



REVIEW PAPER

A bibliometric study on organization citizenship behavior for the environment

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ABSTRACT

Organization Citizenship Behavior for the Environment is discretionary and proactive behavior that contributes to more effective environmental management by organizations. It originates from the organizational behavior concepts of organizational citizenship behavior and discretionary pro-environmental behaviors. As environmental challenges have become more complex, they cannot be managed solely through formal procedures. Thus, there is a need for Organization Citizenship Behavior for Environment. It does not prescribe the pro-environmental behaviors employees are expected to engage in. Organization citizenship behaviour for the environment includes various workplace environment management initiatives, such as sharing knowledge that can prevent pollution, providing solutions for waste reduction, and implementing environmentally friendly technologies. This study aimed to synthesize the literature on Organization Citizenship Behaviour for the environment through a bibliometric analysis. Bibliometrics is a methodology that analyzes academic research and addresses massive volumes of information. It is a big data analytics technique used in systematic literature reviews and entails quantitatively analyzing scholarly works. It examines research trends, productivity, and scientifically linked patterns in-depth. Journal publications from 2000 were downloaded from the Scopus repository in comma-separated values and plain-text formats. The VOSviewer program was used to visualize and analyze various trends and patterns in the available literature. The results show that the literature on Organization Citizenship Behavior for the environment is increasing rapidly, as are the citations of the topic. Over the past decade, 187 articles have been published on this topic. In the same period, the term organization citizenship behavior for the environment was found to be a keyword used 54 times. This trend is expected to continue. This study contributes to an improved understanding of the emerging concept of organization citizenship behaviour in the environment. This study presented a macroscopic summary of the main characteristics of organization citizenship behaviour in the environment, which was not attempted earlier. This study also discusses the limitations and scope for future research. These limitations include limiting the study to the Scopus database and methodology used. For instance, the bibliometric method is sensitive to the selection criteria and filters used to construct a sample. It is possible that the selection criteria concealed certain relevant articles based on the search query used in the study.

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INTRODUCTION

Over the last few decades, environmental and ecological concerns have attracted academic interest in “corporate greening” because it is an essential organizational issue (McKinsey and Company, 2011; Samimi and Moghadam, 2024). Moreover, environmental issues are increasingly moralized in the public sphere, pressuring businesses to advance the environmental cause more responsively and comprehensively (Ortiz-Avram et al., 2023; Pandey et al., 2013). Reflecting this trend, the concept of corporate greening emphasizes the need to treat the natural environment as an essential stakeholder (Driscoll and Starik, 2004; Hamsal et al., 2023) and to leverage employees’ civic attitudes and citizenship behaviors (Daily et al., 2008). This thought process explores how individual and organizational characteristics influence employees’ discretionary and proactive involvement in environmental impact management (Sulphey and Safeer, 2017; Matheen et al., 2023; Temminck et al., 2015). This proactive behavior improves corporate environmental performance and plugs environmental gaps beyond formal organizational structures (Raineri and Paille, 2016). Employees’ environmental actions are critical elements of corporate greening (Bauer and Aiman-Smith, 1996; Ramus and Killmer, 2007; Daily et al., 2008). Globally, academics and environmental policymakers firmly believe that environmental damage, such as resource depletion (Moghadam and Samimi, 2022), increasing pollution (Samimi and Shahriari-Moghadam, 2023), and biodiversity loss (Samimi et al., 2023), occurs due to industrial actions and human behavior (Khan et al., 2020; Urban et al., 2023; Samimi and Nouri, 2023). In response to this global problem, organizations must pay greater attention to adopting green behavior for employees because people are a critical component of organizations (Daily et al., 2008; Shafaei and Nejati, 2023). As a solution, Organization Citizenship Behavior for the Environment (OCB-E) originated. Borial (2008) defined it as “individual and discretionary social behaviors that are not explicitly recognized by the formal reward system and that contribute to a more effective environmental management by organizations.” This recent concept originates from Organizational Citizenship Behavior (OCB) and discretionary pro-environmental behaviors (Daily et al., 2008; Borial, 2008; Yuriev et al., 2018). Self-

