

## Article

# Cross-Cultural Adaptation of a Questionnaire Measuring Organizational Citizenship Behavior towards the Environment

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**Abstract:** Translation, adaptation, and validation of instruments for cross-cultural investigation requires a rigorous methodological procedure that should be carefully planned to deliver instruments with adequate reliability and validity. This process was applied to a questionnaire measuring Organizational Citizenship Behavior toward the Environment (OCBE), Organizational Identification (OI), Environmental Responsibility (ER), and Green Human Resources Management (GHRM) in Portuguese and Slovak organizations. Several methodological procedures for cross-cultural adaptation and validation of questionnaires were analyzed, most of which used independent translators, experts' analysis, and backward translation to the original language. In the present study, a procedure adapted from Beaton et al. (2000) was applied successfully, and the blind backward translations; expert committee; and the two pretests to assess content validity, functional equivalence, and clarity proved to be worthy. The psychometric properties were measured using a sample from Portugal (N = 122) and Slovakia (N = 269). Although employees were perceiving neither a strong environmental responsibility of their organizations nor strong green human resources management, they identified themselves with the organizations and engaged in OCBEs. Comparing both countries, the factorial structure was remarkably similar, highlighting the eco-helping actions and eco-civic engagement of OCBEs. Comparing both countries, the factorial structure was remarkably similar, highlighting the eco-helping actions and eco-civic engagement of OCBEs. The results indicated that the translated instrument was functionally equivalent to the original one, valid (scale CVI/Ave > 0.83), and reliable (Scale Alpha > 0.733) for evaluating the effect of employee practices and organization management in promoting and supporting environmental sustainability.

**Keywords:** cross-cultural adaptation; translation; organizational citizenship behavior toward the environment; organizational identification; environmental responsibility; green human resource management; Portugal; Slovakia



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## 1. Introduction

The importance of organizational environmental performance lies in its impact on the well-being of the planet, as well as the long-term sustainability and success of the business. Companies have reasons highlighting the significance of prioritizing and improving organizational environmental performance, such as sustainability and longevity, cost savings and efficiency, market leadership and reputation, risk mitigation, innovation and adaptability, employee engagement and talent attraction, investor confidence, and global supply chain resilience. Organizational environmental performance is not only an ethical imperative, but also a strategic necessity. It ensures the responsible use of resources, reduces negative

impacts on the environment, and positions businesses for long-term success in a world where sustainability is increasingly intertwined with economic and social considerations.

Environmental performance can be evaluated by indicators such as low environmental emissions, pollution prevention, waste minimization, and recycling activity (Lober 1996). In this scenario of environmental performance, employee behavior is central, and one of the concepts researched is OCBE. Daily et al. (2009) argue that OCBEs are discretionary and non-rewarded or required acts practiced by employees within the organization which are directed toward environmental improvement. If HRM contributes to creating an organizational setting that supports environmental performance, companies should prepare employees. According to Wright et al. (2001), the Strategic Human Resources Management (SRHM) finality is to manage competence in knowledge, skills, and abilities, among other things, and to direct behaviors by encouraging certain desirable behaviors on the job. In fact, the significance of knowledge management has risen as a crucial factor for sustainability within competitive sectors. Knowledge has evolved into an exceptionally valuable resource in line with its ability to foster innovation and uphold competitive sustainability (Figueiredo et al. 2023). Also, companies that prioritize human resource development through organizational culture foster adaptability, flexibility, and a willingness to embrace risk and change (Ferreira-da-Silva et al. 2020). Therefore, in companies with this type of concern for the management of people, it is easier to lead employees in the expected direction, as occurs with sustainable behaviors.

Studies indicate that employees tend to feel a greater sense of identification with green management practices when they are perceived as beneficial for the employees themselves (Afshar Jahanshahi et al. 2021), as well as for the business, environment, and society. Therefore, employee environmental actions are particularly important for organizations wishing to develop their environmental sustainability practices. These actions are frequently defined as behaviors that promote employee engagement and contribute to environmental sustainability (Ones and Dilchert 2012; Sabbir and Taufique 2022).

In this context, to measure the level at which companies are, it is necessary to use measurement instruments, such as questionnaires. Questionnaires are not always available in the official language of the country that intends to apply the scale. Therefore, the translation and validation of the questionnaire is necessary, which is the direction of the research. Furthermore, the validation of this questionnaire aimed at employees will allow future investigations to use a consistent instrument that uses the most approximate concepts (OCBE, OI, ER, GRHM) to legitimize investigations that can be used by other researchers and by companies in planning future actions that cover the topic in question.

Portugal and Slovakia, as members of the European Union, comply with EU directives on environmental responsibility (Eur-Lex 2021). Although the culture, language, and many other aspects of the two countries are unique due to their geographical locations and histories, both countries have unique nature and protected areas with a large number of endemics. Portugal is known for its national parks and reserves, as well as the protection of marine ecosystems. Slovakia has a varied landscape, including mountains and lakes, with designated parks and protected areas. At the same time, they are among the countries with the richest reserves of drinkable water and mineral springs. For this reason, the environmental behavior of residents is among the priorities. These countries can be models for each other in numerous environmental areas. For example, Portugal is among the leaders in Europe when it comes to the use of renewable energy sources. The country has made significant progress in wind and solar power, reducing its dependence on fossil fuels (Bairrão et al. 2023). Slovakia is also committed to increasing the share of renewable energy sources. The Slovak authorities have made it a priority to increase the share of renewable energy sources in electricity consumption. The country has easily achieved the Union's target of 14%, thanks to hydropower and biomass energy (Kochanek 2021). On the other hand, Portugal has various programs to promote waste recycling, but some areas may face challenges in terms of waste management, while Slovakia has a systematic approach to waste recycling, with a built-in infrastructure for sorting and recycling. According to

[Khomenko et al. \(2023\)](#), both Portugal and Slovakia can be included in a common cluster in waste sorting together with the Czech Republic, Hungary, Lithuania, Poland, Spain, and Estonia. Recycling and landfilling are the main methods of waste management in these countries; they dispose of around 80% of waste. On average, 35% of waste is recycled, 18.5% is incinerated, and 43.5% is landfilled. These common features were the main motive for the effort to compare the environmental behavior of employees in organizations in Portugal and Slovakia.

Scale translation is a fundamental practice in scientific studies that seek to evaluate phenomena in different cultural and linguistic contexts. The justification for using this approach lies in the theoretical and practical contribution to the field of environmental management. In terms of theoretical implications, the study contributes to the known literature on OCBE, IO, ER, and GHRM by providing empirical evidence of their validity and reliability in two different cultures. From a practical point of view, the study can help specialists and managers in designing and implementing effective strategies to improve the environmental behavior of organizations in both countries.

The present research aims to investigate the complex issue of translation and cross-cultural adaptation of a questionnaire to evaluate organizational citizenship behavior concerning the environment. In this context, the functional equivalence, content validity, reliability, and validity of the studied constructs were assessed for the Portuguese and Slovak cultural contexts. Therefore, the central question that guides this study is: how do these adaptations impact the comparison of results on environmental organizational citizenship behavior between these two cultural contexts? This question seeks to explore the implications of the translation and cross-cultural adaptation of this instrument in different contexts, providing valuable insights for understanding cultural nuances and their influences on organizational behavior concerning the environment.

Considering this context, the objective of this study is to translate, adapt, and validate a questionnaire designed to measure several factors influencing organizational environmental performance within Portuguese and Slovakian contexts. Moreover, it is worth highlighting that there is a scarcity of research within Portugal and Slovakia regarding the cultural adaptation of such a questionnaire to fit their specific country contexts. Therefore, this research aims to fill this gap by not only undertaking the translation and adaptation process, but also examining the implications of these adaptations on the comparison of environmental organizational behaviors between these distinct cultural settings.

The following tasks were established for this study: (a) to cross-culturally adapt the questionnaire for employees to the Portuguese and Slovak contexts; (b) to evaluate the functional equivalence and the content validity of the instrument using target participants in a relevance pretest and a clarity pretest; (c) to analyze the data to identify factors and behaviors and assess the reliability and validity of the studied constructs; and (d) to compare the results in the two different cultural contexts.

In seeking to answer our research question, previous research that translated and validated the scales was considered. We can mention the works carried out by [Costa et al. \(2022\)](#); [Boiral and Paillé \(2012\)](#), and [de Andrade et al. \(2018\)](#), for example. In the present study, a procedure was adapted from [Beaton et al. \(2000\)](#) and [Acquadro et al. \(2008\)](#).

Concerning the variables used in this study, we refer to a study from [Freire and Pieta \(2022\)](#) that used scales with variables such as green HRM, OI, job satisfaction, and OCB. This study presents evidence regarding the positive effects of green HRM on employees' OCB, as well as on the mediating role of job satisfaction. The study followed a "behavioral perspective" ([Shen et al. 2018](#)) of green HRM practices and focused on the impact of sustainable HRM practices on employees' behavior and well-being. Regarding the OCBE variable, a study by [Paillé et al. \(2014\)](#) aimed to understand the relationship between SHRM and environmental performance and identified that OCBE mediates the process by which SHRM impacts environmental performance. Furthermore, [Boiral and Paillé \(2012\)](#) were the first authors to publish a validated OCBE measurement scale, and its application

showed three main behavior types, which were: eco-initiatives, eco-civic engagement, and eco-helping.

The translation and cross-cultural adaptation proved to be a very useful methodology to produce instruments with good functional equivalence, relevancy, and validity in terms of contents. After correlation analysis, as well as exploratory (EFA) and confirmatory (CFA) factor analyses, the results highlighted the reliability and validity of the instruments to assess the impact of employee and management practices in promoting and supporting environmental sustainability. When comparing data between Portugal and Slovakia, a notable similarity was observed in the structures of all investigated constructs (OCBE, OI, ER, and GHRM), in terms of the ratings and extracted latent variables.

### 1.1. Organizational Citizenship Behavior toward the Environment

Organizational Citizenship Behavior toward the Environment is “discretionary acts by employees within the organization that are directed toward environmental improvement; these actions are not rewarded or required by the organization” (Daily et al. 2009, p. 252). The basis of this behavior is to be discrete, and, according to Organ (1988), discretionary acts suggest that individuals are free to act or not to act. Discretionary actions cannot be obtained, for example, through the elements of contractual employment or the threat of punishment. The OCBE reflects employee willingness to cooperate with one’s company and its members by performing behaviors beyond one’s job duties that benefit the natural environment (Boiral and Paillé 2012). An example of OCBE is when employees propose suggestions to reduce resource and energy consumption or persuade colleagues to conduct their work in other, more environmentally friendly ways (Boiral and Paillé 2012). In the published studies that approach OCBE, it is possible to identify three factor groups: the external employee factors (organization context, leadership, policies, etc.), the demographics, and the internal employee factors (values, awareness, attitudes, social and personal norms, etc.) (Blok et al. 2015; Norton et al. 2014).

OCBE can yield benefits for both individuals and the broader community. Engaging in pro-environmental actions has been associated with increased subjective well-being, satisfaction, and perceived happiness. Moreover, OCBE can positively impact individuals’ health by mitigating the effects of environmental hazards. For instance, natural disasters like heat waves have been linked to elevated morbidity and mortality rates (Honda et al. 2014; Stanke et al. 2013), while environmental concerns can contribute to feelings of depression, guilt, and despair (Doherty and Clayton 2011). In this scenario, active participation in OCBE can indirectly alleviate the adverse effects of environmental degradation on human health by collectively contributing to environmental preservation efforts. Moreover, adopting pro-environmental behaviors like using eco-friendly transportation methods, such as cycling to work (Robertson and Barling 2017), can positively influence both physical and mental well-being. Another illustration is assisting colleagues in embracing environmental initiatives at the workplace, like demonstrating how to print documents double-sided. Such actions enable others to experience the beneficial outcomes associated with engaging in OCBE.

### 1.2. Organizational Identification

In an early conceptual paper, Foote (1951) argued that human beings tend to identify with “fellows in groups”, that they categorize the social world around them to “regularize their doings”, and that “these categorizations of experience motivate behavior through the necessary commitment of individuals in all situations”. Brown (1969) defines organizational identification as a self-defining response, set in a specific relationship between the individual and the organization. This involves four aspects, including attraction to the organization, consistency of organizational and individual goals, loyalty toward the organization, and reference of self to organizational membership.

These initiatives, aimed at creating a positive external image for the organization (Chaudhary 2020), often result in fostering a stronger sense of organizational identifica-

tion. Drawing from social identity theory (Tajfel 1974), individuals are inclined to align themselves with an organization when they perceive it as having high prestige and a favorable image (Ashforth and Mael 1989). Employees belonging to a prestigious organization with a strong environmental reputation tend to view the organization's performance positively. This fosters a sense of belonging among employees, ultimately leading to organizational identification. Viewed through this lens, the research conducted by Bauman and Skitka (2012) suggests that responsible organizations contribute to heightened levels of organizational identification among employees, as this enhances the company's reputation.

