network

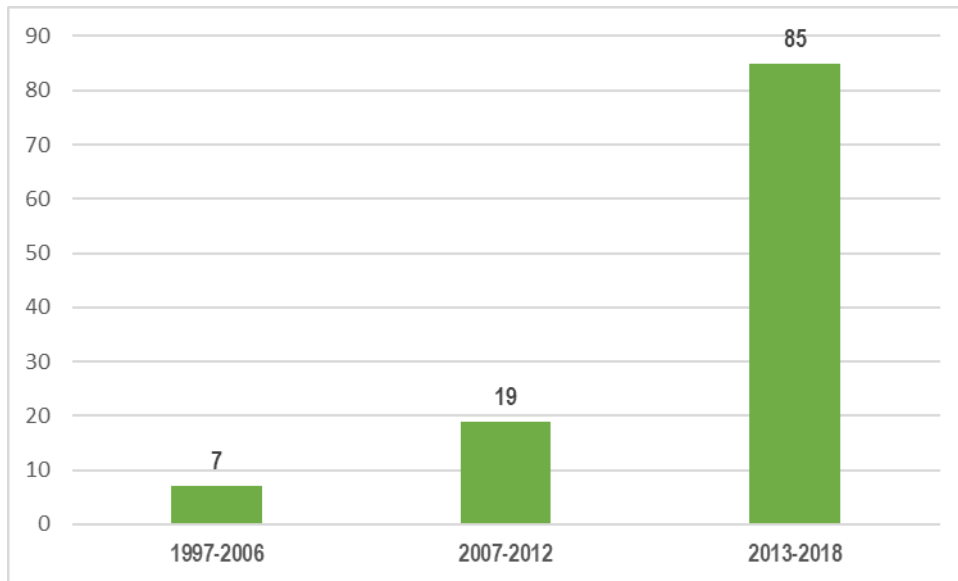


Fig. 3. International WoS publications in the sustainable HRM field of study

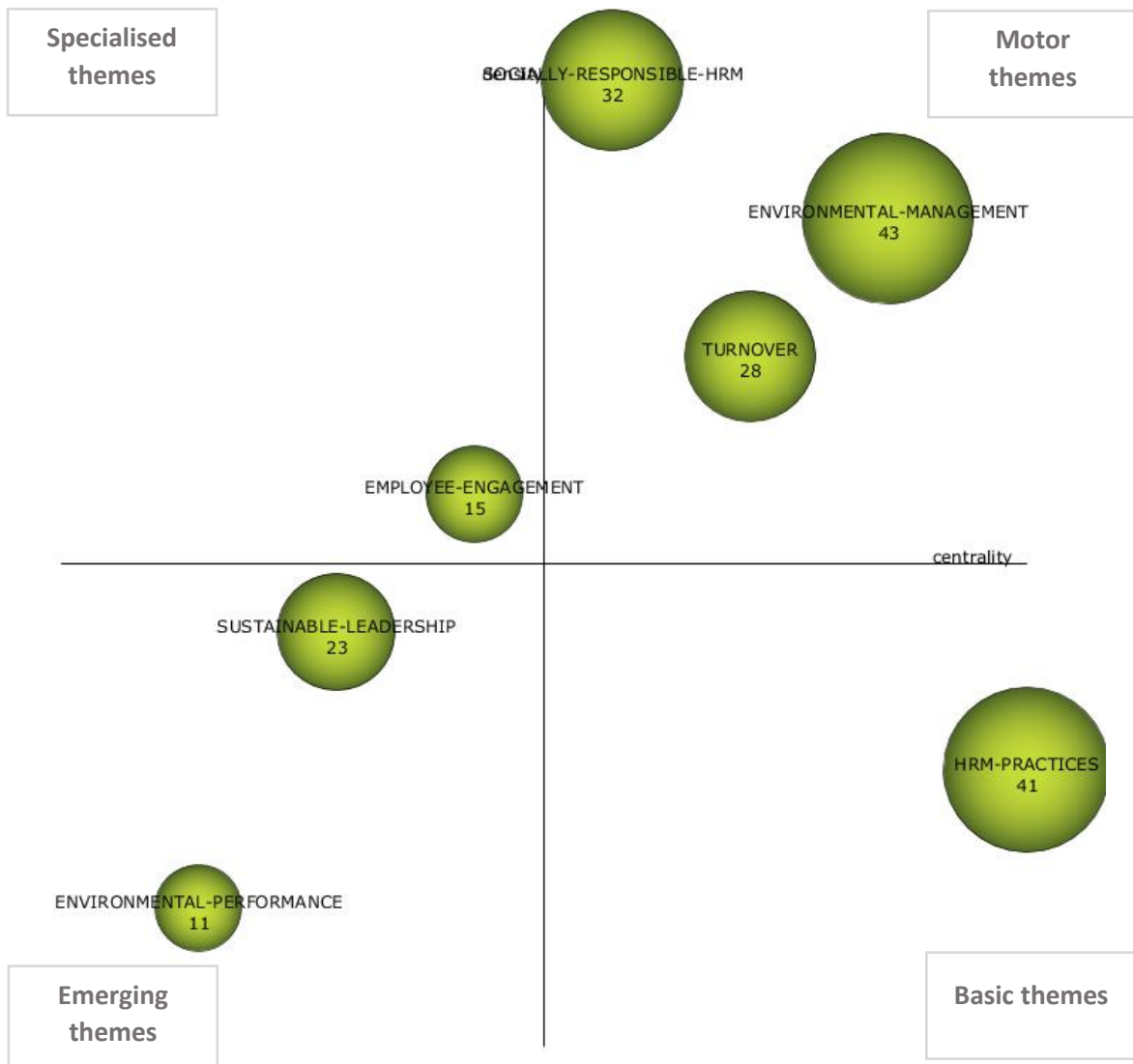


Fig. 4. Strategic diagram of sustainable HRM themes from 2013 to 2018 (Number of documents)

Table 4. Performance of the sustainable HRM themes for the period 2013-2018

Name	Number of documents	Number of citations	h-Index
ENVIRONMENTAL-MANAGEMENT	43	347	9
SOCIALLY-RESPONSIBLE-HRM	32	315	8
TURNOVER	28	136	6
EMPLOYEE ENGAGEMENT	15	49	4
HRM-PRACTICES	41	199	7
SUSTAINABLE LEADERSHIP	23	96	6
ENVIRONMENTAL PERFORMANCE	11	155	5