efficacy, morals and values, self-identity, and individual environmental beliefs stimulate OCB-E (Ciocirlan, 2017; Huda et al., 2021; Van der Werff et al., 2013). This does not involve any prescribed pro-environmental behaviors employees must engage in (Robertson and Barling, 2017). Alternatively, it proposes various initiatives in the workplace, such as sharing knowledge that can prevent pollution, providing solutions for waste reduction, and implementing environmentally friendly technologies (Boiral and Paille, 2012; Liu et al., 2020). Since the concept of OCB-E was first suggested in the early part of the century (Boiral, 2009; Dially et al., 2008), it has attracted the interest of many academics (Paillé et al., 2017; Raineri and Paillé, 2016). Despite its recent origin, OCB-E has received wide attention, and there is a sizeable body of literature on it (Lamm et al., 2013; Paillé et al., 2013; Raineri and Paillé, 2016). OCB-E is important because of the complexity of environmental challenges that cannot be controlled solely through formal procedures. Furthermore, OCB-E is relevant because of the complexity of environmental challenges that cannot be managed solely through formal procedures (Liu and Qi, 2022). OCB-E, a discretionary initiative of employees, helps enhance energy efficiency, adopt appropriate waste management techniques, encourage robust green initiatives, and positively impact environmental performance (Boiral and Paille, 2012; Ramus, 2001; Ramus and Steger, 2000). Employees with OCB-E also have higher levels of voluntary eco-initiatives and heightened environmental awareness (Huda et al., 2021; Paillé et al., 2013; Raineri and Paillé, 2016). Employees demonstrating OCB-E also propose energy and resource reduction and urge colleagues to conduct environmentally friendly organizational tasks (Boiral and Paille, 2012; Neessen et al., 2021). OCB-E fosters complementarity with formal environmental management systems (EMS) to address environmental gaps unidentified by regulatory systems. It also directly assists organizations in lowering environmental costs and improving their environmental reputation (Alt and Spitzbeck, 2016; Zhao and Zhou, 2020). The importance of OCB-E in fostering voluntary environmental behavior highlights its importance in changing industrial scenarios. This study intends to examine the work done in OCB-E to assess its current position and importance through a bibliometric analysis. Bibliometric methods

quantitatively analyze published materials (Ellegaard and Wallin, 2015; Tu *et al.*, 2021). It provides a consistent and uniform collection of indicators (Van Raan, 2003). It also examines an article's effect on future research by tracking the citations of a published article. This is because being referenced implies that the original researcher has an influence (Cooper, 2015). It examined publication patterns using quantitative analyses and statistics. Examining the current knowledge on OCB-E enables one to comprehend the themes and major theoretical approaches and identify gaps and crucial opportunities for future growth. Bibliometric studies are scarce on OCB-E. This bibliometric review aims to fill this research gap by objectively assessing this area. This study aimed to close this gap through quantitative and visual bibliometric analyses. This study aimed to contribute to the literature on corporate greening and organizational behavior (OB) by synthesizing the available literature on OCB-E. This objective was achieved through a bibliometric analysis. Globally, investigators have used bibliometric analyses to study specific trends across multiple disciplines (Falagas *et al.*, 2006; Sulphey, 2022; Wang *et al.*, 2009). Specifically, the method helps assess and quantify research patterns. It also helps to identify scientific outputs based on authors, keywords, journals, citations, research productivity, and many other parameters (Abramo *et al.*, 2011; Wang *et al.*, 2009). Studies that have examined individual differences as predictor variables of socially and environmentally conscious work behavior, environment-specific values, anxieties, perceptions, and belief systems have received more attention than those that have examined general traits linked to a broader range of other work outcomes (Aguinis and Glavas, 2012). Four variables influence individual environmental behavior: contextual, attitudinal, sociodemographic, and habitual. Awareness of environmental issues and a sense of duty have positively impacted an individual's environmental behavior (Boiral *et al.*, 2013; Erdogan *et al.*, 2015; Kalamas *et al.*, 2014). Values also influence people's awareness of environmental issues and their negative consequences. The perceived ability to decrease impact shapes one's sense of obligation to act on such consequences. The stronger one's environmental awareness, the higher one's altruistic, prosocial, and biospheric values and the resultant pro-environmental

activities (Boiral, 2009). There are many socially and environmentally conscious work behaviors, among which OCB-E is of prime importance. Identifying generic personalities and specific moral traits that may stimulate underlying motives also helps to identify a theoretical route for inducing green employee behavior, such as OCB-E, and its application in organizations. OCB-E is individual, informal, voluntary, and flexible behavior that promotes and facilitates organizational greening. Daily *et al.* (2008) define OCB-E as the "discretionary acts by employees within the organization not rewarded or required that are directed toward environmental improvement." The OCB-E is a modified version of OCB. The main difference between the two is that, while in OCB, employees engage in proactive behaviors with the organization's best interests in mind, OCB-E involves concern and voluntary behaviors that benefit the environment (Boiral *et al.*, 2015; Paille and Boiral, 2013). Some social scientists (for instance, Boiral, 2009; D'Arco & Marino, 2022; Paillé *et al.*, 2014) have identified OCB-E as an environmental citizenship behavior (ECB). Boiral (2009) identified ECB as "innovative and spontaneous employee acts directed toward environmental improvement in the work context." OCB-E is the most commonly used terminology. OCB-E is characterized by discretionary and voluntary behavior (Boiral & Paillé, 2012; Tosti-Kharas *et al.*, 2016) and does not form part of any formal job description (Lamm *et al.*, 2013; De Groot & Steg, 2008; Kim *et al.*, 2015). OCB-E has its moorings in citizenship theory. This theory implies that social and environmental responsibility is a thinking style or mode of citizenship exercised in individual lives and daily routines. According to this theory, citizenship expects individuals and organizations to act in ways that preserve the integrity of nature and increase social justice, even if there are no returns or rewards for accomplishing it. OCB-E is not limited to social-environmental theory (Norton *et al.*, 2015; Stern, 2000). OCB-E is a moral-political orientation that adopts ecologically sustainable conduct in private, organizational, and public arenas by defining the link between individuals and the "common good" (Sarid and Goldman, 2021). Individuals' ecological and environmental values may motivate them to act responsibly if they believe they can make a difference to benefit the environment (Ciocirlan, 2017; Lamm *et al.*, 2015; Osbaldiston and

