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Examining the Role of Organizational Culture on Citizenship Behavior: The Mediating Effects of Environmental Knowledge and Attitude Toward Energy Savings

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Abstract: Workplace energy conservation is vital for sustainability, as it reduces environmental harm, lowers greenhouse gas emissions, and conserves natural resources. Such procedures lead to significant financial savings, adherence to environmental standards, enhanced corporate social responsibility, and improved organizational citizenship behavior (OCB). This study investigated the impact of organizational culture (OCULT) on OCB, with environmental knowledge (EK) and attitude toward energy savings (ATES) as mediating factors. Components of the theories of planned behavior and value-belief-norm were evaluated through a structural equation model, showing that OCULT influences OCB through EK and ATES, suggesting OCULT's direct and indirect effects on OCB. The degree to which EK and ATES mediate these effects varies, emphasizing the importance of a strong OCULT in fostering an environmentally conscious workplace. Specifically, the findings reveal that OCULT is responsible for positively impacting ATES and EK, with path coefficients of 0.587 and 0.661, respectively. OCB is positively influenced by it (coefficient of 0.228). The research indicates that knowledge is vital in improving organizational behaviors, with a significant correlation between EK and OCB (coefficient of 0.675). Mediation analysis indicates that EK mediates the relationship between OCULT and OCB (standardized estimate of 0.344), and that ATES and EK together can enhance OCB (standardized estimate of 0.078), demonstrating a robust and meaningful causal effect mediating this link. This outcome is the product of the mutually beneficial interaction among various variables. This study highlights the importance of integrating cultural considerations into knowledge management to foster a more engaged and proactive workforce, which will enhance organizational performance. As a practical implication, managers should promote energy-saving behaviors and nurture a supportive OCULT to enhance OCB. Incorporating sustainability into core organizational strategies will result in a dedicated workforce actively participating in OCB and energy-saving initiatives.

Keywords: sustainability; theory of planned behavior; value-belief-norm theory; environmental knowledge; attitude toward energy saving; Colombia

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1. Introduction

In today's rapidly evolving global landscape, sustainability has become a critical priority for organizations worldwide. The pressing need to address environmental concerns such as climate change, resource depletion, and pollution has compelled businesses to integrate sustainable practices into their core strategies (Pérez Estébanez 2024). As organizations seek to balance economic growth with environmental stewardship, understanding the factors driving sustainable workplace behaviors becomes increasingly vital.

Organizational behavior is a discipline that seeks to explain the reasons for human behavior and the benefits and disadvantages of different types of behavior; it is the discipline of behavior that faces people, teams, and organizational groups' phenomena, including motivation (Arumi et al. 2019) and improving organizations' efficiencies using the most critical production factors, such as human factors. One of the main components of organizational behavior is organizational culture. Based on what has been stated by Sahyoni and Supartha (2020), it can guide employees' behavior to improve their working ability, commit to work programs, and behave in additional roles, such as assisting colleagues, volunteering to accomplish work-related activities, avoiding conflict with colleagues, protecting organizational property, complying with existing rules, providing constructive feedback, and preventing wastes of organizational resources.

Schein (2010) mentioned that culture is an abstraction, but cultural power can be created if organizations know it. Dynamic cultural phenomena always surround our lives. Culture is constantly implemented and created by interactions with others, and leaders, structures, routines, rules, and norms continuously form it. According to Aldrin and Yunanto (2019), culture is the same attitudes and behaviors of individuals living in the same environment. Further, Aldrin and Yunanto (2019) state that employees may feel positive about organizational culture but are not automatically encouraged to engage in organizational citizenship behavior.

In this study, we investigate the intricate connections among organizational culture (OCULT), environmental knowledge (EK), attitudes toward energy savings (ATES), and organizational citizenship behavior (OCB) to understand how these elements interact to foster a sustainable organizational environment. The research is grounded on the theory of planned behavior (TPB) and the theory of value-belief-norm (VBN).

Schein (2010) states that OCULT is connected to shared values, beliefs, and practices that form behavior within a company. These factors have a significant impact on employee behaviors and attitudes. An organization with a solid and optimistic culture can foster inclusion, inspire employees, and ensure that individual actions align with the group's objectives. In the context of sustainability, organizational culture can either hinder or enhance the implementation of environmentally friendly practices. An OCULT that prioritizes sustainability can encourage employees to engage in behaviors that reduce waste, conserve energy, and support environmental initiatives (Isensee et al. 2020).

The impact of OCULT on sustainability has been highlighted in various studies (Ahmed et al. 2019; Chams and García-Blandón 2019; Gong et al. 2019). Cameron et al. (2014) highlight that fostering a culture centered around sustainability can result in enhanced environmental performance and a competitive edge. However, the mechanisms through which OCULT influences specific sustainable behaviors, such as environmental knowledge and attitudes toward energy savings, remain underexplored. Bridging this gap, this research is essential in understanding how a positive organizational culture can enhance EK and foster favorable ATES, ultimately leading to increased OCB.

