Modern Environmental Science and Engineering (ISSN 2333-2581) April 2020, Volume 6, No. 4, pp. 454-461 Doi: 10.15341/mese(2333-2581)/04.06.2020/004

Academic Star Publishing Company, 2020

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Green Perceptions or Green Practices: What Are the Strongest Influences on Work Engagement?*

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Abstract: Green practices promoted in terms of people management, and which embody a Green Human Resources Management, are important tools for establishing a workforce which understands, values and practices green initiatives, which in turn will enable the organizations to attain their sustainability objectives. Workers also need to perceive that their organizations are concerned with and values sustainability, a phenomenon known as the organisational rationale for sustainability, and when they experience a close psychological connection with the organization, workers adopt its organizational objectives and targets for themselves, showing higher levels of organizational identification and work engagement. This paper analyses which factors most influence levels of work engagement in an organizational framework of pro-sustainability actions and concerns. Based on a sample of 275 workers from different organizations, economic sectors and occupations, the results show that implementing HRM green practices, especially in recruitment and selection and compensation (and, to a lesser extent, training), and reinforcing organizational identification are stronger determinants of greater work engagement than the perception that workers have of the importance which their organization attaches to sustainability.

Key words: sustainability, green HRM practices, organizational rationale for sustainability, organizational identification, work engagement

1. Introduction

Sustainability has increasingly become one of the main strategic orientations of organizations, based on a triad of economic, social and environmental objectives which are difficult to manage and keep in balance. Organizations reflect societal and stakeholder concerns, attempting to make appropriate use of resources and to safeguard long-term competitive advantage [1]. To this

alignment of the organization's necessary sustainability objectives and the values, attitudes and behaviours of their employees. Green practices which may be promoted in terms of people management, and embody a Green Human Management (Green HRM), are important tools for establishing a workforce which understands, values and practices green initiatives, which in turn will enable the organizations to attain their sustainability objectives [2]. Green recruitment and selection, green training and green compensation are practices which have been studied closely. Environmental sustainability objectives are more easily reached if selection focuses on candidates who already have environmental values, sensitivities and beliefs; if they are given training to develop skills and abilities in this domain; and if they are rewarded, in monetary or other form, for their pro-environmental behaviour.

end, they depend on those who work in them and on a

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^{*}A Portuguese version of this paper has been published in the Proceedings of the SGA'19 Conference — Sustentabilidade na Gestão Ambiental: Inovação e Desafios para os Países de Língua Oficial Portuguesa (Sustainability in Environmental Management: Innovation and Challenges for Portuguese-Speaking Countries), which was held in Lisbon during June 2019. Available at: http://www.ambientecplp.org/documentos/educacao-ambiental/sga-2019-sustentabilidade-na-gestao-ambiental-pdf.aspx

As important as, or perhaps even more important than effective action and practices in favour of sustainability, is the organisational rationale for sustainability (ORS) [3] or, in other words, the way workers perceive the way their organization is concerned with and values sustainability. Workers must understand and believe that their organizations place sustainability first and foremost, because this perception has a greater impact on their adoption of pro-sustainability behaviours than their personal values [3]. Correspondingly, when workers perceive that the internal and external image of their organization projects sustainability as a key strategic guideline, and that it supports pro-environmental initiatives, they tend to identify more closely with the organization [4, 5]. In experiencing a close psychological connection with the organization, workers adopt its organizational objectives and targets for themselves. This predisposes them to higher levels of work engagement [6]. Engaged workers show energy, enthusiasm, effort and concentration, reflected in subsequently higher levels of individual and organizational performance [7].

Despite the recent growth of the international literature in this domain and its significant practical implications, organizations still face a number of challenges to "green" management of people and achieving the purposes of sustainability. The aim of this study is to analyse the effect of certain green HRM practices (recruitment and selection, training and compensation), the perceived organisational rationale for sustainability and organizational identification (OI) on employees' work engagement (WE). This paper, which has an organizational (green HRM practices) and perceptive-individual (ORS and OI) focus, analyses how these factors interact and influence work engagement. Using quantitative methodology, this exploratory research seeks to contribute to a better understanding of what factors determine work engagement in a framework of an organizational strategy of environmental sustainability.