Table 1: Types of Organization citizenship behavior for the environment (Boiral and Paillé, 2011)

No.	Type	Description
1	Eco-initiative	This involves various employee-led pro-environmental activities in the workplace, like recycling, reducing the consumption of finite resources, making pro-environmental suggestions, and voluntary initiatives to reduce greenhouse gas emissions.
2	Eco-civic engagement	This relates to contributions to the organization's environmental activities, such as participation in environmental events, promoting the organization's green image, and voluntary participation in the organization's environmental events.
3	Eco-helping	This type concerns assisting colleagues with environmental concerns, expressing opinions on environmental issues, and adopting more ecologically responsible behavior.

Schott, 2012). Adequate empirical evidence has been accumulated on various aspects of OCB-E (Ren *et al.*, 2020; Ruiz-Palomino and Martínez-Cañas, 2014). Empirical evidence suggests that environmental beliefs are precursors of OCB-E (Bissing-Olson *et al.*, 2013; Lamm *et al.*, 2013; Temminck *et al.*, 2015). For instance, Priadi *et al.* (2018) found that variables such as environmental sensitivity, knowledge of ecology, and locus of control positively affect OCB-E. Paillé *et al.* (2014) believe that OCB-E tends to have a multiplier effect on environmental performance. Boiral and Paillé (2012) identify three types of OCB-E, as detailed in Table 1.

Each type presented in the Table focuses on different aspects of environmental management. For example, while eco-initiative involves all personal environmental initiatives, eco-civic engagement identifies contributions to various corporate environmental activities, and eco-helping is mutual pro-environmental assistance towards colleagues (Hanna *et al.*, 2000; Ramus and Steger, 2000; Ramus, 2001). This typology has been confirmed by Liu *et al.* (2017). OCB-E helps employees perform actions beyond their routine jobs to enhance their green targets, improve organizational environmental performance, and contribute successfully to the environment (Adjei-Bamfo *et al.*, 2020; Alt and Spitzbeck, 2016; Kalimmullah *et al.*, 2019; Paille *et al.*, 2013). Factors positively affecting OCB-E include administrative supervision (Paille *et al.*, 2017) and a pro-environmental atmosphere (De Groot and Steg, 2008; Zientara and Zamojska, 2018). It also significantly enhances environmental performance (Boiral, 2009; Ramus and Killmer, 2007; Steg *et al.*, 2014). Studies have also confirmed the role of OCB-E in improving the organizational pro-environmental atmosphere (Paille *et al.*, 2017; Zientara and Zamojska, 2018). Furthermore, if OCB-E exists in

an organization, it becomes easy to implement environmental management practices and fill gaps in environmental practices outside all formal systems (Lülfes and Hahn, 2013; Raineri and Paille, 2016). Recent research on OCB-E has indicated the benign role of HRM towards environmental management processes using an employee-centric approach (Khalid *et al.*, 2022). Furthermore, the benefits of OCB-E have been well-documented in the literature (Ren *et al.*, 2020; Paillé and Meija-Morelos, 2019). Primarily, OCB-E enhances workplace-specific positive environmental behaviors. It helps organizations improve their environmental performance (Herlina *et al.*, 2023; Hameed *et al.*, 2020; Khalid *et al.*, 2022; Sulphrey, 2017) and is essential to inculcate and nurture OCB-E among the younger generation, as such an effort will help them account for their actions towards the environment and build a promising future. The apparent benefits and relevance of OCB-E have encouraged the European Union (EU) and United States (US) governments to enact regulations encouraging it within companies (Herlina *et al.*, 2023). All these factors present the importance of OCB-E in the current situation, wherein the environment is under constant threat. Furthermore, it could benefit organizational performance and the potential for long-term reputation. This study aimed to synthesize the available literature on OCB-Es. The present study is expected to help the study of environmental management and OCB-E, as it highlights the growing importance of the concept and its current position. This study aimed to examine the work done in OCB-E to assess its current position and importance through a bibliometric analysis. This study used journal publications from the year 2000 downloaded from the Scopus repository. A software tool for constructing and visualizing bibliometric networks (VOSviewer) was used to visualize and analyze the

various trends and patterns in the available literature. This study aimed to examine the work done in OCB-E to assess its current position, publication productivity, and importance through a bibliometric analysis. This study conducted an in-depth examination of research trends, productivity, and scientific link patterns. Journal publications published since 2000 in Scopus were used in this study.