EK pertains to an individual's comprehension of environmental concerns and sustainable methodologies. It encompasses awareness of the environmental impact of one's actions and the ability to implement sustainable solutions (Ip-Soo-Ching and Zyngier 2015). Enhancing employees' EK is crucial for promoting sustainable behaviors in organizational settings. Knowledgeable employees are more likely to understand the importance of sustainability, recognize the benefits of energy conservation, and adopt practices that minimize environmental harm (Camacho et al. 2023).

The role of EK as a mediator between organizational culture and sustainable behaviors has gained attention in recent literature. For example, Smederevac-Lalic et al. (2020) suggest that organizations with a strong culture of knowledge sharing are better positioned to enhance their environmental performance. Organizations can build a knowledgeable workforce that supports environmental initiatives by fostering an environment where employees can learn about and discuss sustainability issues (Ip-Soo-Ching and Zyngier 2015). This study investigates the mediating role of EK in the relationship between OCULT and OCB, providing insights into how knowledge dissemination can drive sustainable behaviors.

According to the International Energy Agency (International Energy Agency 2022), energy efficiency is considered the "first fuel" due to its critical role in reducing carbon emissions, cutting energy costs, and enhancing energy security. Belaïd and Joumni (2020) emphasize that achieving energy efficiency targets requires a comprehensive approach that integrates organizational behavior and the complexity of attitudes to identify the key drivers of energy-efficient practices. Furthermore, in industrial contexts, energy efficiency specifically means minimizing the amount of energy needed for production processes (Gajdzik et al. 2024).

ATES reflects employees' beliefs and feelings about the importance of conserving energy and adopting energy-efficient practices. Positive ATES are essential for encouraging behaviors that reduce energy consumption and contribute to environmental sustainability (Ajzen 1991). OCULT can significantly influence these attitudes by shaping the norms and values that guide employee behavior. Previous research has shown that ATES are critical predictors of energy-saving behaviors (Qalati et al. 2022; Steg 2008). Organizations that cultivate a culture emphasizing the importance of energy conservation can foster positive attitudes among employees, leading to a more significant commitment to energy-saving practices. This study explores how OCULT impacts ATES and how these attitudes, in turn, influence OCB. Understanding this relationship can help organizations design more effective interventions to promote sustainable energy use.

OCBs are voluntary actions that promote overall success (Organ and Ryan 1995). In sustainability, OCBs include reducing waste, conserving energy, participating in environmental programs, and encouraging others to adopt sustainable practices. Various factors influence OCBs, including organizational culture, individual attitudes, and knowledge.

The notion of OCB toward the environment (OCBE) was initially proposed by Daily et al. (2009). OCB for the environment encompasses the voluntary efforts made by employees to enhance the environment within the firm without seeking compensation or duty. These principles revolve around discretionary and voluntary involvement without reward incentives. Hence, it is imperative for managerial support to inspire staff habits, which can be demonstrated by allocating resources or by leaders exemplifying eco-friendly behaviors (Kim et al. 2020). Hence, showcasing leadership is crucial to inspire employees to engage in the organization's environmental management independently. Furthermore, as Kim et al. (2020) analyzed, implementing an environmental policy within the firm might provide a clear rationale for employees to embrace environmentally conscious actions.

Hence, the organization's environmental policy may incentivize employees to actively participate in environmentally conscious practices, as Kim et al. (2020) stated. Furthermore, it can motivate staff to adopt an ecological mindset, recognizing the importance of sustainability to the firm and encouraging them to go above and beyond their regular responsibilities. Additionally, environmental training is highly successful in fostering shared knowledge and implementing certain organizational practices through organizational learning (Vidal-Salazar et al. 2012). Providing environmental training to employees can enhance their understanding of environmental issues (Kim et al. 2020). Moreover, environmental education through training can promote a more substantial commitment to environmental values and practices inside the firm.

Positive behavior that exceeds expectations can occur at the individual level; examples of demonstrating exceptional professionalism include assisting colleagues even when not required, willingly taking on extra tasks, adhering to organizational policies and

regulations, and displaying tolerance towards any work-related challenges or disruptions, as explained by Arumi et al. (2019). Sahyoni and Supartha (2020) state that OCB is a positive behavior displayed by an organization's members. This conduct entails a deliberate and voluntary inclination to exert additional effort and contribute more to the organization than expected. These supplementary contributions aid in bolstering the efficient operation of the organization. Furthermore, the OCB indirectly correlates with the compliments organizations give members. Azmy (2021) discovered that it has a significant effect on the operations of businesses, particularly in terms of enhancing productivity.