2. Literature Review

2.1 Sustainability and Green Human Resources Practices

When an organization incorporates sustainability into its mission, values and strategy this implies that its employees should subscribe and become involved with measures associated with it [8]. Human resource management, through a set of practices, policies and initiatives, to which the prefix "green" is commonly added, may contribute significantly to achieving organizations' sustainability objectives, given that they incentivize, promote and develop awareness and ecological behaviour among employees. The green practices which have been studied most in the literature are green recruitment and selection, green training and green compensation.

Green Recruitment and Selection. To ensure a good fit or alignment of the organization's prescribed sustainability objectives and the values, perceptions and interests of employees, recruitment policy and organizational selection must be defined so as to attract and select candidates who have environmental skills. attitudes and sensitivities, and are predisposed to take part in pro-environmental initiatives and support the firm's plans for sustainability [1]. Among various possible strategies it is fundamentally important that job descriptions and specifications, as well as selection interview scripts and group dynamics, cover environmental aspects [9], and that full advantage is taken of technology to ensure that the whole procedure (e.g., posting of vacancies, online tests) takes place without using paper [10-12]. The literature shows that an organization which has green employer credentials and a green image and reputation is powerful in terms of attracting the best talents [13-15].

Green Training. Training is a key component in the success of an organization's sustainability plans, in that it provides information on the organization's green policies, procedures and initiatives; contributes to higher employee engagement levels in implementing

pro-environmental practices, such as the adoption of recycling and energy efficiency; and helps to develop employees' ecological awareness, encouraging them to identify problems and their corresponding solutions in these domains [16-19]. Existing studies show contradictory results as to the effect of green training on performance and pursuit of environmental targets, some of them positive [20-22], others neutral [17]. In order for the training to have the desired effect, it has to be prepared, designed and applied on the basis of, amongst other things, a correct analysis of needs, an assessment of employees' readiness to learn in this way and an appropriate transfer of knowledge to the job function and place of employment [9, 23].

Green Compensation. Including green targets in reward systems helps to encourage and reinforce pro-environmental behaviours and alignment with the organization's ecological aims and initiatives [16, 19, 20, 23]. To this end, it is imperative that employee environmental performance appraisal be based on objective, known, equitable and fair criteria [24] and that organizations acknowledge green behaviour by rewarding it [25]. Rewards may be monetary (e.g., prizes or incentives to buy hybrid cars or bicycles) or non-monetary (based on recognition in the form of a premium for excellence or a step up promotion/career progression ladder) [10, 11, 16]. Previous studies show that it is rare for monetary rewards to be given to lower levels of the hierarchy (at most, there is non-monetary recognition), but this trend is reversed for senior managers, who receive financial rewards [9, 10, 16, 24].

2.2 Organizational Rationale for Sustainability, Organizational Identification and Work Engagement

The way workers perceive and interpret their organization's commitment to sustainability is called the *organisational rationale for sustainability* [3]. These perceptions are built on the strategy outlined by the company itself (through its mission statement, policies and practices) and in organizational culture

and communication (values, beliefs) [4]. Before acting, workers make a judgment not only on whether sustainability seems to be a priority for the organization, but also on the organization's own justification for the importance of sustainability [3]. The rationales associated with arguments in favour of pro-sustainability orientation may be based on moral and eco-centric reasons (environmental conservation is an end in itself) or organizational reasons (business priorities, reputation, economising on resources). In this way of seeing things, workers' perceptions of how organizations value sustainability, whether for moral or business reasons, are stronger determinants of organizational identification and for organizational civic behaviours in favour of the environment than the organization's actions. Other studies have also found that there is a positive effect on workers who are aware of their organization's efforts to be socially responsible, particularly as far as their commitment and work engagement are concerned [3, 4, 26, 27].

When employees see that their organization has an integrated, prioritized and coherent sustainability strategy, that the organization's internal and external image reflects this posture, and that they will be supported when putting forward environmental initiatives, they tend to identify with their organization [4, 5]. A worker's level of organizational identification (OI) is strongly related to his or her connection to the organization's values, beliefs and targets. OI is defined in relation to the sense of unity with the organization, given that the individual's self-concept contains the same attributes which he believes define the organization [28]. Workers thus see the organization as part of themselves, and its successes and failures are therefore lived as if they were their own [29]. The literature argues that OI is positively related to work engagement [6, 30, 31]. When an individual feels a strong psychological tie to his organization, he internalizes organizational aims and targets, and that reinforces his predisposition to higher levels of work engagement [31].