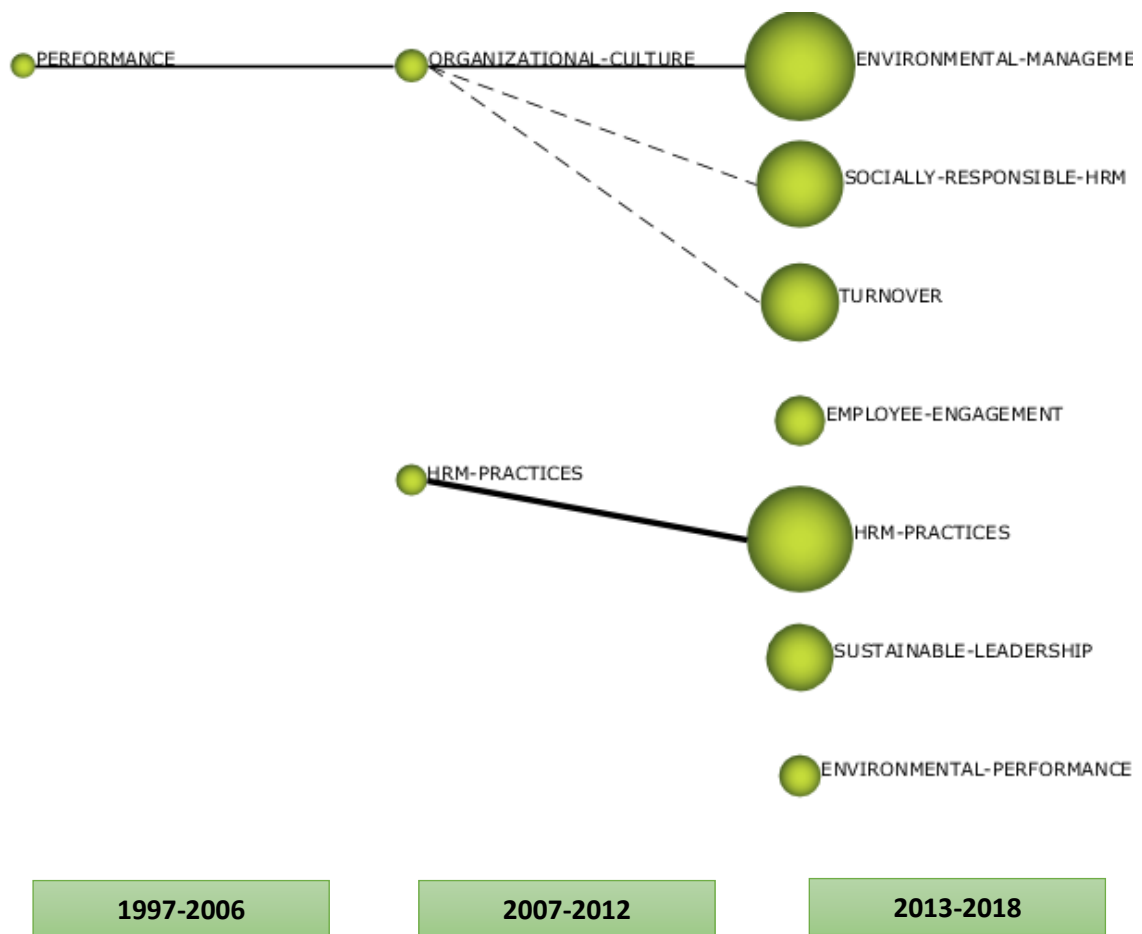


Fig. 5. Evolution map of sustainable HRM themes for periods 1997-2006, 2007-2012 and 2013-2018