The link between OCULT and OCB has been well-documented in the literature. Podsakoff et al. (2000) found that a supportive OCULT enhances employees' willingness to engage in citizenship behaviors. This study expands upon previous findings by investigating the role of EK and ATES in mediating the connection between OCULT and OCB. By examining the intermediary roles involved, this study seeks to identify how corporate culture promotes sustainable behaviors.

This research aimed to accomplish four specific objectives: firstly, to investigate how OCULT influences OCB, EK, and ATES; secondly, to explore how EK mediates the relationship between OCULT and OCB; thirdly, to determine how ATES mediates the relationship between OCULT and OCB; and finally, to provide practical recommendations for managers on fostering a culture of sustainability that enhances EK and promotes positive attitudes toward energy savings in the workplace.

The research contributes to the theoretical and practical understanding of how OCULT impacts sustainability and energy-saving in the workplace. Theoretically, it extends existing models of organizational behavior by integrating EK and ATES as mediators. The findings offer practical insights for managers seeking to promote sustainability within their organizations. By identifying the key factors that drive sustainable behaviors, this study provides a framework for designing effective interventions that align with organizational goals and values.

To the best of our knowledge, this study presents three significant theoretical innovations. First, it provides evidence on specific mediation mechanisms, emphasizing the roles of attitudes toward energy savings and environmental knowledge in translating cultural influences into organizational behaviors. This underscores the importance of considering both direct and indirect pathways in theoretical models. Second, it integrates organizational culture and organizational citizenship behavior into a research model, offering a fresh perspective on the topic. Third, it enhances the understanding of the mediating role of attitudes and knowledge in the relationship between organizational culture and energy-saving behavior, confirming that energy conservation impacts energy-saving behavior both directly and indirectly.

This paper is structured into six sections. Following the Introduction (Section 1), Section 2 provides a relevant literature review. Section 3 explains the study's methodology and data collection process. Subsequently, Section 4 presents the findings and data analysis. Section 5 contains the debate, while Section 6 has the conclusion and managerial and practical implications.

2. Theoretical Framework and Hypotheses Argumentation

The TPB is a conceptual framework that examines the relationship between individuals' attitudes, subjective norms, and perceived behavioral control in predicting their intentions and subsequent behaviors. The TPB can be applied to environmental consciousness to understand how beliefs, social influences, and perceived control over actions influence intentions and behaviors toward the environment and energy saving (Canova and Manganelli 2020; Li et al. 2019; Wang et al. 2021).

Numerous studies have investigated environmental psychology to understand the factors influencing sustainability behavior. These studies have emphasized the significance of the TPB (Ajzen 1991) in analyzing and predicting sustainable behavior and energy saving in the workplace (Gao et al. 2017; Lopes et al. 2019). According to the TPB, attitude, subjec-

tive norm, and perceived behavioral control impact an individual's behavioral intention. Therefore, researchers frequently use the TPB to study sustainable behavior (Berki-Kiss and Menrad 2022; Kumar et al. 2017).

In addition, recent research has shown interest in investigating environmental consciousness through environmental concern (Chang and Su 2021; Panda et al. 2020), environmental knowledge (Patwary et al. 2023), and environmental values (Ghose and Chandra 2020). Environmental consciousness refers to views influenced by an individual's psychological inclination towards engaging in pro-environmental actions (Zelezny and Schultz 2000). This study examines environmental knowledge as an indicator of environmental consciousness and evaluates how this factor relates to sustainable purchasing, focusing on energy saving in the workplace. Incorporating the TPB with environmental issues provides a comprehensive view of environmentally friendly behavior among consumers.

On the other hand, the VBN theory has been widely employed to comprehend and forecast pro-environmental behaviors, such as energy-saving activities in the workplace (Kumar et al. 2017; Liu and Wu 2020). The theory suggests that people with strong biospheric and altruistic values are more inclined to perceive environmental challenges, such as climate change, as significant and believe their actions can impact the environment and other individuals (Ibtissem 2010; Joachim et al. 2015). These convictions might result in a feeling of personal duty or ethical obligation to participate in environmentally friendly behaviors, such as decreasing energy usage at work (Liu and Wu 2020; Kim and Seock 2019) and energy-saving behaviors. According to Carrico and Riemer (2011), it is crucial to develop strong biospheric and altruistic values, increase understanding of the impacts of energy consumption, and create a social atmosphere that emphasizes the significance of energy conservation. In addition, the VBN theory can be effectively connected to the theory of planned behavior, highlighting the significance of attitudes in influencing an individual's intentions and actions (Ajzen 1991). Moreover, studies have discovered that social and cultural norms, which refer to significant individuals' perceived expectations and behaviors, might impact personal norms and, as a result, their energy-saving practices (Si et al. 2022). According to Kim and Seock (2019), people are more likely to adopt and feel compelled to follow energy-saving activities if they believe their peers, colleagues, or superiors respect and actively participate in them.