METHODOLOGY

The term “bibliometrics” was first used by Paul Otlet in 1934 (Rousseau, 2014; Syafrudin *et al.*, 2023). This was later developed by Broadus (1987), who defined it as “the quantitative study of physical published units, or bibliographic units, or the surrogates for either.” Bibliometrics analyzes academic research and deals with vast volumes of information (Makarius *et al.*, 2020; Mustak *et al.*, 2021). It is a big data analytics technique used in systematic literature reviews and entails quantitatively analyzing scholarly works (Broadus, 1987). It enables examining scientific activities from several perspectives (Dickersin *et al.*, 1994; Gaur and Kumar, 2018). It also helps collect and classify complex bibliometric data. Bibliometric study citation and cocitation analyses help delve into the trends and characteristics of published (Broadus, 1987). The analysis helps uncover emerging trends such as publication, collaboration patterns, and research constituents. It also uses a qualitative methodology to investigate the intellectual structure of specific domains in the existing literature. This study focused on the content of the OCB-E. The content analysis used was an investigative system that aimed to analyze and systematize data in a way that could be replicated. Considering and deciding on the documents to be analyzed is of utmost importance. The methodology has the following different stages:

The time frame for selecting articles

Articles on OCB-E published in the last 20 years (from 2000) in the Scopus repository were considered for this study. This has facilitated the authors’ recent publication on this topic. Elsevier’s Scopus database is a well-known and complete social sciences database. It is the world’s largest abstract and citation database, with the widest coverage of peer-reviewed literature on various subjects (Pham-Duc *et al.*, 2022). Scopus also has an extensive quality assurance process that

constantly monitors and improves all data elements (Bass *et al.*, 2020). This study did not use multiple databases other than Scopus simultaneously, as it would help reduce potential errors due to duplications. Furthermore, the use of a single database is adequate for scientific examination. Scopus was identified as the data source, as it is the major repository of multidisciplinary peer-reviewed articles and is widely used in similar studies (Eito-Brun, 2018; Pham-Duc *et al.*, 2022; Sulphey, 2019; 2022). Many studies have used the Scopus database to conduct bibliometric reviews (Faisal, 2023; Pham-Duc *et al.*, 2022). Scopus enabled the authors to publish recent publications on OCB-E.

Data mining and extraction

Publications indexed in the Scopus database were extracted. The Scopus database was mined for the articles included in this study. As Scopus is a comprehensive source, it was chosen to gather literature on a given topic. Since the concept of OCB-E is recent, bibliometric analysis has been utilized in publications since 2000. Journal publications published in 2000 were downloaded in comma-separated values (CSV) and plain text formats. No publications were found before 2000. Other aspects, such as keywords, citations, and bibliographic information, were also downloaded. A total of 862 publications were retrieved from the Scopus database and analyzed to provide representative and informative perspectives on the topic. Keywords like “*Organization citizenship behavior for the environment, OCB-E*” were used to identify the required publications. Although the authors attempted to include all possible articles, they did not claim completeness or exhaustiveness.

Selection of articles

Data mining helped to generate multiple potential publications. Every effort was made to minimize selection bias. All efforts were made to eliminate replication, reduce disparities across the selected studies, and boost data quality. Finally, irrelevant publications were excluded, for which a clear criterion set by Dickersin *et al.* (1994) for selecting the studies was followed. A few publications were excluded because they were not appropriate for the analysis. All duplicate and irrelevant articles were excluded to maintain uniformity and eliminate prejudice.