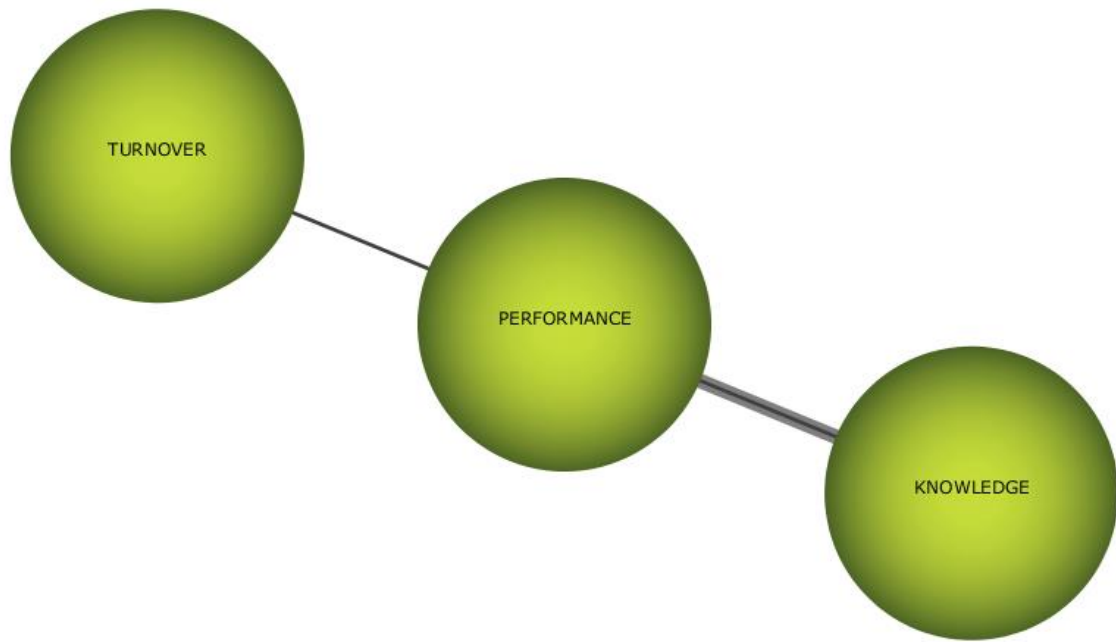


Fig. 6. Cluster's network of sustainable HRM themes for period 1997-2006

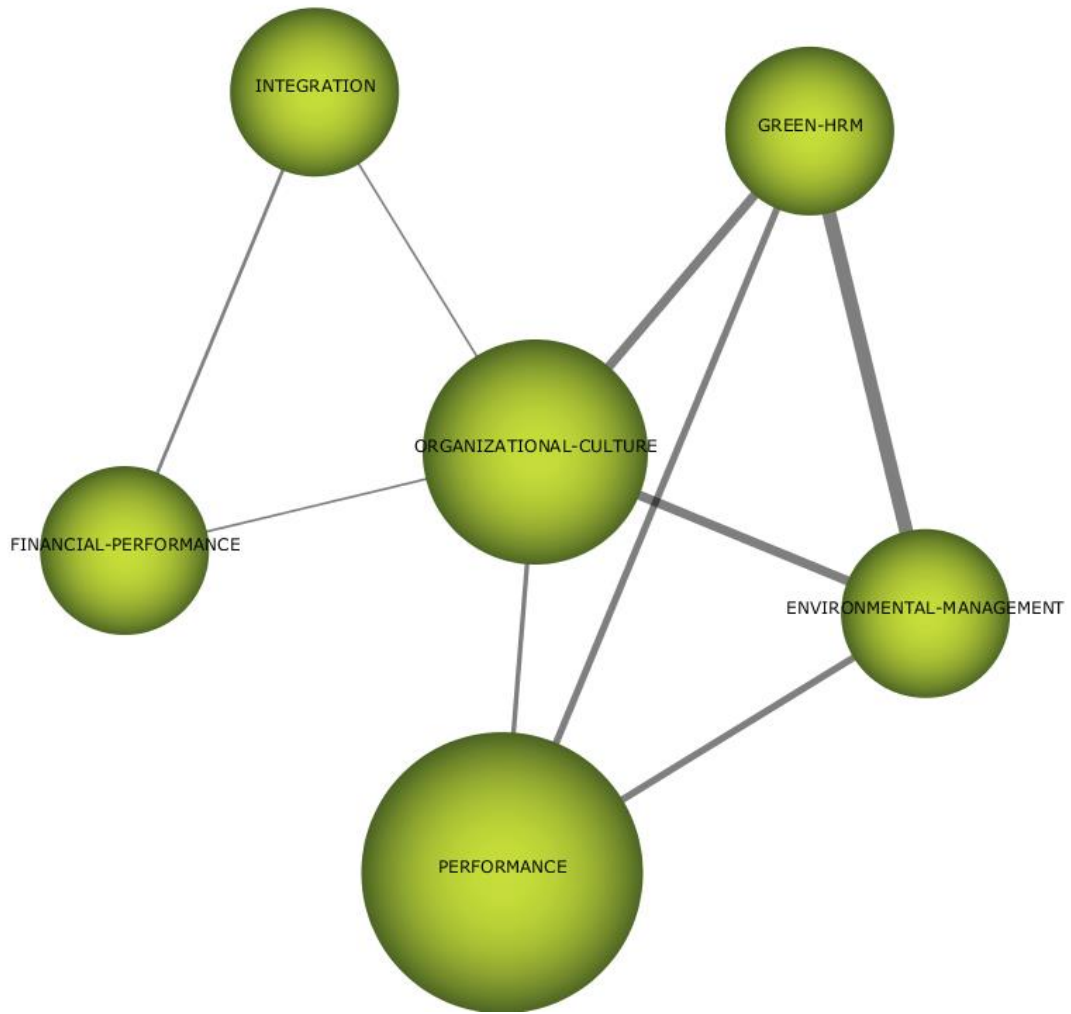


Fig. 7a. Cluster’s network of sustainable HRM themes (Organisational Culture) for period 2007-2012