The VBN and TPB have overlapping features, as the beliefs and personal norms emphasized in the VBN theory might impact the attitudes within the TPB. Moreover, the extent to which one believes they can participate in energy-saving acts can influence their sense of personal responsibility and readiness to engage in environmentally friendly behavior (Arya and Chaturvedi 2020; Carrico and Riemer 2011). By considering these complementary theoretical viewpoints, organizations can cultivate a more comprehensive understanding of the elements that influence energy-saving behaviors in the workplace and devise more efficient measures to encourage sustainable employee practices (Steg and Vlek 2009).

2.1. Organizational Culture

OCULT refers to the shared values, beliefs, and practices that shape the behavior of members within an organization (Schein 2010; Sinaga et al. 2018). It is a foundational element influencing various aspects of organizational life, including decision-making, employee behavior, and overall organizational effectiveness. According to Cameron et al. (2014), OCULT significantly impacts an organization's approach to sustainability and can improve environmental performance and competitive advantage. Such a culture promotes sustainable practices, encourages innovation in sustainability, and supports long-term environmental goals. Several mechanisms through which OCULT influences sustainability have been identified in the literature. First, leadership plays a crucial role. Leaders prioritizing sustainability can instill these values in the organizational culture, influencing employee behavior (Cameron et al. 2014). Second, organizational policies and practices that support sustainability can reinforce a culture of environmental responsibility (Schein 2010). Finally,

communication and training programs that emphasize the importance of sustainability can help embed these values within the organizational culture (Gold et al. 2001).

The success of organizations depends heavily on the performance of employees, because the more they are engaged in the workplace, the more expected it will be to create great results for the organization (Lee and Ha-Brookshire 2018; Okwata et al. 2022; Raczyńska and Krukowski 2019). Attention should be paid to the importance of OCULT for every organization to achieve organizational success, as Arumi et al. (2019) explained. Therefore, it must be considered whether each organization needs to develop OCULT. This is especially true today, considering the significant economic changes, constant technological advancements, increasing competition, and environmental changes (Cameron et al. 2014).

Recently, Zhao et al. (2024) found that different organizational cultures have varying impacts on ecological innovation behavior. Specifically, adhocracy culture and clan culture positively influence ecological innovation, with green creativity and absorptive capacity partially mediating this effect. In contrast, hierarchy culture and market culture show little impact. Complementing these findings, Bortolotti et al. (2024) identified that developmental, group, and rational cultures enhance the link between proactive environmental practices and firm performance, whereas hierarchical culture negatively affects the relationship between internal proactive practices and performance, but positively influences the link between external reactive practices and performance.

OCULT, as analyzed by Al-Madadha et al. (2021), is very important when an organization tries to manage changes. In recent years, the leading cause of environmental problems has been destructive to human livelihoods and cannot be ignored, as Al-Swidi et al. (2021) explained. Some organizations have begun to adopt environmentally friendly initiatives to shape employees' activities at work accordingly and install OCULTs that support environmental awareness (Smederevac-Lalic et al. 2020). Although organizations prioritized enhancing environmental changes' technical and management aspects, they also strongly discouraged human actions that threatened the environment (Brammer et al. 2012). OCULT is essential in forming EK and practices (Linnenluecke and Griffiths 2010). Based on all the information provided, we propose the first hypothesis:

H1a: *Organizational culture has a significant influence on environmental knowledge.*

Implementing fundamental modifications in organizational behavior will significantly mitigate climate change, preserve resources, and enhance environmental quality (Nauges and Wheeler 2017). According to Scherbaum et al. (2008), organizations and their employees are the primary energy consumers globally. Numerous businesses acknowledge the significance of conserving staff energy and need advice on encouraging active employee participation in energy savings (Tang et al. 2019).

According to Belaïd and Joumni (2020), to achieve energy efficiency targets, it is necessary to adopt a comprehensive approach to integrating organizational behavior and the complexity of attitudes, to identify the primary drivers of energy-efficiency behavior. The study's results support that behavioral intervention can be a powerful energy policy instrument. Fatoki (2023) indicated that a clear understanding of reducing corporate energy consumption and improving energy efficiency would benefit the economy and society. Based on all the information presented above, the study put forward the following hypothesis:

H1b: *Organizational culture has a significant influence on attitudes toward energy savings.*