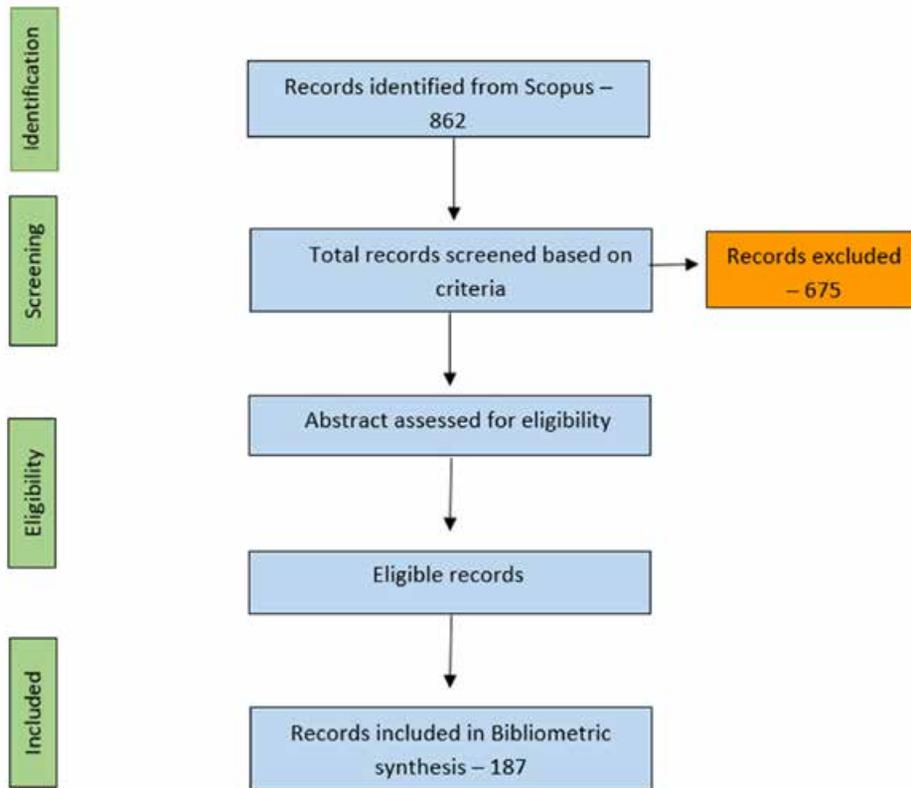


Fig. 1: The study flow diagram

Bibliometric analysis of extracted publications

A systematic review guided by a set of inclusion and exclusion criteria was applied to filter articles unrelated to the objectives and scope of the bibliometric search. A systematic review procedure was adopted to ensure transparency in the bibliometric analysis by focusing on OCB-E (Gora, 2019). This study uses VOSviewer as an analytical tool to visualize and analyze various trends and patterns in the literature. VOSviewer is simple and can be used to explore numerous data relationships. Furthermore, it is an open-source program that produces better results from medium and large datasets by performing mapping analyses (Moral-Munoz et al., 2019). This software supports bibliometric analysis by producing co-authorship, co-citation, and co-occurrence maps. It is an essential tool in this study because it offers additional features such as searching, magnification, and navigating (Van Eck et al., 2010). VOSviewer also displays the overall research trend and general and cooperative network analysis while integrating network visualization and

automatic cluster labeling to examine the possible knowledge structure in the literature for further investigation. The software aids bibliometric analysis by generating co-occurrence maps, co-authorship, and co-citation. The software also has other features, such as searching, magnification, and navigation, making it a crucial tool in this study (Van Eck et al., 2010).

Classification of articles

The publications were shortlisted, and keywords like “organization citizenship behavior for the environment, OCB-E, Environmental Management, environmental performance” were identified. Based on the sorting list, a bibliographical list of 187 publications was prepared for classification. All these publications had the identified keywords, originality of the articles, aims of the study, and relevance. Our analysis was based on 187 publications. These results are presented in the following sections. The flow diagram is shown in Fig. 1.

Table 2: Number of articles with OCB-E

Year	Number of publications	Percent (%)
2022	32	17.1
2021	37	19.8
2020	25	13.4
2019	23	12.3
2018	17	9.1
2017	7	3.7
2016	9	4.8
2015	7	3.7
2014	5	2.7
2013	5	2.7
2012	4	2.1
2011	2	1.1
2010	2	1.1
2009	7	3.7
2008	1	0.5
2007	1	0.5
2002	1	0.5
2000	2	1.1
Total	187	100

Initially, a descriptive analysis was performed on the data, which analyzed the basic information of the 187 retained articles, including the number of publications by year and journals linked to the research. This was followed by cocitation analysis using VOSviewer software, which generated cocitation clusters. The clusters were then labeled to visualize the scientific structure of the study topic. Subsequently, co-keyword analysis chronologically classified the studies based on their publication dates. This facilitated an unambiguous description of the developments in this research topic. This study identified several publications on OCB-E from the Scopus database that were shortlisted from indexed international journals, including subscribed and open-access journals. These results are presented in the following sections. First, we performed a citation analysis, a scientific mapping, because citations form significance, relevance, and rational associations between publications. This analysis presents the reputation of a research work or author. Citation analysis examines the impact of the number of citations a publication receives. This analysis is an effective and unbiased measure of impact. Furthermore, a citation analysis offers an understanding of the rational dynamics of OCB-E. Citation analysis is presented in the following sections. From the analysis, it is found that 187 publications were found to have OCB-E in the title or as a keyword. Of the extracted publications,

169 were empirical: seven conference articles, six book chapters, and five reviews. The details of the extracted articles based on the year of publication are presented in [Table 2](#). The study did not identify any articles published before 2000, indicating that the term OCB-E originated only at the turn of the century. Furthermore, there has been a steady increase in the number of publications on OCB-E. It is heartening to note that there was (especially post-2017) a quantum leap in publications. As of September 2022, when the authors extracted the publications, 32 articles had been identified, indicating the 'concept's popularity among social scientists. This concept is expected to soon gain popularity with multiple publications in the area.

A few authors authored multiple articles, the top of which were Boiral and Paillé, with 12 and 10 articles, respectively. Details of the authors with the maximum number of publications are presented in [Table 3](#).

Multiple publications have used OCB-E and related topics as keywords. Details are presented in [Table 4](#). It can be observed that OCB-E occurred 54 times in the keywords of the extracted publications. Other keywords included environmental management, organizational citizenship, leadership, and organizational citizenship behavior.