According to Pratt (1998), organizational identification occurs when an individual's beliefs about his or her organization become self-referential or self-defining. This means involving the integration of "beliefs about one's organization into one's identity" and that "identification explicitly refers to the social aspects of a person's identity" (Pratt 1998, p. 172). In addition, Van Dick (2001) defines organizational identification as the links to social identity theory and self-categorization theory. This involves main sub-concepts such as the affective component (emotional attachment to the group); cognitive component (knowledge of being a member); evaluative component (positive evaluation of the organization, e.g., pride); and behavioral (conative) component, including actual behavior—more specifically, "participation in action". One of the factors that most influences organizational identification is leadership, namely, transformational leadership (Bose and Patnaik 2015). Transformational leadership has been indicated, in several studies, as one of the most effective forms of leadership in terms of performance, outcomes, and employee attitudes (Magalhães et al. 2022).

Organizational identification means that employees accept the organization's values and goals, and these, consequently, become the individual's values and goals (Edwards 2005). Organizational identification entails employees embracing the values and goals of the organization, which then become integrated into their values and goals (Edwards 2005). The theory of social identity (Tajfel 1974) posits that social identity is rooted in both cognitive recognition (acknowledgment of belonging to an organization) and emotional attachment (alignment with the organization's values/goals). Hence, research suggests that employees who feel a stronger sense of identification with the organization are inclined to exhibit behaviors and attitudes that surpass their role expectations (Van Dick 2001), ultimately contributing to the company's success (Edwards 2005). Consequently, it can be inferred that employees with heightened organizational identification are more likely to actively support the organization's sustainability efforts.

The research question regarding how adaptations impact the comparison of environmental organizational citizenship behavior between two cultural contexts aligns with the Organizational Identification literature. Initiatives aimed at fostering a positive organizational image often lead to stronger employee identification with the organization. Drawing from social identity theory, individuals tend to align themselves with organizations perceived as prestigious and possessing favorable reputations. Employees of prestigious organizations with strong environmental credentials tend to view performance positively, fostering organizational identification. Research by Freire and Gonçalves (2021) supports this idea, suggesting that responsible organizations enhance employee identification, thus boosting the company's reputation. Organizational identification involves employees aligning with the organization's values and goals, rooted in cognitive recognition and emotional attachment. Employees with stronger organizational identification tend to exceed role expectations, contributing to the company's success. Therefore, heightened organizational identification likely drives active support for the organization's sustainability efforts.

### 1.3. Environmental Responsibility

Environmental Responsibility refers to a state in which a person expresses an intention to act toward the remediation of environmental problems, acting not as an individual consumer with his or her own economic interests, but through a citizen–consumer concept of societal–environmental well-being (Stone et al. 1995). Environmentally responsible

behaviors describe the voluntary conduct that goes beyond the employees' formal job descriptions and have a substantial impact on the improvement of the work environment, such as making innovative suggestions to improve the organization's environmental performance, informing management of potentially environmentally irresponsible policies, willing to speak up when policy or rules do not contribute to the achievement of the organization's environmental goals, and frequently suggesting revisions to work practices to achieve the organization's environmental objectives (Paillé and Boiral 2013).

The relevance of employees' engagement in environmentally responsible behaviors at work was addressed in studies by Paillé and Boiral (2013) and De Roeck et al. (2016). These types of behaviors can contribute positively to energy consumption reduction (Scherbaum et al. 2008) and environmental performance (Singh et al. 2019). Environmentally responsible behaviors can contribute positively to the quality of life of current and future generations (Afshar Jahanshahi et al. 2017). Therefore, encouraging these types of behaviors may eventually lead to better protection of the environment and has the potential to improve societal well-being (Koehler and Hecht 2006). Encouraging desired employee behavior can be effectively achieved through performance appraisal. Indeed, the primary objective of performance appraisal within organizations is, or should be, to enhance employee engagement, facilitate the learning process, promote progress, and align with both team and organizational performance (Ferreira-da-Silva et al. 2015). In this regard, Corral Verdugo (2012) believed that environmentally responsible behavior is a type of positive behavior at work that originates mostly from positive dispositional factors. In fact, there are plenty of arguments that individual behavior contributes to corporate greening (Boiral 2009).

The research question regarding how adaptations impact the comparison of environmental organizational citizenship behavior between two cultural contexts intersects with the literature on Environmental Responsibility. Environmental Responsibility encompasses behaviors that extend beyond job descriptions, fostering a proactive stance toward environmental improvement within organizations. Studies (Paillé and Boiral 2013; De Roeck et al. 2016) have highlighted the relevance of employees' engagement in environmentally responsible behaviors, which can positively impact energy consumption reduction and environmental performance. Moreover, these behaviors contribute to the quality of life for current and future generations, indicating potential for better environmental protection and societal well-being. Encouraging such behaviors aligns with the primary objectives of performance appraisal, enhancing employee engagement and organizational performance. Consequently, fostering environmentally responsible behavior not only enhances organizational sustainability, but also promotes societal and environmental well-being.

#### 1.4. Green Human Resources Management

According to Parente and Fischer (2014), research has identified sustainability as a practice capable of generating organizational value and attracting and retaining stakeholders. The Triple Bottom Line (TBL) approach emphasizes the three main pillars of sustainability: economic, political, and environmental (Mignaqui 2014). The TBL means that organizations must adjust their different departments to guarantee the fulfillment of environmental goals. To be sustainable, organizations should adjust their strategy, and the HRM system must look and become more green-based to adopt practices with this approach (Wilkinson et al. 2001). While the concept of green HRM practices is relatively recent (Ren et al. 2018; Jackson and Seo 2010), the imperative to decrease carbon emissions and minimize resource wastage through responsible behavior has garnered escalating attention in the literature (Moin et al. 2020). This underscores the crucial role of employees' commitment to achieving organizational sustainability goals (Ahmad and Schroeder 2003). Hence, organizations can utilize HRM to effectively deliver and implement environmentally sustainable policies (Renwick et al. 2013). Some studies have identified a range of green HRM practices. For example, for green HRM to be an effective force in eliciting employee green behavior in the workplace, it should ensure that the firm has recruitment strategies aimed at attracting employees who have similar environmental values and beliefs as the organization; development, perfor-

mance, and reward practices that take into account individual environmental performance; and effective training programs that develop environmental awareness, attitudes, skills, and knowledge (Daily and Huang 2001; Renwick et al. 2013).

This approach to HRM is called Green HRM (GHRM), and emphasizes the activities developed by the HRM system to increase employees' environmental-supporting behaviors (Opatha and Arulrajah 2014). Ren et al. (2018) defined GHRM as a phenomenon relevant to understanding the relationships between organizational activities that impact the natural environment and the design, evolution, implementation, and influence of HRM systems (Renwick et al. 2013). GHRM refers to all human resource activities, from recruitment and selection of employees, through their subsequent training, development, management, and evaluation, to their remuneration and recognition for their environmental behavior (Peerzadah et al. 2018). Renwick et al. (2013, p. 1) understand that Green HRM practices refer to "HRM aspects of Environmental management" which "promote ecological responsiveness to the sustainable development of resources and involving employees' commitment and engagement towards the organization's goal and practices" (Singh and Nath 2020, p. 1483).

Green Human Resources Management aims to implement practices that promote the development of environmental skills and provide employees with the possibility of becoming involved in "green" initiatives (Shen et al. 2018). Thus, GHRM refers to the use of human resource management principles that include environmentally sustainable practices within human resources and allow for increased employee engagement in sustainability issues. With the help of such procedures, the company can subsequently generate higher efficiency and environmental performance and reduce the carbon footprint of its employees. Therefore, we can define GHRM as the process of using human resources in the workplace for the purpose of achieving goals so that this process contributes to environmental sustainability (Mwita 2019).

Businesses transitioning to green practices help to create a more sustainable culture that leads to increased efficiency, lower costs, and, at the same time, greater employee satisfaction. The promotion of ecological culture subsequently leads to improved sales and lower costs. In addition to higher employee satisfaction, better relationships with stakeholders, and employee retention, companies implementing GHRM also have a better sense of social responsibility (Awwad Al-Shammari et al. 2022). In sum, GHRM has the potential to contribute positively to both employee well-being and improved organizational performance.

The research question regarding how adaptations influence the comparison of environmental organizational citizenship behavior between cultural contexts intersects with the literature (Ren et al. 2018) on GHRM. GHRM emphasizes aligning HRM practices with environmental sustainability goals, integrating environmental considerations into various HRM processes. It aims to cultivate employees' environmental awareness, attitudes, skills, and engagement towards sustainable practices. By focusing on recruitment strategies for environmentally aligned candidates and providing effective training programs, GHRM fosters employee involvement in "green" initiatives (Shen et al. 2018). Implementing GHRM not only enhances environmental performance and efficiency, but also leads to greater employee satisfaction, stakeholder relationships, and social responsibility. Therefore, considering GHRM practices is crucial in understanding how HRM influences environmental organizational citizenship behavior across cultural contexts.

### *1.5. Translation and Cross-Cultural Adaptation*

A good procedure for developing and using assessment tools is crucial for several reasons: validity and reliability, equivalence, fairness, accurate results, legal and ethical considerations, relevance, cost-effectiveness, continuous improvement, transparency, standardization, and accountability. Beaton et al. (2000) and their colleagues have contributed significantly to developing guidelines for the cross-cultural adaptation of health-related quality-of-life measures. They introduced a comprehensive process that involves forward

and backward translations, expert reviews, and pre-testing. Therefore, a good procedure for developing and using assessment tools is essential for ensuring and contributing to the overall quality and credibility of the assessment process. Contributions from [Hambleton \(1996\)](#) are also significant to the field of educational and psychological testing. His work addresses issues related to test adaptation and validation across different cultures and languages.

The process of translating and adapting questionnaires from one cultural context to another involves much more than converting the items from the source language to the target language. The questionnaire must be equivalent to the original, considering the new cultural context where it will be applied. There are many methodologies in the literature ([Beaton et al. 2000](#); [Gjersing et al. 2010](#); [Sousa and Rojjanasrirat 2011](#)) and reviews evaluating their strategies ([Acquadro et al. 2008](#); [Erkut 2010](#); [Epstein et al. 2015](#)). In general, this process includes the following steps: forward translation, backward translation, analysis of translation, pretesting, and evaluation of the psychometric properties of the final version. These steps involve several strategies necessary to guarantee the quality of the final instrument, involving blind translations, language experts, experienced researchers, and procedures to examine content validity and reliability ([Beaton et al. 2000](#)).

To achieve different types of equivalence between the original and the translated questionnaire, different methodological strategies need to be used. [Herdman et al. \(1998\)](#) defined six different types of equivalence that are still being widely applied by the research community ([Epstein et al. 2015](#); [Cruchinho et al. 2023](#)). These different types are defined as being conceptual, item, semantic, operational, measurement, and functional equivalence. Conceptual equivalence between both versions of the same questionnaire is achieved when the measured domains are identified as equally conceptualized in both cultures, thus legitimating its adaptation to the new target culture. Item equivalence is related to the relevance of the measured domains across different cultures. For example, items asking about compliance with waste legislation in the organizations will not be relevant in cultures where the legislation has not yet been developed. Semantic equivalence is achieved when the translated items possess the same semantic meaning in the original language; thus, the item words must be carefully chosen so the target population will understand them properly. The words must be related to a clear concept, avoiding parallel connotative meanings, idiomatic expressions, or emotional points of view. Therefore, the translation of a questionnaire is much more than a technical exercise of word correspondence between the two languages. The translators must think carefully in the chosen words so the item's message will be as clear and accurate as possible to the target population. Operational equivalence is achieved when the questionnaire instructions, administration mode, and measurement methods do not affect the results. For example, sending the questionnaires to employees by email is not appropriate if they do not have easy access to computers, or if the measurement methods, like the response options, are not similarly understood by participants with different levels of literacy. Measurement equivalence is achieved when the different language versions of the same questionnaire have acceptable psychometric properties that may be measured by construct validity and reliability. Functional equivalence can be defined as the extent to which an instrument is measuring what it is supposed to in the new target population. It is "intended to highlight the fact that all parts of the process outlined here are important in achieving cross-culturally equivalent questionnaires" ([Herdman et al. 1998](#), p. 331).

Validity and reliability are important psychometric properties that must be evaluated while adapting scales to new cultures and target populations. Content validity is related to the extent to which items are relevant to, or representative of, the construct that is being measured, thus determining whether it measures what it is intended to measure. There are different measures described in the literature to evaluate the content validity, such as the widely used Content Validity Index (CVI) and the modified Kappa ([Polit et al. 2007](#); [Yusoff 2019](#)). Both are indexes of inter-rater agreement calculated using the relevance degrees attributed to each item composing the scales. The relevance degree is measured from

1 = not relevant to 4 = highly relevant. CVI has the advantages of focusing on the agreement consensus and giving information about the relevance of each item (I-CVI) or of the scale (S-CVI). This scale index can be calculated using two different techniques, i.e., averaging all I-CVI (S-CVI/Ave) or counting the number of items that receive Universal Agreement (UA) among all experts (S-CVI/UA), with UA being achieved when all experts consider an item relevant. Even so, these indexes fail to adjust for chance agreement, because the choices are shrunk to a dichotomy of relevant/not relevant by collapsing the 4-point ratings. This problem is solved by the modified kappa statistic ( $k^*$ ), (Polit et al. 2007), and is calculated as follows:

$$k^* = \frac{(I - CVI) - p_c}{1 - p_c} \quad (1)$$

where  $p_c$  is the probability of chance agreement, defined as

$$p_c = \frac{N!}{A!(N - A)!2^N} \quad (2)$$

where  $N$  is the number of experts and  $A$  is the number agreeing on good relevance. The thresholds for these indexes are dependent on the number of experts working in the relevance assessment (Polit et al. 2007).