Work engagement (WE) is a positive, active state of mind in relation to work and has three aspects: vigour, dedication and absorption [32]. Vigour is a high level of energy and a willingness to devote extra effort to work and to be mentally resilient when faced with difficulties; dedication is pride in and enthusiasm for one's work; and absorption reflects one's level of concentration and focus on the work [33]. In overall terms, this is a persistent psychological state involving energetic connection, commitment, enthusiasm, effort and concentration [32, 34]. Earlier studies have found empirical evidence that work engagement is positively associated with individual and organizational performance, given that engaged workers tend to be more creative and productive [7, 35-38].

Based on the theoretical framework, we propose the following research hypotheses:

- H1. Green HRM practices are positively related to work engagement.
- H2. The perception of organizational rationale for sustainability is positively related to work engagement.

H3. Organizational identification is positively related to job engagement.

3. Method

This research is based on a sample of 275 workers in organizations, different economic sectors occupations. Our sampling procedure was based on non-probability and convenience sampling. summary, 57.5% of the sample consists of women and 42.5% of men, aged 19-63 years with an average of 31 years. The average literacy of all of the respondents is 16.3 (measured in number of years of school). In terms of tenure in the organisation, 35% have less than a year's tenure, 44% have been in the organisation for more than a year but less than 4 years, and 21% have more than 4 year's tenure. 50.5% of the total sample are supervisors. Of the respondents, 43.3% work in hotels and food retail, with the remaining working in service companies. The data obtained were analysed using SPSS Amos software, version 24, based on the theoretical model and assumptions defined in the literature.

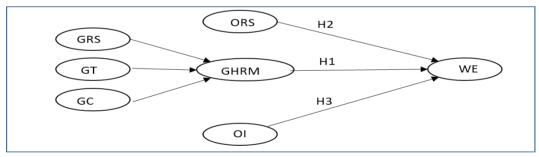


Fig. 1 Theoretical Model.

GRS = green recruitment and selection; GT = green training; GC = green compensation; ORS = Organizational rationale for sustainability; GHRM = green human resources management practices; OI = organizational identification; WE = work engagement.

3.1 Measures

The scales used to test the constructs under analysis were selected from the existing literature and adapted to the Portuguese language. All the scales revealed robust psychometric properties (with Cronbach's alpha above 0.7). Participants expressed disagreement/agreement with the statements using a five-point Likert scale (1 = strongly disagree to 5 = strongly agree).

Green Human Resource Management Practices (Green HRM practices) has 11 items, was adapted from Guerci et al. (2016) and includes the following dimensions: green recruitment and selection (GRS) (2 items; $\alpha = 0.814$), green training (GT) (4 items; $\alpha = 0.896$) and green compensation (GC) (5 items; $\alpha = 0.912$). Examples of the statements are: "My organization has environmental training programs for employees", "In my organization, job descriptions

include environmental responsibilities" and "My company has variable compensation based on environmental performance".

The organizational rationale for sustainability (ORS) was tested based on a shorter version by Tosti-Kharas et al. (2017), whose original formulation comprises personal and organizational rationales, based in moral or business reasons. This study only tests the organizational rationale and the business reasons. The scale consists of 4 items ($\alpha = 0.740$), such as: "My organization believes that good environmental practices will contribute to its success in the long run" and "My organization believes that a good reputation for environmental sustainability will appeal to our customers and clients".

Organisational Identification was measured through 6 items ($\alpha = 0.817$), as elaborated by Mael and Ashforth (1992). Examples of items are: "When I talk about my organization, I usually say 'we' rather than 'they'" or "When someone praises my organization it feels like a personal compliment".

Work Engagement (WE) ($\alpha=0.845$) was measured using the well-known Utrecht Work Engagement Scale (UWES). Vigour was assessed in 6 items, examples of which are: "At my work, I feel bursting with energy" and "When I get up in the morning, I feel like going to work"; dedication includes 5 items and examples are: "I am enthusiastic about my job" and "My job inspires me"; absorption was measured through 6 items, such as "I feel happy when I am working intensely" and "When I am working, I forget everything else around me".