Arumi et al. (2019) argue that thriving OCULT, teamwork, innovation, loyalty, communication, and other attributes contribute significantly to organizational success. Badawy et al. (2017) found that OCULT impacts various aspects of an organization, including OCB. Arumi et al. (2019) described OCB as behaviors that exceed the formal roles defined and are not mentioned in the job description. On the other hand, Khan et al. (2019) identified OCB

as an essential component of functioning organizations; they highlighted that it is crucial to recognize that relying solely on regular behavior is insufficient for achieving objectives and fulfilling an organization's vision. Innovation and continuous change depend on actions beyond the scope of the work description because such extraordinary actions are essential for innovation and survival (Al-Madadha et al. 2021). Based on all the information presented above, the study put forward the following hypothesis:

H1c: *Organizational Culture has a significant influence on Organizational Citizenship behavior.*

2.2. Environmental Knowledge

Environmental knowledge is an individual's awareness and understanding of environmental issues and sustainable practices (Kollmuss and Agyeman 2002). It is a critical factor in promoting sustainable behaviors within organizations. Enhancing employees' EK is essential for fostering sustainable behaviors. Knowledgeable employees are more likely to understand the environmental impact of their actions and adopt practices that minimize environmental harm (Nonaka and Takeuchi 1996). Organizations prioritizing environmental education can build a workforce supporting and engaging in sustainability initiatives (Gold et al. 2001). The role of knowledge sharing in promoting sustainability has been widely studied. Wang and Noe (2010) argue that organizations with robust knowledge-sharing practices are better equipped to enhance their environmental performance. Organizations can foster a culture of continuous learning and improvement by creating an environment where employees can share information and best practices related to sustainability. Despite its importance, promoting EK within organizations can be challenging. Barriers such as lack of resources, insufficient training, and resistance to change can hinder knowledge dissemination (Kollmuss and Agyeman 2002). Organizations can overcome these challenges by implementing environmental education into training programs, providing access to sustainability resources, and encouraging employee participation in environmental initiatives (Nonaka and Takeuchi 1996).

In recent years, the increase in environmental demand from industry, consumers, new laws, and regulations has increased the awareness and expertise of organizations faced with environmental challenges (García-Sánchez et al. 2021; Patwary et al. 2023). In the environment, when organizations provide training programs for their employees and create green opportunities, they will act in favor of the organization, as explained by Pham et al. (2018). Moreover, implementing environmental practices will allow organizations to cultivate EK and foster a green culture among employees effectively. This will result in enhanced customer satisfaction, improved environmental and economic performance, decreased water and energy consumption, and reduced waste, emissions, and pollution (Molina-Azorín et al. 2015). Pham et al. (2018) recognize the need for environmental training to help employees better understand environmental standards and encourage active behavior. Training and education practices contribute to developing green competencies, inspire employees to take more steps in environmental activities, and encourage voluntary workplace green behavior (Camacho et al. 2023). The study proposed the following hypothesis based on the above paragraph:

H2a: *Environmental knowledge has a significant influence on organizational citizenship behavior.*

H2b: *Environmental knowledge mediates the relationship between organizational culture and organizational citizenship behavior.*

2.3. Attitudes Toward Energy Saving

ATES refers to employees' beliefs and feelings about the importance of conserving energy and adopting energy-efficient practices. Lee et al. (2022) determined that to attain high levels of energy-saving behavior, it is crucial to prioritize attitudes toward energy conservation, awareness of societal norms related to energy conservation, and the idea that

energy conservation can be readily accomplished. Positive attitudes towards energy savings are crucial for encouraging behaviors that reduce energy consumption and contribute to environmental sustainability. The theory of planned behavior (TPB) provides a valuable framework for understanding how attitudes toward energy savings influence behavior (Ajzen 1991). Lately, the TPB has been identified as one of the most commonly used theories in current research on pro-environmental behavior (Brick et al. 2024). According to TPB, attitudes, subjective norms, and perceived behavioral control predict an individual's intention to engage in a behavior. Therefore, positive ATES increases employees' likelihood of adopting energy-efficient practices, and a positive correlation exists between employees' energy-saving attitudes and their energy-saving habits—stronger attitudes toward energy-saving lead to better habits (Chen and Chen 2021).

According to Steg (2008), a culture that values sustainability and promotes energy conservation can foster positive attitudes among employees. Therefore, OCULT significantly influences employees' attitudes toward energy savings. For instance, organizations that implement energy-saving policies, provide regular feedback on energy usage, and recognize employees' efforts in conserving energy can enhance positive attitudes towards energy savings. Positive ATES have been shown to predict actual energy-saving behaviors. Steg (2008) found that employees with favorable ATES are more likely to turn off lights, reduce energy usage, and support energy-saving initiatives. This relationship underscores the importance of fostering positive attitudes to promote sustainable energy practices within organizations.

Traditionally, attitudes have been used to gauge how well employees perform at their jobs and the level of organizational productivity (Carmeli et al. 2023). According to Vijayasarathy (2004), attitude refers to a person's conviction that a particular concept, service, or product is a good idea. Consequently, the person exhibits a strong inclination towards that element. According to Costantini et al. (2022), attitude refers to a learned tendency to respond to an object in a persistently favorable or unfavorable manner. It has a significant impact on how employees behave.