Missing data in self-report instruments, such as those used in the present study, may present a problem because most statistical analysis requires complete data sets, and the default procedure in many statistical software is to erase the incomplete cases. Moreover, the data reduction can impact the validity of research findings by biasing the data and hiding certain results (Fox-Wasylyshyn and El-Masri 2005). This is why it is important to investigate the extent and the pattern of the missing values. They can result from questionnaire administration procedures or data collection, and in this case, the corresponding data must be eliminated. If the missing values occur due to the intrinsic nature of the study phenomena, it should be evaluated whether they are random or systematic (Fox-Wasylyshyn and El-Masri 2005; Pestana and Gageiro 2014). The systematic missing values or NMAR (not missing at random) probably characterize certain population segments that refuse to answer, and, as consequence, the results from the analysis may be biased if they are excluded. NMAR is only dependent on the unobserved missing value. If the missing values are random, they are classified as MCAR (missing completely at random) or MAR (missing at random). In the first pattern, MCAR, the missing value is independent from all participant characteristics, and the data without these missing are representative of the original sample. The latter pattern, MAR, is solely dependent on the other observed covariates, while the NMAR also depends on the incomplete information itself (Fox-Wasylyshyn and El-Masri 2005; Vesin et al. 2013).

There have been several techniques proposed to assess the missing patterns between MCAR and MAR, but they do not allow NMAR assumptions to be tested (Vesin et al. 2013). One technique is the bivariate correlation between the missing data dummy code (missing value = 0; non-missing value = 1) and other variables in the database using Pearson or Spearman correlations for metric data (verifying the assumption of data normality or not, respectively). If the correlations are strong and significant, then the missing values are not MCAR. Another technique involves comparing variable means of metric data between the respondents and non-respondents using the  $t$ -test or Wilcoxon, or even Chi-square for categorical data (Fox-Wasylyshyn and El-Masri 2005; Vesin et al. 2013). If a statistically significant difference between the two groups is found, the MCAR pattern is ruled out. There is also another accurate technique, logistic regression modeling, in which the missing value dummy code is the dependent variable. In this case, if the missing values are predicted by any of the other variables, MCAR is excluded.

There are many reported techniques in the literature to manage the missing values using data deletion or imputation (Fox-Wasylyshyn and El-Masri 2005) depending on the extent and pattern of the missing values. Listwise or pairwise deletion are common procedures already implemented in software and applied depending on the specific statistical

analysis assumptions. The listwise procedure removes all cases that have at least one missing value, and the entire analysis uses the same case number. The problem is that the data dimension can decrease more than expected, thus making it impossible to use certain statistical procedures. The pairwise procedure will exclude the cases if the missing values are in variables that are being used in a statistical analysis; if not, they are included (Pestana and Gageiro 2014; Zygmunt and Smith 2014). There is another missing data estimation approach used in structural equation modeling packages called full information maximum likelihood (FIML), whose estimates are based on the information of all cases. Enders and Bandalos (2001, p. 430) showed in his simulation studies that “FIML estimation was superior across all conditions of the design” when compared to the other listwise or pairwise techniques, even in the presence of MAR and MCAR.

Imputation techniques are related to a replacement of the missing values by new values; one of the most common techniques is replacement by a series mean of the indicator (Latif 2023). This technique may be beneficial if there are no excessive numbers of missing values, although it may reduce the data variance, fails to account for the individual differences of the respondent, and may create new variable correlations. SPSS (IBM, version 28) has already predefined other imputation techniques, such as replacement by mean of nearby points, median of nearby points, linear interpolation, and linear trend at point.

As referred to in the study of Fox-Wasylyshyn and El-Masri (2005), if the missing data represent less than 10%, the extension of the missing data is not significant for the variable data and the missing data should be treated. However, for missing percentages higher than 40%, the recommendation is to remove the corresponding variables. Other studies (Hair et al. 2010) have shown that the missing values can be treated by imputation and still have good parameter estimates.

Reliability and validity are two psychometric properties that are going to be assessed in the analysis of possible underlying variables in the dataset through exploratory and confirmatory factorial analysis. Convergent validity is assessed by average variance extracted (AVE), which refers to the extent to which items that are supposed to measure the same latent variable/construct are indeed related to each other. AVE is equal to the squared loadings sum divided by the number of items in the construct. Cronbach’s alpha is a measure of internal consistency reliability and assesses the extent to which a set of items within a scale or questionnaire measures the same underlying construct consistently (Hair et al. 2010).

## 2. Methodology

### 2.1. Study Design

This study involves cross-sectional research, in which a questionnaire for employees was developed to target the OCBE in the Portuguese and Slovak cultural context. The instrument was also tested, and the psychometric properties were evaluated. The methodology of the translation and cross-cultural adaptation of the scales was based on the studies of Beaton et al. (2000) and Acquadro et al. (2008), which are very complete and rigorous and are still used in recent literature.

After translation, the scales were evaluated in meetings of a committee of experts in different scientific fields of interest, translators, and language professors. The updated questionnaire was then sent to six experts to assess the relevance of each item, the language, and the adopted response scales, and then to participants from the academic community and organizations human resources to improve item clarity.

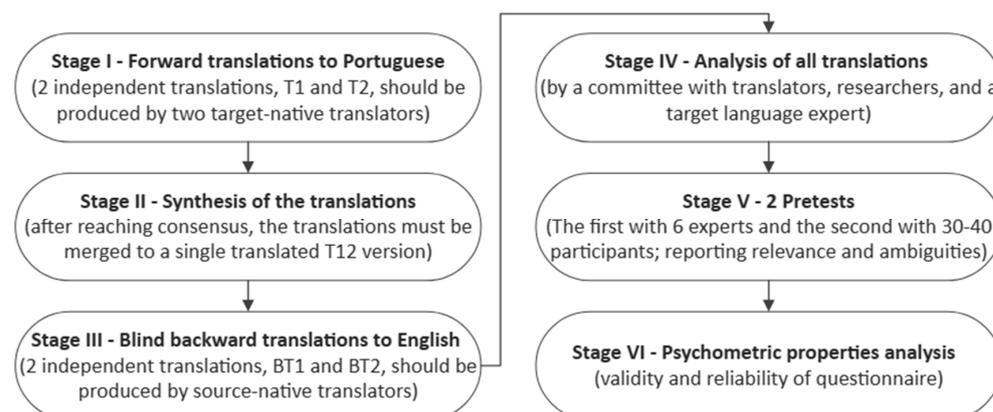
In the final stage, a cross-sectional study was carried out to assess the psychometric properties of both questionnaires using exploratory factorial analysis and confirmatory factorial analysis. This section may be divided by subheadings. It should provide a concise and precise description of the experimental results, their interpretation, as well as the experimental conclusions that can be drawn.

## 2.2. Questionnaire Description

This study was conducted in Portugal and Slovakia using a questionnaire for employees composed of constructs to measure Organizational Citizenship Behavior toward the Environment (OCBE), Organizational Identification (OI), Environmental Responsibility (ER), and Green Human Resources Management (GHRM), as indicated in Appendix A. OCBE was adapted from Paillé et al. (2014), and has 11 items regarding the environmental awareness and behavior of employees in their activities in the organization. A sample item is: “I encourage my colleagues to adopt more environmentally conscious behavior”. OI was adapted from Freire and Pieta (2022), and has 5 items to measure how closely the employee identifies himself with the organization’s values and objectives. A sample item is: “The success of my organization is my success”. ER was adapted from Vlachos et al. (2013) and has 3 items to measure how employees perceive the organization’s responsibility towards the environment. A sample item is: “My organization engages in environmentally responsible initiatives because it feels morally obligated to help”. GHRM was adapted from Dumont et al. (2017) and has 6 items to measure how employees perceive the human resources management favoring their environmentally behaviors. A sample item is: “My organization considers employees’ workplace green behavior in performance appraisals”.

## 2.3. Translation and Cross-Cultural Adaptation

In the present study, the guidelines and recommendations of Beaton et al. (2000) and Acquadro et al. (2008) were followed and are indicated in Figure 1.



**Figure 1.** Graphic representation of the stages of the process of translation and cross-cultural adaptation of a questionnaire.

In stage I, two translators worked independently to translate the questionnaire from the source language (English) to the target language (Portuguese and Slovak). The translators were bilingual and native in the target language, and one of them familiar with dimensions used in the questionnaire and the target population. Both translators reported the difficulties and uncertainties while translating the questionnaire.

In stage II, a meeting with the researchers of this study and the translators was conducted to produce the final version, merging both stage I versions and including the suggestions of the two translators.

In stage III, blind backward translation, two English-native translators independently produced two English versions of the questionnaire using the version of stage II. These translators did not know the original or source version, and reported the difficulties and uncertainties while translating the questionnaires.

In stage IV, all translations and the reports were analyzed by an expert committee composed by the researchers of this study, the translators, and a language expert. The committee produced a pre-final version of the questionnaire after analyzing all translated versions of the previous stages, as well as the reports from the translators and the experts and participants in the 2 pretests.

In stage V, two pretests were performed. The first one, the relevance pretest, was run to measure the content's validity by asking 6 experts in human resources management, environmental engineering, and statistics to rate the relevance of each item on a 4-point scale (1 = "not at all relevant"; 2 = "somewhat relevant"; 3 = "quite relevant"; and 4 = "highly relevant"). These data were merged to a dichotomous category of not relevant/relevant to assess the content validity. A second pretest, the clarity pretest, was run with 30 to 40 participants from the academic community and the organization's human resources. After answering the questionnaires, all participants were contacted to gather information about their impressions and their understanding of the questionnaire items. The researchers analyzed the collected data and the reported information of the participants and corrected the items in the questionnaire.

In stage VI, the psychometric properties were evaluated using exploratory and confirmatory factorial analysis in a cross-sectional study to identify underlying latent factors, convergent validity, and reliability.

#### 2.4. Participants and Data Collection

The present study was developed using a cross-sectional methodology and non-probabilistic sampling in Portugal and Slovakia. In Portugal, the selected organizations were from the 3rd sector, operating in the national Civil Protection area. These organizations are responsible for ensuring the safety and well-being of the population in case of emergencies, disasters, and other crisis situations. These organizations are organized at both the national and local levels and involve a combination of professional and volunteer employees. First, their CEOs were contacted by email to request authorization to include their organization in this study. Subsequently, emails were sent to employees with the research objectives, the characteristics of data collection, and questionnaire links using Limesurvey software (version 3.24.0+201013). The data were collected from July to December of 2023, and there were 122 collected complete answers to the questionnaire after removing the incomplete cases. In Slovakia, questionnaires were sent to organizations operating in different sectors, data were collected from July to December 2023, and the collected complete responses in the questionnaires numbered 269.

Informed consent was obtained from all subjects involved in the study. Participation was voluntary and confidential to avoid the possible effect of social desirability.

#### 2.5. Statistics

The data from the 2 questionnaires (one in Portugal and another in Slovakia), collected with Limesurvey, were codified and uploaded to SPSS. Preliminary analysis of the data was performed to analyze missing values, descriptive statistics measures, outliers, and normality. After quantifying the missing values, dummy codes (missing value = 0; non-missing value = 1) were calculated for variables with more than 10% missing values to test their patterns. Non-parametric Spearman's rho correlation was calculated between these dummy scores and all other metric and ordinal variables. This correlation is insensitive to distribution asymmetries and outliers, and can be applied to non-normal data. The association is considered acceptable for correlation absolute values higher than 0.3 (Mukaka 2012; Pestana and Gageiro 2014), being considered low (0.30–0.50), moderate (0.50–0.70), high (0.70–0.90), and very high (0.90–1.00) levels of correlation.

The validity of the constructs was assessed with the exploratory factorial analysis (EFA), followed by the confirmatory factorial analysis (CFA). In EFA, it was identified underlying factors or latent variables that explained patterns of correlations among observed variables, merging most of the data information into fewer variables. One of the most common extraction methods is principal component analysis, which is sensitive to non-normality data, although this assumption is not so important for large datasets (Pestana and Gageiro 2014).

There are 3 different criteria to extract factors, although the first one is the most used in the literature (Maroco 2021; Pestana and Gageiro 2014). The first is called the Kaiser

criterion, and suggests the factors' retention if their eigenvalues are greater than 1. The second criterion recommends extracting factors until the inflection point in the scree plot is reached. The last defines that factors must be retained until they explain 50% or more of the total variance extracted.

To assess the EFA model quality, Kaiser–Meyer–Olkin measure (KMO), Bartlett's test of sphericity, and the communalities must be observed. KMO is calculated based on the ratio of the observed correlation coefficients to the partial correlation coefficients, and it is very good (0.90–1.00), good (0.80–0.90), adequate (0.70–0.80), acceptable (0.60–0.70), or mediocre (0.50–0.60) (Maroco 2021; Pestana and Gageiro 2014). Different values were observed in the literature; for example, in Field (2009), values between 0.5 and 0.7 were mediocre, values between 0.7 and 0.8 were good, values between 0.8 and 0.9 were great, and values above 0.9 were superb (Hutcheson and Sofroniou 1999). This indicates that the lower limit of acceptability was 0.5. Bartlett's test of sphericity is used to examine whether the observed variables in a dataset intercorrelate significantly, which is a prerequisite for conducting factor analysis and must be below 0.05.