4. Results and Discussion

The adjusted model is shown in Fig. 2 and adjustment quality is present in the "fit" results (Cmin/DF = 3.701; CFI = 0.728; RMSEA = 0.099; TLI= 0.705). The results in Fig. 2 indicate that green HRM practices (which include green hiring, green training and green compensation) are those which most contribute to work engagement, confirming hypothesis 1. The most significant practices are green recruitment and selection (GRS) ($\beta = .94$) and green compensation (GC) (β = .90). As the literature attests, organizations have to recognize green employee behaviours and initiatives, through financial and symbolic rewards, and thus render their pro-sustainability objectives effective [25]. In the same way, alignment of candidates' environmental values and concerns with the purposes of the organization, through green selection and recruitment, help to achieve better results in implementing an environmental sustainability agenda [10]. Green training (GT) (β = .80), however, seems to be less significant when compared with the other two practices. As was explained in the literature review, the results in connection with the impact of training are ambiguous, in some cases showing positive effects and in others a neutral effect [17, 20-22]. For this research, the lesser impact of training may reflect the average age of the sample and its reduced seniority, thus lining up by default with the ideas of Guerci et al. [1], given that young people are naturally "formatted" in favour of green practices in the management of human resources.

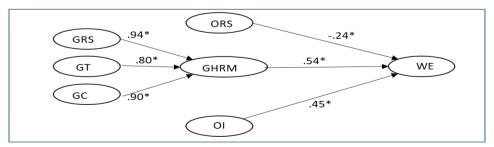


Fig. 2 Final model.

p = .000

GRS = green recruitment and selection; GT = green training; GC = green compensation; ORS = Organizational rationale for sustainability; GHRM = green human resources management practices; OI = organizational identification; WE = work engagement.

Hypothesis 2 is rejected, given that the influence of ORS on WE is not only the weakest of the three, but is actually negative. This is a surprising result, in that it seems to run counter to the existing literature on this topic [3, 4]. The rejection of this hypothesis should perhaps be seen in a context where interviewees work in organizations which in truth do not have an organizational rationale for sustainability, or in which the business model does not require a clear sustainability orientation. Hypothesis 3, which relates OI to WE, is proven and provides theoretical support for the quality of this research, given that it behaves as expected and in a way which is amply supported by the literature, including research work which is not "green". It should be noted that demographic variables, used for control purposes, have not had any demonstrable effect on results.

5. Conclusion

The aim of this research work was to analyse which factors most influence levels of work engagement in an organizational framework of pro-sustainability actions and concerns. The results obtained show that implementing HRM green practices, especially in recruitment and selection and compensation (and, to a lesser extent, training), and reinforcing organizational identification are stronger determinants of greater work engagement than the perception that workers have of the importance which their organization attaches to sustainability.

To interpret these results correctly it is necessary to place them in the context of the average age of the sample, which was made up mostly of millennials. Amongst other characteristics, this generation is often associated with greater awareness of environmental values [39] and a greater need for immediate and constant feedback [40]. In order to achieve sustainability, in particular in its environmental aspect, organizations must redouble their efforts to attract candidates whose environmental values and concerns are in line with their own (millennials already possess

these values, making green training redundant), and provide effective feedback mechanisms. This may involve compensation and benefits schemes which incentivize, recognize and reinforce employees' green behaviours and initiatives.

Contrary to what the literature argues, the results of this research fail to confirm the relevance of ORS. There are two possible reasons for this discrepancy. On the one hand, interviewees may not see how important sustainability is for their organization because the organization is unable to convey that image internally. It does not suffice for sustainability to be written into the mission statement or the in-house magazine; an effective internal communication strategy is required. On the other hand, ORS in this research was checked only for business reasons and not for moral reasons (in other words, for the value of nature as an end in itself and not as a means to an end). Even though one of the motivations for firms to adopt pro-sustainability values is the expectation that they will obtain direct financial benefit from doing so, we may rightly assume that millennial interviewees would be more favourably impressed if their organizations valued environment of and for itself, regardless of the economic benefits they might derive from it.

This research makes two main contributions to the field. In the academic context, it puts the topic of green HRM on the map of the Portuguese literature, where this focus has hitherto been practically non-existent. Portugal is, however, a unique context for examining the issue of environmental sustainability in organizations, given that environmental concerns, which are embodied in legislation and formal associations, are a relatively recent phenomenon here when compared to countries of northern Europe, and are externally driven [41]. In terms of its implications for management, this research points above all to the need for firms to implement a green human resources management system, as well as strategies for organizational identification which better reflect

pro-sustainability organizational values, with positive effects on employee work engagement.