[White and Griffith \(1981\)](#) introduced the author cocitation analysis (ACA), which has been applied in bibliometric research. ACA measures the number of

Table 3: Authors with a maximum number of publications

Author details	Number of publications
Boiral, O.	12
Paillé, P.	10
Khan, N.U.	5
Wang, M.	4
Channa, N.A.	3

Table 4: Occurrences of keywords

Keywords	Occurrences
organizational citizenship behavior for the environment	54
Environmental management	29
Organizational citizenship	28
Corporate social responsibility	19
Organizational citizenship behaviors	19
Sustainability	19
Environmental performance	16

Table 5: Top cited authors and journals

Author details	No. of citations	Publication
Paillé et al., 2013	372	International Journal Of Human Resource Management
Boiral and Paillé, 2011	270	Journal of Business Ethics
Kim et al., 2014	241	Journal of Management
Daily et al., 2008	238	Business and Society
Boiral, 2008	234	Journal of Business Ethics
Rupp and Mallory, 2015	228	Annual Review Of Organizational Psychology And Organizational Behavior
Miles et al., 2002	185	International Journal Of Selection And Assessment
Raineri and Paille, 2016	155	Journal Of Business Ethics

references to a publication and another 'author's work ([Jeong et al., 2014](#)). The ACA network is illustrated in [Fig. 2](#). [Table 5](#) lists the most cited authors. The table shows that [Paillé et al. \(2013\)](#) was the most cited publication, with 372 publications. This was followed by [Boiral and Paillé \(2011\)](#), with 270 publications, and [Kim et al. \(2014\)](#), with 241 citations.

It is worth noting from [Table 5](#) that most publications were in reputed journals with very high citations. Three articles were published in the Journal of Business Ethics.

The concept of OCB-E, which originated a decade ago, has attracted widespread research interest ([Boiral et al., 2013](#); [Paillé et al., 2013](#); [Sulphey et al., 2023](#)). It must be noted that the concept was new and originated only at the turn of the century ([Boiral, 2008](#); [Daily et al., 2008](#)). Deep interest in the topic will continue to rise as discretionary and proactive behaviors such as OCB-E in environmental

impact management are now indispensable for any organization ([Borial, 2008](#); [Huda et al., 2021](#); [Liu et al., 2020](#)). OCB-E is closely associated with the broad disciplines of environmental management and organizational behavior. It is also related to topics such as pro-environmental and green behavior. Research on OCB-E could positively contribute to all these disciplines and topics substantially and help enrich the literature. This study employs a bibliometric approach that provides a more in-depth examination of research trends, productivity, and scientific link patterns ([Cucari et al., 2022](#); [Donthu et al., 2021](#)). This methodology is objective, systematic, transparent, and ideal for identifying unique and associated networks and providing domain summaries. A well-conducted bibliometric study can significantly improve the field by enabling a comprehensive view by detecting research gaps and critically analyzing contextualized research issues ([Broadus, 1987](#); [Dickersin et al., 1994](#);