After obtaining a good factor model for the dataset with EFA, CFA can be applied to confirm its validity. CFA can be also applied to test models validated by other authors. There are several goodness-of-fit indices available in the literature, and there is no agreement on which are the best. Their cut-off values are not always the same and depend on the research area. Comparative Fit index (CFI) compares the fit of the specified model to the fit of a baseline model and considers the sample size. Bollen's Incremental Fit Index (IFI) is used to assess how well a hypothesized model fits the observed data by comparing it with the fit of a null or baseline model. CFI and IFI must be in the range of 0.90–0.95 (acceptable model) or 0.95–1.00 (good model) (Maroco 2021; Pestana and Gageiro 2014). The Root Mean Square Error of Approximation (RMSEA) measures the discrepancy between the observed covariance matrix and the model-implied covariance matrix. The RMSEA values should be 0.00–0.05 for an excellent model, 0.05–0.08 for a good model, and 0.08–0.10 for an acceptable model. If CFI > 0.90, IFI > 0.90, and RMSEA > 0.10, the goodness-of-fit indices are not acceptable and the model must be rejected (Maccallum et al. 1996; Pestana and Gageiro 2014).

Average Variance Extracted (AVE) and Cronbach's alpha assess the convergent validity and the reliability, and should be above 0.5 and 0.7 to indicate satisfactory levels of reliability and validity (Hair et al. 2010; Pestana and Gageiro 2014).

Common Method Variance (CMV) is the bias variance caused only by the measurement method rather than the variance related to the measured dimensions. This may undesirably influence the internal consistency by creating apparent correlations among the variables. CMV influence was evaluated by Harman's one-factor test using the Principal Component Analysis (PCA) with Varimax rotation to check whether a single component did not explain the majority of variance with a 50.0% threshold (Podsakoff et al. 2003).

All statistical methods were performed using SPSS software (version 28.0) and JASP (version 0.18.2) (JASP 2023).

### 3. Results and Discussion

#### 3.1. Translation and Cross-Cultural Adaptation

The cross-cultural adaptation of the questionnaire was performed following the stages indicated in Figure 1. After performing the two independent forward translations to Portuguese and Slovak, and the backward blind translations to English, all discrepancies and semantic ambiguities were investigated by the committee of researchers, translators, and experts until reaching a consensus. Semantic ambiguities resulted from different meanings of words and discrepancies from the difficulty of a direct translation of certain expressions, like "weight" and "volunteering", because they are not used within or clear to the target population.

In the translation to the Portuguese version (PT1 and PT2), several choices were made to achieve semantic equivalence, a more homogeneous terminology, and to produce items with an understandable, clear, and accurate message. Some examples are:

- “Organization” was always chosen instead of “firm” or “company” because it is more general;
- In the questionnaire, “my organization” was used instead of “the/this/our organization”, because each respondent would answer in accordance with his/her organization;
- All verbs that were in the past tense were changed to the present form;
- “Environmental” was used instead of “green”;
- Several verbs (“weigh”, “volunteer”, “give time”, “provide”, “enroll”) were substituted by other verbs that were not necessarily synonyms, but were more used in the same Portuguese context and maintained the conceptual equivalence.

Some expressions or items were introduced in the Portuguese version by the researchers of this study, which were not in the original scales, such as:

- The item OCBE11, “I feel motivated to engage in environmental actions and initiatives in my work regardless of my organization orientations,” was added to measure whether employees adopted OCBE independently from the organization’s orientations;
- In item OI2, “we” was changed to “we do” and “them” was changed to “my organization does” to be more understandable;
- In item GHRM5, the word corresponding to compensation was removed, because reward has a similar meaning.

After merging both Portuguese translations into one version (PT12), this was delivered to English-native translators who independently backward-translated to English again, without knowing the original scales in English (blind translators). The translated items of PBT1 and PBT2 are indicated in Table S1 in Supplementary Data.

There were some expected differences between the back-translated and the original scales due to the non-direct correspondence expressions between both languages. For example, there was a discrepancy in OCBE1 because the verb “consider” (think about something carefully) is different from “weight” (implies measuring pros and cons of a situation), which was in the source item. “Consider” works better in Portuguese, and the item equivalence and conceptual equivalence are not affected. The 5-point Likert response scales were equivalent in all forward and backward translations performed.

In the meeting with the experts in stage IV, it was also decided to remove the word correspondent to “endeavors” (OCBE7) in the Portuguese version, because it is generally related to construction works, and the word compensation, as it is semantically equivalent to reward (GHRM5).

In the translation into the Slovak version, certain differences in two independent translations (ST1 and ST2) were also observed. Some of them were caused by the existence of a relatively free word order in the Slovak language. However, this fact usually does not have a fundamental impact on the meaning of individual statements. After the creation of a unified Slovak translation (ST12) and subsequent blind translations into English (SBT1 and SBT2) (Table S2, Supplementary Data), some ambiguous equivalents appeared, such as:

- The words “efforts” and “endeavors” are slightly different in meaning. “Efforts” is usually used to refer to an attempt to achieve a certain goal or task. Endeavors has a similar meaning, but is often used in a context that requires greater effort or is associated with adventure or challenge.
- The phrases “I volunteer” and “I spontaneously devote” are also not completely identical. “I volunteer” means that someone offers or participates in some activity or task on his own initiative. “I spontaneously devote” means that someone, suddenly and without prior planning, devotes his time, energy, or resources to some activity or task. So, although both phrases refer to involvement in some activity, “I volunteer” usually

means without external influence and often long-term involvement; on the other hand, “I spontaneously devote” means sudden and perhaps one-time involvement.

- The expressions “I am genuinely/truly interested in” and “I truly care about and “I am genuinely concerned about” have a similar, but not exactly the same, meaning. The expression “I am genuinely/truly interested in” denotes real interest or curiosity. On the other hand, “I truly care about/I am genuinely concerned about” means that something really matters, which can include deeper feelings than concern, such as love, care, or devotion. The term “I am genuinely concerned about” indicates real concerns or worries.

Similarly, as in the Portuguese version, the term “organization” replaced the terms “firm” and “company” because it includes all addressed subjects; all verbs that were in the past tense were changed to the present form; and the term “environmental” was used instead of “green” because it is more common in Slovak, and we assume that the respondents will be more familiar with it. In addition, the word “green” can mean immature or just forming in Slovak.

The meetings ended with a consensus about the final versions of the questionnaires that presented a good conceptual equivalence. It also defined the initial instructions, mode of administration and the measurement method. The initial instructions added to the questionnaires explain the survey goals and assure the confidentiality of the participants that do not need to identify themselves or their organization and all responses will be analyzed together. The administration mode was decided to be by email for the pre-identified organizations with the links of the questionnaires that were located on Limesurvey. The items were measured with 5-points Likert responses, defined equally for all scales. It was also defined which psychometric properties and statistics were important to be tested. So, at the end of stage IV, measurement and operation equivalence were guaranteed as well as the functional equivalence.

### 3.2. Pretests Results

After Stage IV, the final version of the questionnaire was sent to 6 Portuguese and 6 Slovak experts to assess the item’s relevance for the scale in which they were integrated. The experts were academics or professionals in human resources, management, environmental engineering, statistics and with experience in research with questionnaires, translations, and cross-cultural adaptations. This first pretest aimed to assess the content validity by the CVI (content validity index) and modified kappa ( $k^*$ ), as defined in Section 1.5. Table 1 exemplifies the results for each item of the OCBE construct in both countries. When the number of experts is 6, the acceptable I-CVI values should be higher than 0.78, and  $k^* > 0.60$  is good and  $k^* > 0.74$  is excellent (Polit et al. 2007). In both countries, the first results of the relevance pretest showed that OCBE had questionable items in the expert’s opinion (Table 1), specially OCBE3 and 8, which received values below the admissible threshold for the Slovak analysis. All 23 other items of the constructs (OCBE, OI, ER, and GHRM) had I-CVIs  $> 0.83$  and  $k^* > 0.82$ , which is according to the recommended range.

Concerning the measure S-CVI for all studied constructs (Table 2), their obtained values were good, except those of OCBE and GHRM in the Slovak assessment, which did not follow the recommendations ( $< 0.80$ ). For S-CVI/UA, the results were not so good, because they were below the threshold of 0.80 (Polit et al. 2007), except for ER in the Slovak assessment. To understand and improve the items, the researchers met with the experts until a consensus was reached and the content validity indexes received acceptable values.

As pointed out by Polit et al. (2007), “the S-CVI/UA calculation method is overly stringent. Acceptable values for S-CVI/UA become more difficult to achieve as the number of experts increases”, especially if an expert is biased or did not understand the construct specifications. S-CVI/Ave looks more attractive because it avoids these problems and considers all item information by averaging the CVIs.

**Table 1.** Content validity indexes of items of OCBE construct.

Items	Portugal		Slovakia	
	I-SCVI	$k^*$	I-CVI	$k^*$
OCBE1	1.00	1.00	1.00	1.00
OCBE2	1.00	1.00	0.83	0.82
OCBE3	1.00	1.00	0.67	0.56
OCBE4	0.83	0.82	0.83	0.82
OCBE5	1.00	1.00	1.00	1.00
OCBE6	1.00	1.00	1.00	1.00
OCBE7	1.00	1.00	1.00	1.00
OCBE8	0.83	0.82	0.67	0.56
OCBE9	0.83	0.82	0.83	0.82
OCBE10	0.83	0.82	0.83	0.82
OCBE11	1.00	1.00	1.00	1.00

**Table 2.** Content validity indexes of constructs.

Items	Portugal		Slovakia	
	S-CVI/Ave	S-CVI/UA	S-CVI/Ave	S-CVI/UA
OCBE	0.94	0.64	0.88	0.45
OI	0.93	0.60	0.90	0.40
ER	0.94	0.67	1.00	1.00
GHRM	0.92	0.50	0.83	0.00

Modified  $k^*$  appeared to be a more powerful/robust parameter, but its results were similar to CVI, as observed in Table 2, due to universal agreement or agreement of five out of six experts. However, if two or more experts disagreed, both indexes would give much different values (15.3% different if two experts disagreed and 45.4% if three experts disagreed). Although the I-CVI has been criticized for not accounting for change agreements, it is easier to calculate and understand and more widely applied (Polit et al. 2007; Yusoff 2019). After this pretest, all items scored three or less were re-analyzed with experts to improve them. This content validity analysis was not a cross-sectional assessment, but an ongoing process that must be repeated whenever it is necessary to re-adapt and update questionnaires based on new evidence or target context, thus ensuring the constructs' relevance and effectiveness.

Then, the complete survey process was tested using a second pretest, in which the questionnaire was sent to 30 to 40 participants who were chosen from organizations and the academy with suitable qualifications. The goals of this clarity pretest were explained, and after answering the questionnaire, the participants reported (email or meetings) all ambiguities; suggested improved wording for unclear items; and commented about the initial instructions, the administration mode, and any other aspects.

### 3.3. Main Study and Psychometric Properties

**Screening.** The first step after codifying the data from the questionnaire was to carefully examine the complete and incomplete cases, the numbers and patterns of missing values, and participant misconduct, as well as to ensure that there were no errors. Around 50–60% of cases did not receive any answer or just received partial answers, and all were automatically excluded from the dataset uploaded to SPSS. Among the complete cases, there were still missing answers, i.e., when the participant marked the “no answer” option. These cases were analyzed individually to check whether the missing values were not excessive and, thus, whether the responses of these participants could be retained.

The participants' misconduct was assessed by screening the data to identify the cases in which the participants marked the same answer on virtually all items. The probability of feeling the same across the items is very low, and these cases were subject to

deletion. The case identification of respondent misconduct was performed by assessing the standard deviation of items' answers in each case. Once cases had been ranked, those with lower standard deviations were analyzed to decide whether they should be discarded or retained. In the Portuguese questionnaire, two cases were deleted because the same response option was given to at least 17 items of a total of 25. There are some ways to verify participants' misconduct or whether the respondent is carefully choosing the answers for the questions. It can be a similar question in a different position in the questionnaire, the same question asked in the negative form, reverse coding, or just asking the respondent to specifically select a number (Malamis and Howley 2022). Reverse coding is a good way to detect carelessness, but it has the drawback of confusing the respondents, thus leading to misresponses, or even honest mistakes (Baumgartner et al. 2018).

**Missing values.** Within the cases that were completely answered, there were items or questions to which the respondent chose "no answer". With mandatory answers in this online questionnaire, it was not possible for questions not to be answered (e.g., not answered because they were not seen) unless the respondent abandoned the questionnaire before finishing. The "no answer" (not wanting/not knowing/not liking the other answer options) may be different from a missing answer (did not see the question), but in this study, there was no possibility or interest to differentiate, and all were treated as missing values.