This research is limited by its exploratory nature and its dependence on a particular context, which prevents generalization of its conclusions. Future research may explore the impact of other green HRM practices (such as performance appraisal) in work engagement and include the moral aspect in surveying the perceived organisational rationale for sustainability.

Acknowledgement

The authors gratefully acknowledge financial support by FCT (Fundação para a Ciência e Tecnologia) (Portugal), national funding through research grant UIDB/04521/2020.

References

- [1] M. Guerci, A. Longoni and D. Luzzini, Translating stakeholder pressures into environmental performance: The mediating role of green HRM practices, *The International Journal of Human Resource Management* 27 (2016) (2) 262-289.
- [2] C. M. Mathapati, Green HRM: A strategic facet, *Tactful Management Research Journal* 2 (2013) (2) 1-6.
- [3] J. Tosti-Kharas, E. Lamm and T. E. Thomas, Organization or environment? Disentangling employees' rationales behind organizational citizenship behavior for the environment, Organization & Environment 30 (2017) (3) 187-210.
- [4] A. Glavas and L. N. Godwin, Is the perception of "Goodness" good enough? Exploring the relationship between perceived corporate social responsibility and employee organizational identification, *Journal of Business Ethics* 114 (2013) (1) 15-27.
- [5] E. Lamm, J. Tosti-Kharas and C. E. King, Empowering employee sustainability: Perceived organizational support toward the environment, *Journal of Business Ethics* 128 (2015) (1) 207-220.
- [6] Y. Zhang, Y. Guo and A. Newman, Identity judgements, work engagement and organizational citizenship behavior: The mediating effects based on group engagement model, *Tourism Management* 61 (2017) (Supplement C) 190-197.
- [7] B. Schneider, A. B. Yost, A. Kropp, C. Kind and H. Lam, Workforce engagement: What it is, what drives it, and why it matters for organizational performance, *Journal of Organizational Behavior* (2017) 1-19.
- [8] S. Ren, G. Tang and S. E. Jackson, Green human

- resource management research in emergence: A review and future directions, *Asia Pacific Journal of Management* 35 (2018) (3) 769-803.
- [9] L. Zibarras and P. Coan, HRM practices used to promote pro-environmental behavior: A UK survey, *The International Journal of Human Resource Management* 26 (2015) (16) 2121-2142.
- [10] W. S. Renwick, T. Redman and S. Maguire, Green human resource management: A review and research agenda, *International Journal of Management Reviews* 15 (2013) (1) 1-14.
- [11] D. Bangwal and P. Tiwari, Green HRM: A way to greening the environment, *IOSR Journal of Business and Management* 17 (2015) (12) 45-53.
- [12] R. Khurshid and M. A. Darzi, Go green with green human resource management practices, *International Journal of Research in Commerce & Manaement* 7 (2016) (1) 19-21.
- [13] T. S. Behrend, B. A. Baker and L. F. Thompson, Effects of pro-environmental recruiting messages: The role of organizational reputation, *Journal of Business Psychology* 24 (2009) 341-350.
- [14] S. M. Gully, J. M. Phillips, W. G. Castellano, K. Han and A. Kim, A mediated moderation model of recruiting socially and environmentally responsible job applicants, *Personnel Psychology* 66 (2013) (4) 935-973.
- [15] J. Story, F. Castanheira and S. Hartig, Corporate social responsibility and organizational attractiveness: Implications for talent management, *Social Responsibility Journal* 12 (2016) (3) 484-505.
- [16] N. Govindarajulu and B. F. Daily, Motivating employees for environmental improvement, *Industrial Management & Data Systems* 104 (2004) (4) 364-372.
- [17] G. M. Perron, R. P. Côté and J. F. Duffy, Improving environmental awareness training in business, *Journal of Cleaner Production* 14 (2006) (6-7) 551-562.
- [18] G. Mandip, Green HRM: People management commitment to environmental sustainability, *Research Journal of Recent Sciences* 1 (2012) 244-252.
- [19] S. Ahmad, Green human resource management: Policies and practices, *Cogent Business & Management* 2 (2015) 1-13.
- [20] C. A. Ramus, Encouraging innovative environmental actions: What companies and managers must do, *Journal* of World Business 37 (2002) (2) 151-164.
- [21] M. D. Vidal-Salazar, E. Cordón-Pozo and V. Ferrón-Vilchez, Human resource management and developing proactive environmental strategies: The influence of environmental training and organizational learning, Human Resource Management 51 (2012) (6) 905-934.
- [22] A. Longoni, R. Golini and R. Cagliano, The role of new