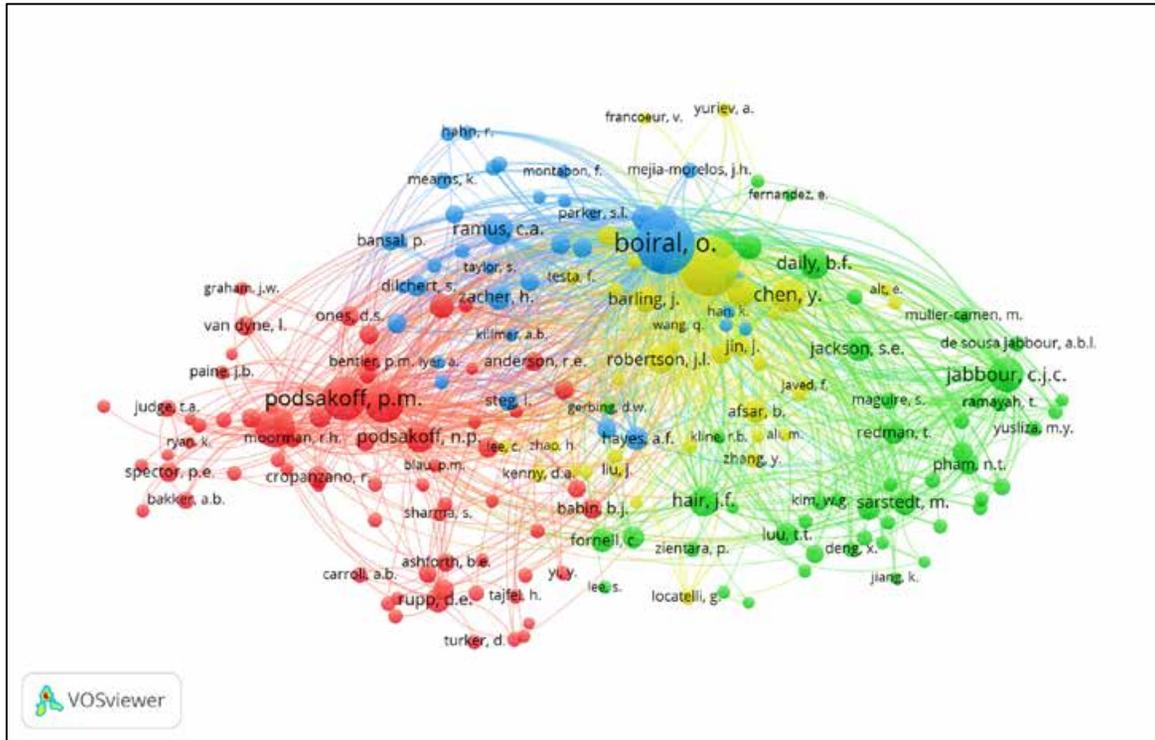


Fig. 2: Author cocitation network

Donthu *et al.*, 2021). The study investigated and obtained information on major areas of OCB-E, such as influential authors, keywords, publications, and citations. It also engages in network analysis to extract relationships between topics and identify themes and subthemes in OCB-E literature. It is a distinct, voluntary, and discretionary social behavior not overtly recognized by formal management systems (Boiral, 2008; Boiral *et al.*, 2013; Paillé *et al.*, 2013). It can contribute to productivity, reduce costs, improve employee engagement, and enhance retention (Sarid and Goldman, 2021). One of humanity's most critical challenges is the long-term ecological impact of environmental degradation. Excessive human interference, inability to practice sustainable development, ineptness of enforcement authorities, and poor community reactions to environmentally conscious ways of life are all causes of environmental calamities. They can damage ecosystems and cause habitat destruction, human health challenges, and species extinction. Institutional rules, programs, and environmental management systems seldom succeed in regulating organizational responses to

environmental issues and concerns. Individual pro-environmental discretionary behaviors not explicitly recognized by the formal system deliver only sustained environmental performance (Miles *et al.*, 2002). Ecological awareness and identity must be nurtured to conserve an increasingly threatened environment. Several factors contribute to attitudes and behaviors that facilitate environmental performance. Some of these include personal environmental beliefs (Paillé *et al.*, 2020), green values (Hooi *et al.*, 2021; Sulphey *et al.*, 2023), and personality (Terrier *et al.*, 2016). Traditionally, individual characteristics have received scant attention from organizational scientists concerned with ethical ramifications and environmental sustainability. This study identifies a reversal of this trend after the turn of the century. The present work examined the research interests in OCB-E among social and organizational scientists. OCB-E, which is relatively new, has its edifice in business and management, with firm roots in environmental science literature. OCB-E embodies multifaceted behavior-based workplace pro-environmental behaviors, such as recycling

and conservation, enacted by organizational members without external influence. Such behaviors can influence organizations to improve their environmental performance by promoting initiatives among colleagues and encouraging them to engage in pro-environmental behaviors. OCB-E is a voluntary action by employees who are not rewarded and is aimed at improving the environment. Previous research has shown that high levels of OCB-E are a significant factor in environmental conservation (Boiral, 2008; Boiral and Paillé, 2011; Paillé, 2019). Furthermore, environmental transformational leadership, particularly immediate leaders, is vital for producing sparks toward and enhancing discretionary behavior. Research evidence also suggests a positive relationship between OCB-E and employees' moral reflectiveness and ethical ramifications of environmental deterioration at work. This directly affects morally laudable and environmentally friendly work practices but is not formally encouraged. By shedding light on the impact of moral reflectiveness and voluntary behaviors, such as OCB-E, the current research helps advance the understanding of environmental sustainability in organizations. Furthermore, Kim et al. (2014) found that moral reflectiveness is a proximal driver of voluntary green behavior at work. This study quantitatively summarizes the pioneering efforts in OCB-E. It also succeeded in identifying the research prospects and fields of OCB-E. Towards this, this study provides bibliometric evidence from published research. This study is one of the few to present a bibliometric analysis of OCB-E using the Scopus database. This study analyzes various categories in the literature, including the most influential authors, keywords, and themes. This study also presents a rigorous background for OCB-E research, as it synthesizes and reviews the content of recent research. This analysis provides an objective reflection of the available literature on OCB-E. This review covers more than a decade and identifies productive authors and publications. Co-occurrence analysis of keywords and network visualization aided in determining the knowledge structure of OCB-E. This study extracted three main segments: research area, context, and research methods. This will facilitate the identification of research gaps that can provide future research directions. This study provides direction and knowledge on the previous, present, and future outcomes of OCB-E to construct conceptual and

theoretical paradigms. This study also demonstrates that OCB-E research is relatively new and important to industry and academia. These findings have also contributed to an improved understanding of the emerging concept of OCB-E. Regarding the multiple foci of OCB and its determinants (Liu et al., 2022; Chiaburu et al., 2011), scant literature exists on the processes that give rise to specific behaviors, such as OCB-E. Therefore, additional empirical studies are required in this regard.

Managerial implications

Organizations are under pressure to perform better in terms of their environment. Unfortunately, green and non-green companies are not usually graded and named in business media. Owing to demands from multiple stakeholders, financial institutions worldwide have started creating various green indices. Stakeholders now signal their intense desire for a more environmentally friendly work atmosphere, products, and services. Understanding individual predispositions such as OCB-E provides valuable guidance for aligning work-related behaviors with stakeholders' demand for green products. Hiring those with high levels of OCB-E would go a long way for any firm to address environmental concerns by relying on workers who are likely to engage in voluntary activities through moral reflectiveness, thus boosting the organization's environmental performance. The OCB-E is paramount in the current industrial scenario because of the diversity and multiplicity of environmental issues and the inherent limitations of formal EMS. OCB-E also helps establish mutual relationships and collaboration among organizational members toward involvement in environmental protection and pollution prevention measures, as current environmental problems are complex and cannot be solved merely through formal systems (Boiral, 2008). The complexity of current environmental issues can no longer be managed using formal systems alone. The ideas presented in this study are offered cautiously, as direct interventions are required to improve organizations' environmental performance.