The analysis of the missing values is important to perform *a priori* as they may affect the study's findings, because no cases including them can be considered in the statistical procedures that need complete cases. This raises several concerns, because there will be less information than originally planned, which will decrease the precision of the performed statistics and complicate the analysis, especially if large samples are needed (IBM 2023). Another concern is that, if these cases with missing values are systematically different from those without them, then the findings will be biased. Tables 3–6 indicate the percentages of missing values in the construct items and in the characterization of organizations and respondents in Portugal and Slovakia.

**Table 3.** Missing values, descriptive statistics, and reliability of data from Portugal.

Factor	OCBE Item	Missing Values (%)	Mean	Trimmed Mean	Stdev	VC (%)	MAD	Reliability	
								$\alpha^a$	$\alpha$
Eco-helping	OCBE1	1.6	4.45	4.47	0.57	12.9	0	---	---
	OCBE2	0.8	4.12	4.17	0.44	16.1	0	0.830	0.831
	OCBE3	0.8	4.08	4.11	0.72	17.6	0	0.825	
	OCBE8	2.5	3.69	3.76	0.93	25.2	0	0.778	
	OCBE9	0.8	4.05	4.09	0.66	16.3	0	0.796	
	OCBE10	3.3	3.86	3.91	0.80	20.8	0	0.785	
	OCBE11	5.7	3.91	4.00	0.90	23.0	0	0.802	
Eco-civic engagement	OCBE4	9.8	3.51	3.57	1.11	31.7	0	0.805	
	OCBE5	2.5	3.81	3.90	0.94	21.7	0	0.792	
	OCBE6	6.6	3.83	3.91	0.97	25.3	0	0.761	
	OCBE7	12.3	3.38	3.43	1.14	33.7	1	0.789	
OI	OI1	0.8	4.10	4.17	0.89	21.7	1	0.702	0.733
	OI2	1.6	3.94	4.01	0.97	24.7	0	0.674	
	OI3	0.0	4.37	4.47	0.82	18.8	1	0.651	
	OI4	0.0	4.14	4.21	0.89	21.6	0	0.663	
	OI5	0.8	4.17	4.27	0.95	22.7	0	---	

Table 3. Cont.

Factor	OCBE Item	Missing Values (%)	Mean	Trimmed Mean	Stdev	VC (%)	MAD	Reliability	
								$\alpha^a$	$\alpha$
ER	ER1	1.6	3.78	3.87	1.00	26.5	0	0.858	0.884
	ER2	4.1	3.73	3.81	0.98	26.2	0	0.859	
	ER3	4.1	3.78	3.87	0.92	24.3	0	0.787	
Eco-training	GHRM1	9.8	3.28	3.31	1.18	36.1	1	---	0.969
	GHRM2	9.0	3.14	3.16	1.19	38.0	1	---	
	GHRM3	8.2	3.15	3.17	1.20	37.9	1	---	
Eco-rewards	GHRM4	10.7	3.22	3.24	1.21	37.7	1	---	0.929
	GHRM5	13.9	2.90	2.89	1.27	43.7	1	---	
	GHRM6	14.8	3.01	3.01	1.22	40.6	1	---	

<sup>a</sup>  $\alpha$  if item is deleted; VC—variation coefficient; MAD—median absolute deviation.

Table 4. Missing values, descriptive statistics, and reliability of data from Slovakia.

Factor	OCBE Item	Missing Values (%)	Mean	Trimmed Mean	Stdev	VC (%)	MAD	Reliability	
								$\alpha^*$	$\alpha$
Eco-helping	OCBE1	0.4	3.70	3.78	1.15	31.0	1	---	0.878
	OCBE2	0.0	3.21	3.23	1.23	38.5	1	0.860	
	OCBE3	0.4	3.14	3.16	1.24	39.4	1	0.839	
	OCBE8	0.4	2.85	2.84	1.19	41.8	1	0.834	
	OCBE9	0.4	3.28	3.31	1.20	36.6	1	0.831	
	OCBE10	0.4	2.88	2.86	1.21	42.0	1	0.857	
	OCBE11	0.4	3.26	3.29	1.19	36.5	1	0.843	
Eco-civic engagement	OCBE4	2.2	2.61	2.57	1.26	42.8	1	0.713	0.788
	OCBE5	1.9	3.15	3.17	1.31	41.5	1	0.754	
	OCBE6	1.1	2.91	2.90	1.19	40.8	1	0.734	
	OCBE7	1.9	2.27	2.21	1.14	50.4	1	0.728	
OI	OI1	0.4	3.54	3.76	1.15	31.1	1	0.801	0.808
	OI2	0.4	3.88	3.95	1.12	28.8	1	0.771	
	OI3	0.0	3.55	3.61	1.13	31.7	1	0.721	
	OI4	0.4	3.59	3.65	1.12	31.3	1	0.732	
	OI5	2.2	3.55	3.61	1.16	32.6	1	---	
ER	ER1	0.4	3.44	3.48	1.15	33.6	1	0.889	0.922
	ER2	0.4	3.25	3.28	1.22	37.4	1	0.828	
	ER3	1.5	3.12	3.14	1.21	38.6	1	0.889	
Eco-training	GHRM1	0.7	2.73	2.70	1.23	44.9	1	0.889	0.940
	GHRM2	2.2	2.43	2.37	1.22	50.1	1	---	
	GHRM3	1.1	2.33	2.27	1.19	51.0	1	---	
Eco-rewards	GHRM4	0.7	2.05	1.97	1.10	53.8	1	0.885	0.903
	GHRM5	1.1	1.80	1.70	0.99	54.7	0	0.830	
	GHRM6	0.7	1.79	1.70	0.98	54.3	0	0.866	

\*— $\alpha$  if item is deleted; VC—variation coefficient; MAD—median absolute deviation.

**Table 5.** Organization descriptives (as percentages) in both countries.

	Classification	Portugal	Slovakia	
Organization type	Public	0.0	26.8	
	Private	0.0	65.1	
	Third sector	100.0	2.2	
	Other	0.0	0.7	
	Missing values	0.0	5.2	
Organization sector	Service	100.0	61.7	
	Industry	0.0	23.4	
	Other	0.0	6.7	
	Missing values	0.0	8.2	
Organization dimension	Fewer than 10 people	0.0	6.7	
	10 to 49 people	37.7	29.4	
	50 to 249 people	54.1	24.5	
	250 to 499 people	0.8	7.8	
	500 or more people	5.7	19.3	
	Missing values	1.6	12.3	
Geographical coverage	Municipal	41.0	0.0	
	Regional	11.5	0.0	
	National	43.4	53.2	
	Multinational	3.3	27.5	
	Missing values	0.8	19.3	
Organization existence time	Less than 1 year	1.6	0.0	
	1 to 5 years	5.7	7.4	
	6 to 10 years	4.1	15.6	
	11 to 20 years	4.9	28.3	
	More than 20 years	82.0	47.2	
	Missing values	1.6	1.5	
Organization region	Aveiro	7.4	Bratislava	12.6
	Braga	13.9	Banská Bystrica	39.0
	Coimbra	9.0	Košice	6.7
	Évora	20.5	Nitra	6.7
	Lisboa	15.6	Trenčín	7.4
	Porto	7.4	Trnava	1.1
	Viseu	9.0	Prešov	5.2
	Other districts	17.2	Žilina	19.7
	Missing values	0.0	Missing values	1.5
Types of environmental and quality management system	No system applied	41.8	39.8	
	ISO14001	1.6	9.3	
	LCA	2.5	0.7	
	EMAS	0.8	0.0	
	Don't know which system	14.8	4.8	
	Other	1.6	0.0	
	Missing values	36.9	45.7	

**Table 6.** Description of participants in both countries (as mean  $\pm$  standard deviation or percentages).

	Classification	Portugal	Slovakia
Age (years)	Mean	40.1 $\pm$ 12.1	34.2 $\pm$ 11.3
	Missing values	4.1%	5.9%
Gender	Male	73.0%	39.8%
	Female	26.2%	53.5%
	Missing values	0.8%	6.7%

Table 6. Cont.

	Classification	Portugal	Slovakia
Habilitation Degree	9 school years	19.7%	0.0%
	12 school years	54.1%	41.3%
	Bachelor	17.2%	19.7%
	Master	4.9%	28.3%
	PhD	0.0%	1.9%
	Missing values	4.1%	8.9%
Service time (years)	Mean	13.7 ± 11.0	7.1 ± 8.2
	Missing values	4.1%	6.3%

In the data collected in the Portuguese questionnaire, the missing values were not extensive in general (i.e., lower 10%), except for the OCBE7, GHRM4, GHRM5, and GHRM6 items, whose missing values percentages were higher (10.7–14.8%). It is interesting to highlight that, among OCBE, items 4 and 7 received the highest percentages, as well as all the six GHRM items (8.2–14.8%), when compared with the other construct items. It looks like respondents did not want to choose among the disagreeing or agreeing options when asked about volunteering and participating in organization events and projects (OCBE4 and 7) or about the green goals, training, and rewarding in their organizations (GHRM construct). The reasons can be varied: either they were not willing to offer themselves for the actions of others in the organization or there were not many of them. Regarding green goals, training, and rewards, this may have been due to the fact that environmental human resources management is not yet fully developed. The data items of the Slovak questionnaire had few missing values, as observed by the low percentages (<2.2%) in Table 4. In relation to questions about the organization or the respondents in Portugal (Tables 5 and 6), the missing values were low (<4.1%), except in questions about the environmental and quality systems (36.9%). This fact may indicate that employees did not know or want to answer this question.

In Slovakia, the missing values on the organization dimension and geographical coverage were considerable (12.3 and 19.3%, respectively). Even so, they could be included in the data used for further analysis (Fox-Wasylyshyn and El-Masri 2005; Hair et al. 2010), although care and proper analysis needed to be executed. Just like in Portugal, the percentages of missing values in Slovakia were also remarkably high in the question about the types of environmental and quality systems, raising, in both cases, the possibility of being removed from further multivariable analysis. The ISO 14001 is considered the world's most successful Environmental Management system (EMS) standard. It is a harmonized environmental standard that has the potential to improve organizational performance. As Comoglio and Botta (2012) state, organizations that have achieved the ISO 14001 certification level are not only greener, but also more efficient. The purpose of environmental management is to develop, implement, manage, coordinate, and monitor corporate environmental activities (Dubravská et al. 2020). Moreover, standard European firms are also registering their EMS according to the Eco-Management and Audit Scheme (EMAS), as presented by Morrow and Rondinelli (2002).

The pattern analysis of the missing values was performed for OCBE7, GHRM4, GHRM5, and GHRM6 only for the Portuguese data. It can be assessed by correlating the missing dummy codes with the other variables using the parametric or non-parametric correlation, depending on the data normality. Using the Kolmogorov–Smirnov test with the Lilliefors significance correction to test the normal distribution of the data, the significance obtained was lower than 0.001 for all the construct items, thus suggesting the non-normality of the data. Furthermore, almost no variables possessed acceptable asymmetry or kurtosis, because the absolute values of the coefficient/standard deviation ratio of skewness and

kurtosis were higher than 3.0 (Pestana and Gageiro 2014). Therefore, the missing values pattern was assessed using the non-parametric Spearman's rho correlations between the missing dummy codes and other items/questions. Table 7 presents the correlations that were statistically significant at levels of 0.05 and 0.01.

**Table 7.** Spearman's rho correlation applied to Portuguese data.

	1	2	3	4
1. Missing_OCBE7				
2. Missing_GHRM4				
3. Missing_GHRM5		0.705 **		
4. Missing_GHRM6	0.196 *	0.755 **	0.900 **	
Variables:				
OCBE2	0.232 *			
IO1	−0.242 **			
ER1	−0.211 *		0.181 *	0.180 *
ER3	−0.194 *			
GHRM1	−0.219 *		0.259 **	0.259 **
GHRM2	−0.204 *		0.289 **	0.256 **
GHRM3	−0.203 *		0.306 **	0.252 **
GHRM4			0.232 *	0.232 *
GHRM6	−0.238 *			

Correlations are significant at the 0.05 \* and 0.01 \*\* level (2-tailed).

It can be observed that there was a significant high correlation among the missing values of GHRM4, GHRM5, and GHRM6 (from 0.705 to 0.900). This fact indicates that it was common to have cases with “no answer” simultaneously in these 3 items. This strong association makes sense, as they are related to eco-training and eco-rewarding and probably not yet well developed in the organization.

All correlations between each missing dummy code and the study variables were significant but negligible (<0.300), except the correlation between GHRM3 and the Missing\_GHRM5 (0.306). This was not considered relevant once it was too close to the threshold, and, therefore, it is plausible to consider that none of these missing values were specifically related to a special group or characteristic in the dataset, meaning that they were MCAR.

**Outliers and Descriptives.** Outliers are extreme results that must always be analyzed as they increase data dispersion and can imply segments of the study population with different characteristics. However, if they arise from input or coding errors, they must be corrected. To understand whether the outliers are affecting the findings, it is necessary to compare the results of the analysis with and without outliers. For data with outliers, the 5% trimmed mean and median absolute deviation (MAD) are more robust measures, because they are less impacted by outliers when compared to the mean and variation coefficient (VC), respectively. The 5% trimmed mean was calculated after excluding 5% of extreme values from both ends. The median absolute deviation (MAD) is the median of the absolute deviations from the median. Through box-plot observation it was found that the Portuguese data had outliers in all items except in GHRM2 to 6, while the Slovak data had outliers only in parameters OI3 to OI5, ER2, and GHRM5 and 6.