- forms of work organization in developing sustainability strategies in operations, *International Journal of Production Economics* 147 (2014) 147-160.
- [23] S. E. Jackson, D. W. S. Renwick, J. C. Jabbour and M. Muller-Camen, State-of-the-art and future directions for green human resource management: Introduction to the special issue, *German Journal of Research in Human Resource Management* 25 (2011) 99-116.
- [24] E. Fernández, B. Junquera and M. Ordiz, Organizational culture and human resources in the environmental issue, *International Journal of Human Resource Management* 14 (2003) (4) 634-656.
- [25] J. Dumont, J. Shen and X. Deng, Effects of green HRM practices on employee workplace green behavior: The role of psychological green climate and employee green values, *Human Resource Management* 56 (2017) (4) 613-627.
- [26] D. K. Peterson, The relationship between perceptions of corporate citizenship and organizational commitment, *Business & Society* 43 (2004) (3) 296-319.
- [27] A. Glavas and S. K. Piderit, How does doing good matter? Effects of corporate citizenship on employees, *The Journal of Corporate Citizenship* 36 (2009) 51-70.
- [28] B. E. Ashforth, S. H. Harrison and K. G. Corley, Identification in organizations: An examination of four fundamental questions, *Journal of Management* 34 (2008) (3) 325-374.
- [29] F. Mael and B. E. Ashforth, Alumni and their alma mater: A partial test of the reformulated model of organizational identification, *Journal of Organizational Behavior* 13 (1992) (2) 103-123.
- [30] B. L. Rich, J. A. Lepine and E. R. Crawford, Job engagement: Antecedents and effects on job performance, *Academy of Management Journal* 53 (2010) (3) 617-635.
- [31] M. Karanika-Murray, N. Duncan, H. M. Pontes and M. D. Griffiths, Organizational identification, work engagement, and job satisfaction, *Journal of Managerial Psychology* 30 (2015) (8) 1019-1033.
- [32] W. B. Schaufeli, M. Salanova, V. González-Romá and A.

- B. Bakker, The measurement of engagement and burnout: A two sample confirmatory factor analytic approach, *Journal of Happiness Studies* 3 (2002) (1) 71-92.
- [33] W. B. Schaufeli and A. B. Bakker, Job demands, job resources, and their relationship with burnout and engagement: A multi-sample study, *Journal of Organizational Behavior* 25 (2004) (3) 293-315.
- [34] W. H. Macey and B. Schneider, The meaning of employee engagement, *Industrial and Organizational Psychology* 1 (2008) (1) 3-30.
- [35] A. B. Bakker and E. Demerouti, The Job Demands Resources model: State of the art, *Journal of Managerial Psychology* 22 (2007) (3) 309-328.
- [36] W. Kim, C. H. Park, J. H. Song and S. W. Yoon, Building a systematic model of employee engagement: The implications to research in human resource development, in: J. Wang & J. Gedro (Eds.), Conference Proceedings of the Academy of Human Resource Development, St. Paul, MN: Academy of Human Resource Development, 2012, pp. 3916-3949.
- [37] M. Tims, A. B. Bakker, D. Derks and W. van Rhenen, Job crafting at the team and individual level, *Group & Organization Management* 38 (2013) (4) 427-454.
- [38] A. Mäkikangas, K. Aunola, P. Seppälä and J. Hakanen, Work engagement-team performance relationship: shared job crafting as a moderator, *Journal of Occupational and Organizational Psychology* 89 (2016) (4) 772-790.
- [39] R. Chaudhary, Can green human resource management attract young talent? An empirical analysis, *Evidence-based HRM: A Global Forum for Empirical Scholarship* 6 (2018) (3) 305-319.
- [40] C. Thompson and J. B. Gregory, Managing millennials: A framework for improving attraction, motivation, and retention, *The Psychologist-Manager Journal* 15 (2012) (4) 237-246.
- [41] V. Soromenho-Marques, O Futuro Frágil: Os Desafios da Crise Global do Ambiente, Mem Martins, Publicações Europa-América, 1998.