Limitations

This study has certain limitations. First, this study only included articles indexed in the Scopus database published in English. Studies indexed in

other databases or published in other languages were excluded. The results show that the maximum number of publications originated from China. There may have been articles in the Chinese language that were not considered. Future studies can also utilize other databases, such as Web of Science (WoS) and other languages, based on data retrieved from alternative databases. Although Scopus is the largest OCB-E database, it does not include all OCB-E-related publications. This study only investigated published articles. There may also be other document types not included in this study. Some of these include conference articles and theses containing articles on OCB-E. Second, the study was confined to OCB-E, limiting the research context. The third limitation of this bibliometric study is the sensitivity of the selection criteria and filters used to construct the sample. This may conceal relevant articles, depending on the search query employed. Searching the references of the selected articles may alleviate this side effect by revealing research not included in the sample, which might help understand the covered subject. Next, there could be multiple other environmental behaviors that could be a topic for further research. Further research could be conducted using sociograms to determine the relationship between OCB-E and variables in the field. Bibliometric analysis, an indicator of research performance, is important for citation analysis. Citation patterns vary significantly and depend on the type of research conducted (Nouri, 2022). For instance, reviews and methodology articles were cited more often. According to Wallin (2005), "bad scientific works" may be cited profusely rather than well-known deserving fundamental works. A few numerical metrics cannot define scientific merit. Kostoff (2002) believes citation analyses signify short-term research impacts and are attractive candidates for impact and quality. Considering that the research topic is recent, it is expected that this aspect will not be an issue for this study.

CONCLUSION

This study aimed to provide a macroscopic summary of the main characteristics of OCB-E based on bibliometric analysis. The prevalence and usefulness of bibliometric software based on artificial intelligence and professional and broad-based databases with literature volumes have made bibliometric analyses

extremely popular. The concept of OCB-E was new and originated approximately two decades ago. The results show that research interest in OCB-E is gaining momentum. The number of citations grew steadily. However, growth is less encouraging than related topics, such as pro-environmental behavior and green human resource management. For instance, only 187 articles have been published in the past decade. This figure is not encouraging for topics such as OCB-E, which have immense potential in organizational settings. OCB-E can potentially become a prominent topic in organizational behavior in the near future as it could facilitate organizational sustainability. The study is significant because the findings provide a clear understanding of the research progress achieved in OCB-E, opening up further vistas for researchers to conduct empirical examinations in the field. The findings also helped to identify the fundamental influences of authors, journals, and references. Bibliometric analysis is ideal for summarizing and synthesizing the available field literature. The novelty of this study stems from the fact that it is one of the few bibliometric studies on OCB-E. This study, the first of its kind, will trigger future research. This methodology has some limitations. For example, data extracted from scientific databases such as Scopus are generally not prepared solely for bibliometric analysis, which could lead to inadvertent errors. Such errors can affect analysis when utilizing data. This study followed established selection criteria. Consequently, all duplications and replications were eliminated, and disparities within the selected studies were reduced, thereby boosting data quality. Since bibliometric analysis is quantitative and the connection between quantitative and qualitative outcomes is frequently ambiguous, bibliometric analysis could be unclear. This situation can be reversed by making qualitative assertions regarding bibliometric observations and supplementing them with content analysis. Future studies should follow this assumption to obtain better results. Furthermore, the study was based on literature accumulated over the past two decades. Therefore, overly ambitious assertions must be avoided when interpreting the findings. This study was conducted based solely on publications mined from the Scopus database. Future studies could consider using publications from other databases, such as the Web of Science, which would help widen the scope of the study.

AUTHOR CONTRIBUTIONS

M.M. Sulphey has conceived and designed the research; Performed the search; analyzed and interpreted the data; contributed materials, analysis tools and data. N.S. AlKahtani analyzed, interpreted the data. N.A.M. Senan interpreted the data; contributed materials, analysis tools and data. A.H.E. Adow contributed materials, analyzed and interpreted the data.

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CONFLICT OF INTEREST

The authors declare no potential conflict of interest regarding the publication of this work. In addition, the ethical issues including plagiarism, informed consent, misconduct, data fabrication and, or falsification, double publication and, or submission, and redundancy have been completely witnessed by the authors.

ABBREVIATIONS

ACA	Author cocitation analysis
CSV	Comma-separated values
ECB	Environmental citizenship behavior
EMS	Environmental management systems
EU	European Union
OB	Organizational behavior
OCB	Organizational Citizenship Behavior
OCB-E	Organization Citizenship Behavior for the Environment
US	United States

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