Ajzen (1991) argues that individuals are more inclined to participate in a specific behavior if they possess a favorable disposition towards engaging in this action. The impact of attitudes on behavior varies and is contingent upon the intensity of the attitude. Tenbült et al. (2008) proposed that attitudes become more robust when individuals have regular exposure to an attitude object or when they often articulate their attitude. People's attitudes are significantly impacted by other individuals' inter- and intra-attitudinal structures (Tenbült et al. 2008). The influence of ATES on OCB is underrepresented in current literature, and this argument is behind the third hypothesis:

H3a: *Attitude toward energy saving significantly influences organizational citizenship behavior.*

H3b: *Attitude toward energy saving mediates the relationship between organizational culture and organizational citizenship behavior.*

2.4. Organizational Citizenship Behavior

OCB refers to discretionary behaviors that are not explicitly recognized by formal reward systems but contribute to organizational effectiveness (Organ 1988). In sustainability, OCB includes reducing waste, conserving energy, participating in environmental programs, and encouraging others to adopt sustainable practices. The link between OCB and sustainability has been widely explored in the literature. Podsakoff et al. (2000) found that employees who exhibit OCB are likelier to engage in behaviors that support organizational sustainability goals. These behaviors, although voluntary, can significantly enhance an organization's environmental performance (Manuel et al. 2024). Several factors influence the likelihood of employees engaging in OCB. OCULT is a crucial determinant, with a supportive and positive culture increasing the likelihood of OCB (Organ 1988). Additionally, individual attitudes and knowledge also play a critical role. Employees with high

levels of EK and positive attitudes toward sustainability are more likely to engage in OCB (Podsakoff et al. 2000).

Since the notion of OCB was first introduced, scholars have tried to establish and improve its definition (Graham 1991). However, the fundamental concept remains the same: OCB encompasses any actions undertaken by an employee beyond their explicitly assigned responsibilities (Organ 1988). While an organization may not explicitly acknowledge or provide formal rewards for OCB, engaging in OCB can lead to positive evaluations from supervisors and co-workers and improved performance reviews (Organ 1988).

Researchers are increasingly focusing on OCB due to its impact on organizational success. OCBs, or Organizational Citizenship Behaviors, play a crucial role in facilitating the smooth functioning of the organization. They enhance the organization's resilience and capacity to adapt to unexpected situations effectively (Smith et al. 1983, p. 654). Podsakoff et al. (1997) found that employees' willingness to engage in voluntary helpful actions can promote their adoption of best practices and ability to perform more efficiently inside the organization. In recent years, several authors have concentrated on examining the influence of different individual and environmental aspects in comprehending the causes or determinants of OCB (Paillé and Raineri 2015; Temminck et al. 2015). Multiple empirical investigations have demonstrated that reciprocity between individuals and organizations actively stimulates OCB (Rhoades and Eisenberger 2002). In addition, OCB can be associated with various problems and, like most human behavior, is influenced by numerous and interconnected motives (Organ et al. 2006, p. 7).

Based on the above discussions and arguments, the framework of this research is presented in Figure 1.