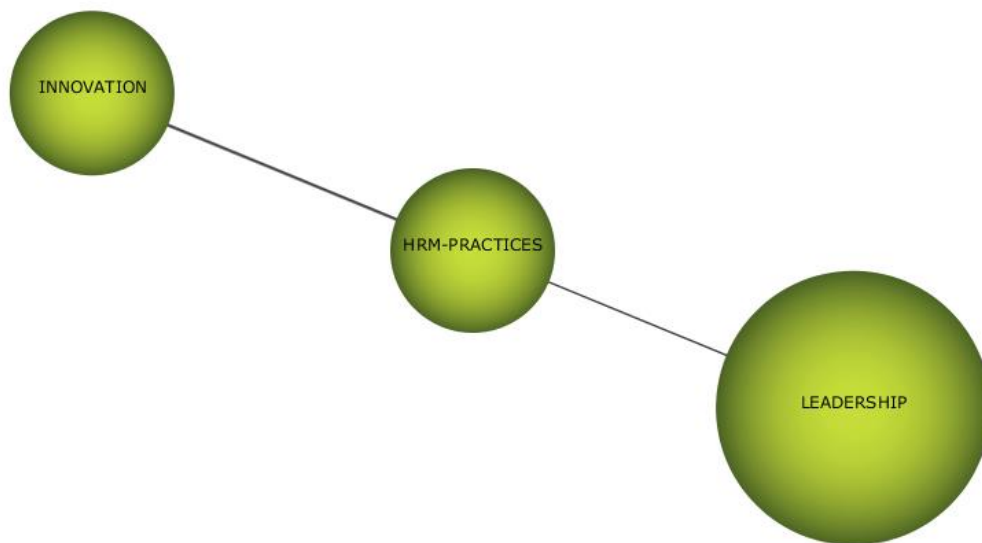


Fig. 7 b. Cluster’s network of sustainable HRM themes (HRM-practices) for period 2007-2012

Table 5. Menu of sustainable HRM practices

Sustainable training and development choices	Sustainable appraisal choices	Sustainable compensation choices	Sustainable planning choices	Sustainable staffing choices
<ul style="list-style-type: none"> • Training programmes to increase ecological and social awareness, skills and expertise for managers and employees • Activities for employees to be involved in social and environmental management (EM), such as suggestion plans and problem-solving teams • Funding green and social related educational programmes (MBAs) • Fostering a culture of environmental and social protection • Supporting individuals' employability through continuous learning initiatives • Promoting interaction and sharing of knowledge among employees through internal rotation, group meetings or brainstorming • Diversity and equal opportunity training 	<ul style="list-style-type: none"> • Setting clear environmental and social goals within the company • Including green performance indicators (e.g. number of eco-friendly goods produced, energy consumption) and social performance indicators (grounded in principles of justice, fairness and transparency) in managers' and employees' appraisals • Implementing dis-benefits in the performance management system for not meeting well-defined and pre-established social and environmental targets 	<ul style="list-style-type: none"> • Compensating retention mechanisms (e.g. childcare and scholarship facilities, life insurance, retirement plans, medical service) • Offering variable pay, incentives and recognition-based rewards based on social and ecological achievement for employees (e.g. monthly bonuses for good EM practices, paid holidays, less polluting cars, bicycles) • Social and ecological skill-based pay • Executives' compensation based on environmental and social achievements • Equal, transparent and fair compensation, with no discrimination by gender or race 	<ul style="list-style-type: none"> • Developing fair and transparent career plans for all employees (e.g. ageing, race, gender) • Offering work-life balance schedules (e.g. flexitime, home-based work, tele-working) • Enabling staff affected by a disability to continue in their position by arranging working hours etc. • Offering flexible schedules to enrol in environmental and social activities during working hours 	<ul style="list-style-type: none"> • Job descriptions include environmental and social responsibilities • Candidate attraction through ecological and social commitment • Green and social employer branding • Offering inductions, manuals and courses on the green and social company culture to new candidates • Diversity, equal and transparent opportunity selection processes • Offering volunteer relocation to employees in case of restructuring