The results of the items' descriptives are indicated in Table 3 for the Portuguese data. Comparing the means and the 5% trimmed means, the values were similar, indicating a low deviation effect due to the presence of outliers. OCBE items received answers with relatively high means (3.38–4.45) and low standard deviations. OCBE7 was the item with the lowest mean and highest dispersion (MAD). It is interesting to note that this was also observed in a pilot study in Portuguese organizations (Manuel et al. 2023a), which seems to indicate that the participants were not so willing to offer themselves to organization events and projects, as they were carrying out other and individual activities that were not demanded or helping colleagues (assessed in other items). All items in Organization Identification (OI) had high averages (3.94–4.37), which suggests that employees identify themselves

with the organizations where they are working. On the other hand, the Environmental Responsibility of the organizations, as perceived by their employees, had lower averages (3.73–3.78). Even lower were those of GHRM items (2.90–3.28) with simultaneously high MAD coefficients, i.e., high dispersion. These results seem to indicate that the employees were not perceiving strong levels of Environmental Responsibility at their organizations, nor applying strong human resources management towards the environment.

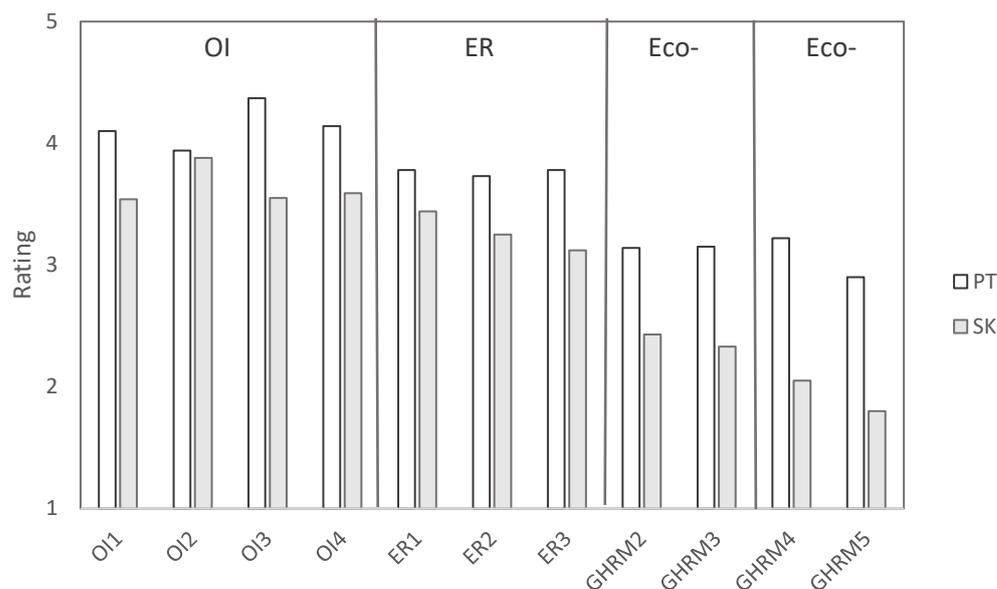
These data should make us reflect on the importance of some concepts for OCBE, such as OI. This concept refers to the individual's awareness of belonging to a specific social group and carrying an emotional value and meaning due to their connection to that group (Buil et al. 2019). When an individual's social identity is robust, it is supported by a deep sense of integration into the organization. Thus, the more ingrained the individual's identification is with the organization, the greater the likelihood of thinking and acting in line with the organization's perspective, as well as dedicating efforts to its benefit (Anwar et al. 2020).

Employees with high organizational identification tend to adopt behaviors that favor the organization, to the detriment of their personal interests. Consequently, when employees have a high level of organizational identification, they are more likely to engage in OCBE compared to those who have a weaker organizational identification. Therefore, employees with strong organizational identification play a crucial role in expressing ecological behaviors (Lin et al. 2022).

At this level, we can say that green human resources management focuses on raising the company's awareness of environmental issues while managing the social and economic well-being of both the company and its team. Furthermore, organizational identification provides employees with a closer experience of the organizations' daily lives, perceiving the company's successes as their own triumphs. This proximity encourages involvement in OCBE, as highlighted by Chen et al. (2006). In fact, there are studies that indicate that human resource management with a focus on sustainability plays a significant role in OCBE. By promoting human capital development and implementing best practices across the organization, companies are committed to optimizing their business operations, thereby reducing potential environmental impacts (Jayabalan et al. 2020).

The observed results from the questionnaires completed in Slovakia (Table 4) reveal low mean values. In the OCBE Eco-helping category, the means were in the range of 2.85–3.28, with standard deviations slightly above 1. Slightly lower means were observed in the OCBE Eco-civic engagement, which were in the range of only 2.27–3.15, with standard deviations from 1.14 to 1.31. It was observed to be the highest mean among all OCBE items for OCBE1, which, however, was excluded from the model by subsequent factor analysis. From the point of view of Slovak organizations, the highest means were observed for OI, with the highest item reaching 3.95 (OI2), from the entire set of Slovak respondents. The ER factor (3.12–3.44) also showed high values by Slovak standards. The lowest of all average values (1.79–2.73) showed that the least environmentally friendly area in Slovak companies was GHRM.

When comparing the data between Portugal and Slovakia (Tables 3 and 4), the results were very similar in structure for all constructs studied, especially for the OCBE mean ratings, which had an almost constant difference of about 20% less in the Slovak data (Figure 2). For the other construct items, the mean ratings decreased for both countries in the order of OI > ER > GHRM, and Slovakia still always had lower values than Portugal did. This seems to indicate that employees, in general, identify themselves better with the organization's values and activities, while their perception of the organization's engagement on environmental responsibility received lower ratings. The Eco-training and eco-reward factors of the GHRM are the ones with the lowest mean ratings. In general, the data from Slovakia had higher dispersion than the Portuguese data, as observed by the MAD values, probably since the organizations were from more disperse sectors and types than those in the Portuguese survey.



**Figure 2.** OCBE items' mean ratings in the Portuguese and Slovak data.

In conclusion, these results showed that Portuguese employees and organizations in this study possess a higher awareness towards environmental issues, although green human resources management must be further developed. This finding is not corroborated by the fact that Slovakia is currently ranked 18th, with an environmental performance index (EPI) score of 60.0, while Portugal is ranked 48th, with a 50.4 score, updated in 2022. The EPI provides a quantitative basis for assessing environmental performance for 180 countries (Wolf et al. 2022). However, this study cannot be extrapolated to the population of each country as the samples are not representative of the populations.

According to Musova et al. (2021) the actions of many people towards the environment are strongly responsible, and their environmental awareness is growing. As they point out, people are most motivated to environmentally responsible behavior by their inner conviction and the desire to set an example for their children/neighborhoods. However, some of them also consider environmentally appropriate behavior to be a current trend. On the contrary, the respondents considered higher costs associated with environmentally responsible behavior, lack of information, lack of time to perform appropriate activities, or mistrust of cooperating organizations in environmental protection as barriers.

**Organization and Participant Descriptives.** In this study, the organizations in Portugal (Table 5) were from the third sector and services (civil protection). They include mainly 10 to 245 workers and have operated in a wide geographical area for more than 20 years. Concerning the geographical working coverage, they were acting at municipal (41.0%), regional (11.5%), and national (43.4%) levels. The organizations were from several Portuguese districts, the most common being Braga, Lisbon, and Évora. Of the participants, 21.3% indicated that their organization had applied an environmental and quality system, although most did not know which system was, and 41.8% indicated that their organizations were not working with any system. The missing values were residual in all questions except for this last one, which was excessive (36.9%). The Portuguese participants (Table 6) were mainly men (73.0%), averaging 40.1 years old and 13.7 service years in their organization. Concerning academic degrees, the majority had no university degree (73.8%), and only 22.1% had a bachelor's or master's degree. The missing values in the questions about the participants are residuals (<10%).

Compared to Slovakia, the organizations in which the respondents worked (Table 5) were mostly privately owned (65.1%), with 26.8% of them being public organizations. Unlike the Portuguese organizations, in Slovakia, we did not manage to reach organizations in one sector, so the sample is more diverse in this respect. However, organizations providing services had the largest representation (61.7%), and only a little less than a quarter was made

up of industrial organizations. The size structures of the organizations were somewhat more dispersed than in Portugal, as 29.4% of organizations employed 10–49 employees, 24.5% employed 50–249 employees, and 19.3% employed more than 500 employees. The shares of organizations with fewer than 10 employees and 250–499 employees were less than 10% each. Respondents most often worked for established organizations existing for more than 20 years (47.2%), and the most frequent regions were Banská Bystrica, Žilina, and Bratislava. A significant part was also made up of organizations with a period of existence from 11 to 20 years. Among the mentioned organizations, more than one-third (39.8%) did not apply any environmental or quality management system, and the most common one was ISO14001 (9.3%).

The importance of quality management practices to the success of environmental management initiatives is unquestionable. Therefore, a quality management system that operates efficiently is an essential condition for the success of an environmental management system. A study showed that quality management helps companies to achieve their environmental innovation and sustainability objectives. Consequently, environmental innovation plays a crucial role in enabling organizations to achieve their sustainable goals (Zhao et al. 2023).

However, the application of environmental management systems does not achieve the expected results, a gap that can be attributed to factors such as the lack of commitment on the part of the administration and stakeholders, the scarcity of financial resources, the lack of specialization in Environmental Management Systems Protection (EMS), and the lack of participation or involvement on the part of students, employees, and teachers with these issues (Putrantomo et al. 2021).

As for the respondents themselves, women prevailed over men in Slovakia (53.5% vs. 39.8%). Their average age was 34.2 years, with a standard deviation of 11.3 years. Respondents who had completed high school education were the most numerous group (41.3%), followed by graduates of the second (28.3%) and first (19.7%) degrees of university studies. The average length of service for the organization was 7.1 years, with a high standard deviation of 8.2 years. It is interesting to highlight that the participants in Portugal were much more often of the male gender, with fewer school years than in Slovakia, which can be attributed to the fact that the Portuguese organizations were all from the civil protection services, which have high percentages of male workers and volunteerism.

**Exploratory factorial analysis.** Due to the non-normality and strongly asymmetric distributions of the Portuguese and Slovak data (Kolmogorov–Smirnov significance  $< 0.001$ ), the data were transformed using the SPSS procedure “Rank cases”, as recommended by (Maroco 2021) and (Pestana and Gageiro 2014). In this way, the factorial analysis was performed using the Spearman’s rho correlation, which is non-parametric and robust even in the presence of outliers (Maroco 2021; Mukaka 2012). Without this procedure, the factorial analysis in SPSS uses, by default, the parametric Pearson correlation, which is sensitive to normality deviations and outliers.

As an example, we will present EFA in more detail for the OCBE construct in the Portuguese data. It was run using the extraction method of principal component analysis and the Varimax rotation method with Kaiser normalization, and the missing values were listwise deleted. The Kaiser–Meyer–Olkin of sample adequacy (KMO) and Bartlett’s test of sphericity are two statistical procedures that evaluate the quality of correlations between the variables. In this case, a KMO value of 0.856 indicates that correlations are good, and a  $p$ -value of Bartlett’s test of sphericity of less than 0.001 proves high statistical significance (Maroco 2021; Field 2009). Therefore, these results are recommended for an EFA analysis. According to the convergence of the scree plot and the Kaiser criterion, which defines the factor extraction if eigenvalues are higher than 1.0, two factors were obtained that explained 62.67% of the total data variance (threshold was 50%). These results were obtained by excluding OCBE1 after observing the increase in the “Cronbach alpha if item deleted”. Factor 1 presented higher factor loadings in items OCBE2, 3, 8, 9, 10, and 11 (from 0.616 to 0.826) and explained 34.88% of the total variance. Factor 2 presented higher factor

loadings in items OCBE4, 5, 6, and 7 (from 0.594 to 0.874) and explained 27.80% of the total variance. Therefore, factor 1 was designated as “Eco-helping”, while the second factor was designated as “Eco-civic engagement”. Additionally, all communalities were above 0.50 (from 0.510 to 0.770), revealing that both retained factors were appropriate to describe the correlational structure among the constructs used. Also, the Cronbach alpha values of each factor were 0.831 and 0.832 (Table 3), characteristic of good reliability. Also, the “alpha if item is deleted” values were within the range of 0.761 and 0.830 (Table 3), which corresponds to a good reliability and indicates that all items are important for the 2-factor structure, because the alpha decreases if each of the items is deleted. It is interesting to observe that OCBE4 saturated in both factors, reflecting the fact that active participation in organizational events can be explained simultaneously by voluntary environmental behavior and involvement in civic initiatives.

Although, in this study, two factors were identified, in the exploratory study of [Boiral and Paillé \(2012\)](#), using a similar scale, three OCBE factors were retained. The first factor was pro-environmental initiatives (Eco-initiatives), which are environmental proposals and actions originated by the employees themselves that make up a crucial aspect of the OCBE, cumulatively contributing to the improvement of organizational environmental performance. The second factor was Eco-civic involvement, which relates to employees’ contributions to the organization’s environmental initiatives and was essential to achieving environmental goals, depending on the voluntary support of employees and the harmonization of values with the organization. The third factor, Mutual Environmental Assistance (Eco-helping), was also extracted, which refers to collaboration between colleagues to address environmental issues. Although often overlooked in environmental management literature, this factor plays a vital role in the effective implementation of environmental actions in the workplace. In the present study, the items related to the first and second factors were joined into one factor, which was called Eco-helping because it includes actions that help the environment which are performed by the employee himself/herself, or by helping colleagues to perform them.