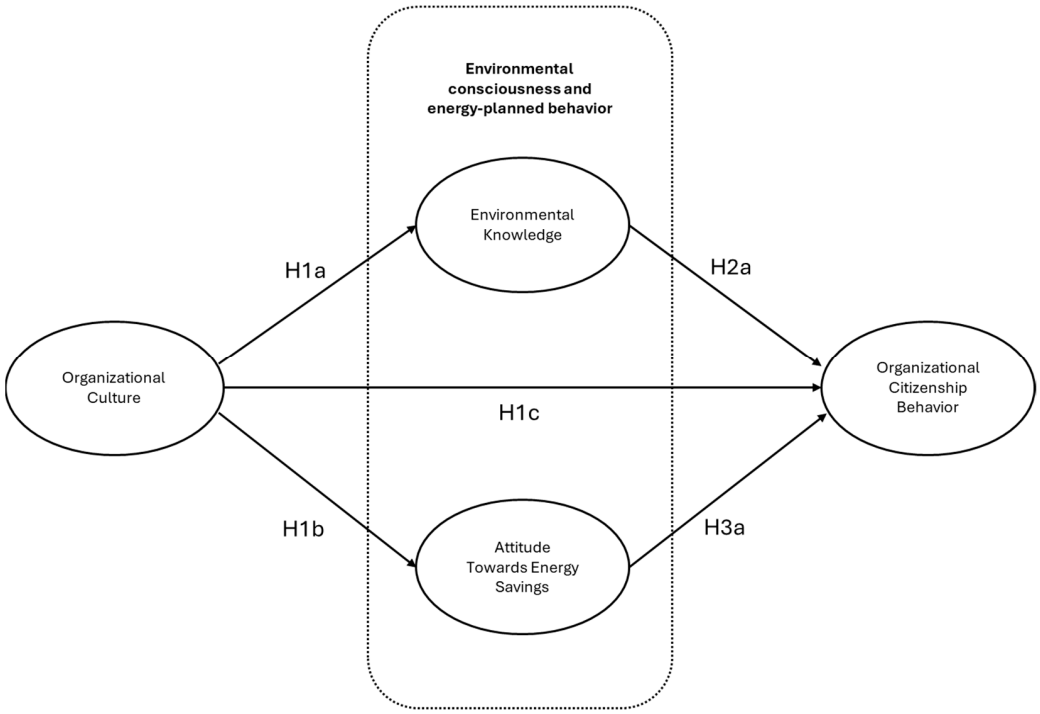

Figure 1. Research model.

3. Methodology

3.1. Research Area and Study Population

When analyzing energy-saving behavior in Colombia, the selection of Bogotá, Medellín, and Cali to conduct research was based on several reasons. The analysis can be structured around the cities' unique characteristics influencing energy consumption patterns, infrastructure, and behavioral responses to energy-saving initiatives. The climates of Bogotá, Medellín, and Cali significantly influence their energy consumption patterns. Bogotá, with

its cool, high-altitude climate, experiences higher energy demands for heating and lighting, making it essential to study energy-saving behaviors in this context (Pardo Martínez 2015). Medellín's mild, temperate climate reduces the need for heating or cooling, making energy use more dependent on behavioral factors like conservation awareness (Beltrán Gallegos et al. 2021). In contrast, Cali's tropical climate drives significant energy use for cooling, particularly in air conditioning and refrigeration, highlighting energy conservation challenges in warmer environments (Grace Quiceno et al. 2019).

Socio-economic and cultural factors significantly impact energy consumption and conservation behaviors in Bogotá, Medellín, and Cali. In Bogotá, the wide range of socio-economic classes and disparities in income and access to energy-efficient technologies suggest that socio-economic status influences energy-saving behaviors, such as adopting energy-efficient appliances or participating in energy-saving programs (Pardo Martínez 2015). Medellín's strong sense of community and history of successful urban projects, like the "Metrocable" transport system, indicate that cultural factors and community-based approaches might enhance public engagement in energy-saving initiatives (Beltrán Gallegos et al. 2021). Meanwhile, Cali's significant Afro-Colombian population offers a unique context for studying how cultural identity and community leadership impact participation in energy-saving programs and the spread of energy-efficient technologies within specific cultural groups (Grace Quiceno et al. 2019).

The energy infrastructures of Bogotá, Medellín, and Cali each play a pivotal role in shaping energy policies and consumption patterns. Bogotá, with its advanced infrastructure, is well-positioned to implement large-scale energy efficiency programs. At the same time, Medellín's innovative urban planning and focus on sustainable development serve as a model for integrating energy-saving measures into city planning. In contrast, Cali's industrial base highlights the challenges and opportunities for energy conservation in a city where industrial energy use is significant (Perez et al. 2024). Public transportation systems also influence energy use in these cities. Medellín's efficient and eco-friendly public transportation network, including the Metro and Metrocable, demonstrates how urban infrastructure can drive energy-saving behaviors. Bogotá's TransMilenio bus rapid transit system similarly offers insights into the impact of public transportation on reducing energy consumption. Although Cali's transportation initiatives are less developed, they still provide an essential context for understanding the role of urban mobility in energy conservation (Perez et al. 2024).

Colombia has introduced several national policies to reduce energy consumption and enhance energy efficiency, with Bogotá, Medellín, and Cali as critical locations for their implementation. Examining how these policies are received and their effectiveness in these cities can shed light on the influence of local governance and policy adaptation on energy-saving behaviors (Grace Quiceno et al. 2019). The level of public awareness and educational programs on energy conservation varies among these cities. For instance, Bogotá, with its broader access to media and educational resources, may experience different levels of public participation in energy-saving initiatives compared to Medellín and Cali. Studies could explore the link between public awareness campaigns and changes in energy-saving behaviors in urban settings (Pardo Martínez 2015).