These forms of OCBE highlight the complexity of environmental practices, emphasizing the need for collaboration, mutual support, and value alignment to effectively address environmental issues. Furthermore, mutual environmental assistance is essential for the successful integration of new members into the organization by providing informal guidance on environmental practices and issues. However, it is crucial to create a collaborative environment to ensure that these behaviors are well received, avoiding negative interpretations by employees.

For the other items (OI, ER, and GHRM), the exploratory factorial analysis was performed under the same conditions and the structure models presented good results, as observed by the reliability coefficients presented in Table 3. The Organizational Identification of employees and Environmental Responsibility each formed one factor, excluding the IO5, because the communality was lower than 0.5, as recommended by [Maroco \(2021\)](#). After removing IO5, the results improved significantly.

With regard to Environmental Responsibility, the increase in companies’ proactive stances when complying with environmental protection standards is notable, a trend that has captured international attention. However, fully understanding the real intentions and breadth of the management and environmental protection practices adopted by companies presents a challenge, highlighting the crucial importance of indicators to assess this performance. Often, this assessment does not occur in isolation, but rather through more comprehensive scales which incorporate Corporate Social Responsibility (CSR), going beyond the exclusively environmental domain. In a study conducted by [Eiadat \(2023\)](#), the CSR-19 scale was developed to analyze the perceptions of business executives in relation to CSR actions during the COVID-19 pandemic, addressing the economic, legal, social, and environmental aspects of CSR. The findings of this study suggest that the legal, environmental, and social aspects of CSR actions are being perceived as positive contributions to CSR practices in companies, while the economic aspect of CSR actions is considered to have

a negative influence on these practices. It is important to highlight that, with regard to the environmental aspects of corporate social responsibility, the results indicate that, among the study participants, since the beginning of the COVID-19 pandemic, there was a significant reduction in the amount of waste produced by the company, along with a notable increase in recycling materials and reformulating products to minimize their environmental impact (Eiadat 2023). It should be noted that this issue is not new in the literature. In 1995, Stone, Barnes, and Montgomery developed an instrument called ECOSCALE, which was designed to assess environmental responsibility (Stone et al. 1995).

Considering OI, the importance of this construct was referenced as being one of the most common variables in OCBE studies developed in European organizations in the last 20 years (Manuel et al. 2023b). There are several studies that have focused on this variable (Mullins et al. 2010; Ho-Tang and Mei-Ju 2015; Kreiner and Ashforth 2004; Jeronimo et al. 2020; Duarte and Mouro 2022). It was highlighted that the organization's actions have the potential to significantly influence OI. For example, simply considering changing a previously promised benefit could result in a decrease in OI or render it neutral. Thus, Organizational Identification is dynamic and sensitive to changes in the relationship between employee and organization.

In GHRM, two factors were defined, joining items 2 and 3, which were called "Eco-training", and items 4 and 5, which were called "Eco-reward". Items 1 and 6 were removed from the modeling. In relation to GHRM, there are several authors who have expressed concern with measuring this type of management, having created and tested several scales in this regard (Dumont et al. 2017; Longoni et al. 2018; Tang et al. 2018). The study carried out by Dumont et al. (2017) highlighted that GHRM exerts both direct and indirect influences on the performance of environmental practices. This influence manifests itself not only in the ecological behavior of employees within the work environment, but also outside their functions, mediated by several social and psychological processes. In the study conducted by Longoni et al. (2018), it was also suggested that GHRM plays a significant role in environmental performance. Furthermore, Tang et al. (2018) developed and validated a comprehensive tool to measure GHRM, addressing five dimensions: green recruitment and selection, green training, green performance management, green compensation and rewards, and engagement. The obtained results corroborated the validity of the proposed measure.

Relative to the data from Slovakia, it is interesting to notice that the findings were very similar to those of Portugal: the same two factors were identified in OCBE and GHRM (and were explained by the same items), which corresponded to two different types of behaviors; one factor for OI and ER. A high success rate was noted when assessing the reliability of the measured data (Table 4). Overall, Cronbach  $\alpha$  reached values from 0.713 to 0.940 (Table 4), which indicates good reliability.

**Confirmatory factorial structure.** CFA was conducted considering the structure revealed by EFA and the reliability assessment. The six-factor models for the Portuguese and Slovakia data are presented in Table 8, with the missing values handled by listwise deletion and FIML (Full Information Maximum Likelihood). It is interesting to emphasize that, for the Slovak data, both techniques resulted in good and very similar structure models, probably due to the fact the percentages of missing values were very low (<2.2%). Different conclusions can be drawn for the Portuguese data. The results were not acceptable using listwise deletion as opposed to the structure model obtained with the other technique (FIML). In this case, there were more missing values, the information of which was certainly important to build a good model, and they were not discarded as they were with the listwise technique. This finding shows that FIML is effectively a superior technique, as was also concluded in the work of Enders and Bandalos (2001).

Table 8. Confirmatory factorial analysis.

		Model Factor	KMO	Bartlett's Test	CFI	IFI	$\chi^2$ (df)	RMSEA	Factor Alpha	Factor AVE
Portugal	Listwise deletion	OCBE (Eco-helping)	0.824	<0.001	0.871	0.875	324.631 (174)	0.103	0.807	0.438
		OCBE (Eco-civic engagement)							0.843	0.581
		OI							0.737	0.414
		ER							0.879	0.715
		GHRM (Eco-training)							0.961	0.925
		GHRM (Eco-reward)							0.927	0.869
Portugal	FMIL	<b>OCBE (Eco-helping)</b>	0.836	<0.001	0.918	0.920	297.756 (174)	0.076	<b>0.791</b>	<b>0.427</b>
		<b>OCBE (Eco-civic engagement)</b>							<b>0.824</b>	<b>0.551</b>
		<b>OI</b>							<b>0.728</b>	<b>0.402</b>
		<b>ER</b>							<b>0.884</b>	<b>0.724</b>
		<b>GHRM (Eco-training)</b>							<b>0.968</b>	<b>0.940</b>
		<b>GHRM (Eco-reward)</b>							<b>0.930</b>	<b>0.867</b>
Slovakia	Listwise deletion	OCBE (Eco-helping)	0.869	<0.001	0.930	0.931	390.192 (174)	0.071	0.875	0.545
		OCBE (Eco-civic engagement)							0.791	0.489
		OI							0.807	0.525
		ER							0.907	0.770
		GHRM (Eco-training)							0.947	0.900
		GHRM (Eco-reward)							0.863	0.762
Slovakia	FMIL	OCBE (Eco-helping)	0.864	<0.001	0.927	0.928	410.027 (174)	0.071	0.867	0.529
		OCBE (Eco-civic engagement)							0.782	0.474
		OI							0.806	0.522
		ER							0.905	0.767
		GHRM (Eco-training)							0.939	0.888
		GHRM (Eco-reward)							0.865	0.763

According to the parameters, the best structure models were those highlighted in bold, i.e., the model for Portugal using FMIL and the model for Slovakia using listwise deletion. In both cases, the Kaiser–Meyer–Olkin measure verified the sampling adequacy for the analysis, with KMO = 0.836 and 0.869, which are good and well above the acceptable limit of 0.5 (Field 2009; Maroco 2021). Bartlett's test of sphericity indicated that the correlations between items were sufficiently large for CFA analysis.

The comparative fit index (CFI) and the incremental fit index (IFI) were also used to assess the model fit quality, presenting values in the range of 0.918 to 0.931. The chi-square test ( $\chi^2$  (174) = 297.756 and  $\chi^2$  (174) = 390.192, respectively) resulted in a significant difference ( $p < 0.001$ ) between the six-factor model and a one-factor model (obtained by loading all items together). The results of these three parameters were according to the acceptable standards of goodness-of-fit suggested by Hair et al. (2010), that is,  $1.0 < \chi^2/df < 3.0$ , and by Bentler and Bonett (1980), with a threshold of 0.90 for the CFI and

IFI indices. The root mean square errors, RMSEAs, were 0.076 and 0.071, which are lower than 0.100, as recommended by [Maccallum et al. \(1996\)](#).

The Cronbach alpha and Average Variance Extracted (AVE) values of each factor were good, except AVEs in OCBE factors and Organizational Identification, which were slightly lower than the threshold of 0.50, but still in the acceptable range. This threshold for AVE has varied somewhat in the literature, and researchers have been using different criteria based on their specific contexts and fields ([Lam 2012](#)). While 0.50 is a commonly suggested threshold for AVE, it is worth noting that some researchers consider values above 0.40 in the acceptable range for the convergent validity ([Lam 2012](#)). Convergent validity is “a more conservative measure” and “the researcher may conclude that the convergent validity of the construct is adequate, even though more than 50% of the variance is due to error” ([Fornell and Larcker 1981](#), p. 46).

Considering previous research that translated and validated the scale used in this study, we cite the work conducted by [Costa et al. \(2022\)](#), which replicated this process in Brazil. In this study, the authors employed the methodology outlined by [Beaton et al. \(2000\)](#), for the translation and cross-cultural adaptation of the scale. Subsequently, the adapted instrument was administered to a sample of 926 employees from a service provider company, followed by confirmatory factor analysis. The findings revealed that the Brazilian version of this scale exhibits satisfactory validity and reliability metrics, thereby indicating its suitability for application in future research endeavors within the realms of administration and related fields. This study underscored the significance of not solely translating the items of a scale linguistically for diverse cultures, but also culturally adjusting them to uphold the content validity of the original version. Towards the conclusion of the process, it was determined that the method which was utilized proved effective in adapting the instrument across cultures, resulting in a national rendition incorporating the items from the [Boiral and Paillé \(2012\)](#) questionnaire translated into Portuguese, alongside instructions and the Likert scale points. Additionally, during the validation of the OCBE construct, it was observed that the factor structure proposed by [Boiral and Paillé \(2012\)](#) was affirmed in this investigation. The dimensions of the initial model remained intact, as did its variables. Given that this study did not aim to analyze the questionnaire responses in order to understand respondents' perceptions regarding the scale's indicators, but rather focused solely on testing its validity in the Brazilian context, direct comparisons at the response level could not be made. However, it is evident that the results, in terms of translation and validation, aligned with our findings, indicating successful validation.

Nonetheless, we can refer to other studies that have examined the translation of scales within this domain. Regarding OCBE, we did not uncover studies specifically validating the translation of a scale with an environmental component. However, there have been studies dedicated to this process at the broader level of Organizational Citizenship Behavior (OCB). [Gunnesh-Luca and Moser \(2020\)](#) study focused on validating a German-language scale based on the referent-shift consensus model (RSCM). In the initial phase of their research, the scale was administered twice to 124 individuals, with both exploratory factor analysis and confirmatory factor analysis, confirming a five-factor solution: helping behavior, sportsmanship, loyalty, civic virtue, and conscientiousness. In the subsequent phase, the OCB scale was evaluated in a sample of 129 work teams. Both the interrater reliability measures and the interrater agreement values supported the requirements of the RSCM. Ultimately, unit-level OCB was found to be associated with group task interdependence and exhibited greater predictability (in terms of job satisfaction and supervisor integrity) compared to individual-level OCB, as observed in previous studies.

Another study carried out within this theme was conducted by [de Andrade et al. \(2018\)](#). The focus of this study was on the translation, cross-cultural adaptation, and validation of the scale “Organizational Citizenship Behaviors for Knowledge Workers” for Brazilian Portuguese. To achieve this purpose, they followed the protocol proposed by [Beaton et al. \(2000\)](#), which included stages of translation, synthesis, back-translation, an evaluation committee, an equivalence pre-test, and submission and evaluation. Furthermore, through

a pilot study, the final version of the instrument was applied to a sample of 247 individuals. The results indicated that the scale in question presented satisfactory validity and reliability indices, making it applicable in future research in the field of administration and related areas, thus contributing to the expansion of scientific knowledge on the topic. Although they used rigorous methods to translate, adapt, and validate the instrument, the authors identified some limitations. One of them was the lack of interviews during the pre-test, where they chose to add the option “I didn’t understand” to a scale of Likert-type response options. Another limitation was the application of the scale to a restricted sample of 247 respondents, despite having met the statistical requirements for instrument validation, suggesting that this sample size should be expanded in future studies. Therefore, the authors suggest replicating this scale using other samples through quantitative studies, and also recommend combining the use of statistical data with analyses that can examine the results obtained in the study, such as confirmatory factor analysis (which was carried out in our study). They also suggest applying this scale to different types of organizations, as well as using it in studies that seek to evaluate OCB as an antecedent or consequence, or to investigate its relationships with other constructs.

Regarding studies on the translation and validation of scales on the OI variable, the closest we found was the study by [Theodorakis et al. \(2010\)](#), which focused on the adaptation and initial validation of the sports spectator identification scale (SSIS) for the Portuguese context. To accomplish this, they followed a methodology, which comprises seven stages. The first three steps refer to the translation the scale, while the next three address the validation of the translated version. The seventh stage, which involves establishing standards, was not included in this study. The results indicated that the Portuguese version of the scale proved to be a reliable and valid instrument to be used by researchers in Portuguese-speaking countries who were interested in evaluating identification with sports teams.

Regarding ER, the most recent and similar study that stood out in translating and validating a scale in this area was conducted by [Zammitti et al. \(2023\)](#), focusing on the analysis of the psychometric properties of the environmental concern scale (EC) in the Italian context. The study comprised three distinct stages. In stage 1, an exploratory factor analysis was performed, resulting in a two-factor solution—biospheric concern and selfish concern—which was confirmed. In stage 2, the structure of the eight-item version of the EC was tested using confirmatory factor analysis, confirming the presence of the two factors as the best factor solution. Furthermore, in this study, the EC dimensions were correlated with life satisfaction and concerns about climate change. In stage 3, gender invariance was tested, revealing that the structure of the EC was consistent for both men and women. These results showed that the EC scale presented good construct validity, factorial structure, and invariance between genders, consolidating its use in the Italian context for future investigations. However, the researchers identified several limitations in their study. One of them was the exclusive use of convenience sampling in all studies, which resulted in a sample predominantly composed of female participants. Furthermore, administering the online protocol made it impossible for the research team to adequately match the sample, potentially compromising the representativeness of the results for the entire population. Another limitation was the use of cross-sectional studies, which do not allow the predictive validity of the scale to be verified over time. Finally, the lack of control for social desirability may have influenced participants’ responses to questions related to socially important topics, such as environmental well-being.

Regarding GHRM, we did not find studies that have translated and validated a scale in this matter, but only studies that have created and/or validated scales in other contexts, such as the study by [Tang et al. \(2018\)](#).

Therefore, the studies we found focus only on the translation and validation of a scale in another culture/language, without actually making reference to the results with regard to the respondents’ perception of the variables under analysis. This demonstrates that our study went further, as it was not only concerned with translation and validation, but also

with a comparative analysis of the questionnaire, taking into account the results obtained through the respondents' answers in two countries. Furthermore, the difficulty of finding other studies that have carried out the translation and validation of scales within these themes also shows the relevance of the present study. However, given that our main focus is to show that this approach to translating and evaluating scales must respect cultural issues and follow a rigorous methodology, this objective was achieved and reinforced by other studies cited here that had the same concerns and care. In this regard, it is important to mention some more general studies which have addressed the issue of translation and validation of scales based on cultural issues.

Gjersing et al. (2010) carried out a study in which they outlined the process and steps involved in the cross-cultural adaptation of a research instrument, using as an example the adaptation of an attitudinal instrument. The adaptation process included the investigation of conceptual and item equivalence. Two forward and two back-translations were synthesized and compared by a committee of experts. Subsequently, the instrument was pre-tested and adjusted as necessary. The final questionnaire was administered to a total of 320 people and had an 84% response rate. However, the original instrument did not pass confirmatory analysis. Instead, a new two-factor scale was identified, which was found to be valid in the new context. The researchers concluded that the failure of the original scale highlighted the importance of adapting the instruments to current research settings, emphasizing the need to ensure consistency of concepts between the original language and the target language. Therefore, it is crucial to consider potential barriers when making direct comparisons between different nations and cultures.

Epstein et al. (2015) conducted a review of interdisciplinary bibliographic databases, searching for articles on methods and guidelines for the cross-cultural adaptation of questionnaires. Initially, articles were selected based on their abstracts and titles, with full articles in English being retrieved later. The references of the selected articles were also examined in search of additional pertinent studies. In this process, 31 guidelines were identified, but there was no consensus regarding cross-cultural adaptation methods. Most methods included the use of committees, focus groups, and back-translations. However, there was a clear gap regarding the best methods, although some suggestions indicated that back-translation might not be essential. In short, the authors concluded that there are several methods available for the cross-cultural adaptation of questionnaires. According to experts, most of these methods could produce comparable results, with the choice between them being a matter of preference and logistics. Additionally, they emphasized that the adaptation and validation of a questionnaire are distinct processes that must be conducted with attention and distinction.

Bornman et al. (2010) investigated the application of translations of developmental assessment instruments from English to African languages and from one cultural context to another (Western to South African). To this end, they adopted a method consisting of four stages: linguistic translation, cultural adaptations, review by teachers, and a pilot test. Specifically, they examined children's performance on two developmental measures: the Mullen Scales of Early Learning and the Ages and Stages Questionnaires. Both measures produced similar results and compared favorably with existing standards. This study established a solid foundation for translating texts, considering both cultural and linguistic aspects, from Western languages and cultures to a wide variety of languages and cultures currently used in South Africa.

Beaton et al. (2000) carried out a study on the guidelines for the process of cross-cultural adaptation of self-report measures. They developed a methodology consisting of six stages: initial translation, synthesis of translations, back-translation, review by a committee of experts, testing of the pre-final version, and submission of documentation to the developers or the coordinating committee to evaluate the adaptation process. The authors highlighted the importance of cross-cultural adaptations in different contexts, since an inadequate translation can result in an instrument that is neither suitable nor equivalent to the original questionnaire. Furthermore, they concluded that the process of adapting

a questionnaire for use in a new environment is time-consuming and costly. However, they argued that this approach is crucial to ensuring an equivalent metric for any self-report attribute that is considered. This allows data collection efforts to be uniform across transnational countries, avoiding the selection bias associated with studies in which people who are unable to complete a questionnaire in another language (English, for example) are excluded, due to a lack of a translated version of the questionnaire.

Therefore, we can conclude that this study is aligned with good practices in the translation, validation, and cross-cultural adaptation of a scale. In this case, in which it was also taken into account whether this process impacted the results, we conclude that there were no significant differences in the responses of both countries. However, the central issue is that these responses were the result of questions interpreted in the same way, and this study followed all the procedures to ensure that this was the case.

**Common Variance Method.** CMV influence was evaluated with Harman's one-factor test. Four components were extracted with eigenvalues higher than 1.0, with the first factor accounting for 31.80% of the total variance explained. This was 67.51% for the Portuguese data. Similar results were obtained for the Slovak data: a four-factor model with the first one accounting for 20.59% of the total variance explained (63.93%). Thus, CMV did not appear to be a pervasive problem in this study (Podsakoff et al. 2003).

#### 4. Conclusions

The purpose of this study consisted of translating, adapting, and validating a questionnaire designed to measure various factors that influence the environmental performance of organizations in Portugal and Slovakia. Attention was focused on scales related to Organizational Citizenship Behavior towards the Environment (OCBE), Organizational Identification (IO), Environmental Responsibility (ER), and Green Human Resources Management (GHRM). The methodological process included cross-cultural adaptation techniques and questionnaire validation, involving independent translators and a committee of experts. The final version was tested with two pretests in both countries, which assessed the relevance, content validity, and clarity.

After the exploratory and confirmatory factor analysis, the results supported the reliability and validity of the instruments to assess the impact of employee and management practices in promoting environmental sustainability. Structure factors revealed by EFA were confirmed by CFA for both countries. When comparing data between Portugal and Slovakia, a notable similarity was observed in the structures of all constructs studied, like the OCBE and GHRM factors (Eco-helping, Eco-civic engagement, Eco-training and Eco-rewards), with decreasing ratings in the order of Organizational Identification > Environmental Responsibility > Green Human Resources Management. Finally, it is essential to highlight a limitation of this study related to the lack of representativeness of the samples with the populations in both countries; consequently, the findings cannot be extrapolated.

This study establishes a methodology that can guide future investigations, emphasizing the importance of choosing good methods to adapt instruments and assess their equivalence, relevance, and good content validity. The applied methods assessed the missing values, dispersion, outliers, and normality, and were also particularly important in preparing the collected data for the statistical analysis.

The results of the study may have several implications for both theory and practice in the field of environmental management. In terms of theoretical implications, the study contributes to the known literature on OCBE, IO, ER, and GHRM by providing empirical evidence of their validity and reliability in two different cultures. The study also points to the usefulness of cross-cultural adaptation techniques and questionnaire validation methods to guarantee the quality and comparability of the investigated phenomena. This could lead to new research in different cultural contexts, highlighting the need for thorough translation, adaptation, and validation of questionnaires. The appropriate use of exploratory and confirmatory factor analysis highlights its importance in validating the structure of research instruments. We consider this a valuable contribution to the methodology of future studies

in similar areas. The similarities and differences between Portugal and Slovakia are also worth highlighting, in terms of their environmental behavior and the factors that influence it. This will help researchers to understand the role of the national culture and other factors in shaping environmental behavior and attitudes. We justify the choice by comparing these two countries in the introduction of the study. At the same time, we must emphasize that the study provides a reliable methodology for future investigations and emphasizes the importance of choosing appropriate methods for adapting instruments and evaluating their equivalence, relevance, and good content validity. The methods used to evaluate missing values, variance, outliers, and normality were also important for processing the collected data and subsequent statistical analysis. These findings can positively influence the methodological procedures of future research in a similar area.

From a practical point of view, the study can help researchers and managers in designing and implementing effective strategies to improve the environmental behavior of organizations in both countries. The revised questionnaire will serve as a tool for organizations to use to compare and improve national environmental behavior. It can be important in identifying strengths and weaknesses. The study confirmed the role of some management practices in promoting environmental sustainability. It suggests that OCBE, IO, ER, and GHRM are important drivers of environmental sustainability and can be improved by appropriate managerial decisions. For example, OCBE can be promoted by creating a supportive and rewarding work environment, IO can be enhanced by promoting a shared vision and identity, ER can be increased through awareness and education, and GHRM can be improved through the integration of environmental criteria and practices into human resource management. By incorporating these recommendations, organizations can benefit from better environmental outcomes as well as greater employee engagement, loyalty, and satisfaction. The marked similarity observed in the structures of all constructs studied between Portugal and Slovakia suggests that these results may be applicable in other similar contexts. However, due to the limitation regarding the representativeness of the samples, considerable caution is required when interpreting these results.

**Supplementary Materials:** The following supporting information can be downloaded at: <https://www.mdpi.com/article/10.3390/admsci14030057/s1>, Table S1: Backward translation from Portuguese to English language, and equivalence to the source version of questionnaire items about (a) OCBE, (b) OI, (c) ER and (d) GHRM; Table S2: Backward translation from Slovak to English language, and equivalence to the source version of questionnaire items about (a) OCBE, (b) OI, (c) ER and (d) GHRM.

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## Appendix A. Constructs and Items

OCBE (adapted from Paillé et al. 2014)	<p>Organizational Citizenship Behavior for the Environment</p> <p>Please indicate to what extent you agree/disagree with the following statements. (1 = “strongly disagree” to 5 = “strongly agree”)</p> <p>OCBE1: In my work, I consider my actions before doing something that could affect the environment.</p> <p>OCBE2: I voluntarily carry out environmental actions and initiatives in my daily activities at work.</p> <p>OCBE3: I make suggestions to my colleagues about ways to more effectively protect the environment, even when it is not my direct responsibility.</p> <p>OCBE4: I actively participate in environmental events organized in and/or by my company.</p> <p>OCBE5: I stay informed about my organization’s environmental initiatives.</p> <p>OCBE6: I undertake environmental actions that contribute positively to my organization’s image.</p> <p>OCBE7: I volunteer for projects or events that address environmental issues in my organization.</p> <p>OCBE8: I spontaneously give my time to help my colleagues take the environment into account in everything they do at work.</p> <p>OCBE9: I encourage my colleagues to adopt more environmentally conscious behavior.</p> <p>OCBE10: I encourage my colleagues to express their ideas and opinions on environmental issues.</p> <p>OCBE11 *: I feel motivated to engage in environmental actions and initiatives in my work regardless of my organization orientations.</p>
OI (adapted from Freire and Pieta 2022)	<p>Organizational Identification</p> <p>OI1: I am genuinely interested in what others think about my organization.</p> <p>OI2: When I talk about my organization, I say “we do...” more often than “they do...”.</p> <p>OI3: The success of this organization is my success.</p> <p>OI4: When someone praises my organization, I feel it as a personal compliment.</p> <p>OI5: If a news article in the media criticized my organization, I would feel embarrassed.</p>
ER (adapted from Vlachos et al. 2013)	<p>Environmental Responsibility</p> <p>ER1: My organization is genuinely concerned about being environmentally responsible.</p> <p>ER2: My organization engages in environmentally responsible initiatives because it feels morally obligated to help.</p> <p>ER3: My organization engages in environmentally responsible initiatives in order to give back something to the community.</p>
GHRM (adapted from Dumont et al. 2017)	<p>Green Human Resources Management **</p> <p>GHRM1: My organization sets green goals for its employees.</p> <p>GHRM2: My organization provides employees with green training to promote green values.</p> <p>GHRM3: My organization provides employees with green training to develop employees’ knowledge and skills required for green management.</p> <p>GHRM4: My organization considers employees’ workplace green behavior in performance appraisals.</p> <p>GHRM5: My organization relates employees’ workplace green behaviors to rewards and compensation.</p> <p>GHRM6: My organization considers employees’ workplace green behaviors in promotion.</p>

\*: included by authors; \*\*: the original scale used a 7-point scale.

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