3.2. Procedure and Participants

This empirical study is conducted via a self-administered online survey of employed individuals residing in Bogota, Medellin, and Cali, Colombia's three biggest cities. The participants in this study were employees from diverse organizations. The questionnaire was distributed through Survey Monkey Audience, an online service that offers access to a varied and geographically focused panel of respondents. The sample distribution was intentionally chosen to mirror the cities' population sizes, guaranteeing that each city's distinct socio-economic and cultural backgrounds were appropriately represented. Survey Monkey Audience streamlined this procedure by selectively screening respondents according to their geographical location and other demographic factors, guaranteeing that

the sample included urban populations being studied. Based on these criteria, the survey was stratified as follows: 200 responses were from Bogotá, accounting for 37% of the total; 180 responses were from Medellín, accounting for 32% of the total; and 170 responses were from Cali, accounting for 31%. Of the 550 surveys received, 176 were excluded from the study due to a lack of essential information. These rejected surveys comprised 68% of the questionnaires that were considered complete. A total of 374 surveys were evaluated.

3.3. Measures

The survey consisted of five separate sections (see Appendix A). Each construct was be measured using established scales from the literature. The items were rated on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). The first section assessed was OCULT, using the scale Van den Berg and Wilderom (2004) proposed, and the second section, EK, was evaluated using the scale proposed by Haron et al. (2005). The third section, ATES, was measured using items adapted from Ajzen (2002), and the fourth, OCB, from Lee and Allen (2002). The fifth section gathered demographic data. The researchers translated and adapted the items that supported the constructs and performed a sequence of translations from English to Spanish and then from Spanish back to English. An analysis was undertaken to determine the credibility of the translation process by examining the differences and similarities between the two versions of the English language.

Table 1 displays the demographic analysis that indicates that the sample consists primarily of young and educated individuals, with a notable presence of females (60.7%). The high proportion of individuals aged 18–34, representing 74.1% of the entire sample, underscores the study's relevance to younger adults. Most participants have low income, as 63.4% reported an annual income between COP 0 and COP 4999. Regarding the level of education, most participants (51.3%) have bachelor's degrees, while 19.0% have acquired graduate degrees. This suggests that the sample is not only youthful but also possesses a high level of education. The demographic profile indicates that the sample comprises young, well-educated persons, primarily women, with relatively low to moderate income levels. The comprehensive comprehension of the participant demographics offers significant context for interpreting the study's findings and their relevance to broader populations.

Table 1. Demographics.

Age			**Income**		
	Frequency	**Percent**		**Frequency**	**Percent**
18–24	127	34.0	COP 0–COP 4999	237	63.4
25–34	150	40.1	COP 5000–COP 9999	65	17.4
35–44	59	15.8	COP 10,000–COP 14,999	24	6.4
45–54	28	7.5	COP 15,000–COP 19,999	16	4.3
55–64	8	2.1	COP 20,000–COP 24,999	9	2.4
65+	2	0.5	COP 25,000 and up	23	6.1
Education			Gender		
Less than a high school degree	13	3.5	Female	227	60.7
High school degree or equivalent (e.g., GED)	46	12.3	Male	147	39.3
Some college but no degree	45	12.0			
Associate degree	7	1.9			
Bachelor degree	192	51.3			
Graduate degree	71	19.0			

4. Results

4.1. Data Analysis

An initial analysis was performed to examine the research objectives, utilizing all the variables included in the study. The analysis used descriptive statistics and correlation analysis, utilizing IBM's SPSS program. Afterward, the internal consistency of the measurements was evaluated by calculating Cronbach's alpha coefficients. According

to Kline (2015), a Cronbach's alpha value of over 0.7 was established as the minimum acceptable level of internal consistency for the items. The measurement instruments were validated by confirmatory factor analysis (CFA) conducted using AMOS version 28. Various model fit indices were utilized to evaluate the appropriateness of the measurement model. The model was improved using modification indices suggested by AMOS. The convergent and discriminant validity examinations utilized composite reliability, average variance extraction, maximum shared variance, and maximal reliability.

Table 2 presents the computed values for means (M), standard deviations (SD), dependability coefficient (CA) (expressed by Cronbach's alpha), and correlations among the variables investigated in the study. OCULT exhibits a marginally reduced standard deviation of 0.50392, indicating that the responses for this variable were relatively more uniform. The table shows that all constructs have CA values higher than 0.8 (EK = 0.873; OCULT = 0.880; OCB = 0.807; ATES = 0.904), indicating strong internal consistency. A coefficient alpha (CA) value greater than 0.7 is often deemed satisfactory, suggesting that the items within each scale consistently measure the same underlying concept (Henseler et al. 2015). The standard deviations (SD) offer insights into the dispersion of the scores around the mean. OCB (0.0678) and EK (0.6053) have the highest standard deviation values, suggesting that their responses have more significant variability than the other variables. This reliability of measurements underscores the trustworthiness of the research findings.

Table 2. Descriptive Statistics.

	EK	**OCULT**	**OCB**	**ATES**
M	1.917	1.596	1.953	1.393
SD	0.605	0.503	0.678	0.550
CA	0.873	0.880	0.807	0.904
		Correlations		
	EK	OCULT	OCB	ATES
EK	0.809			
OCULT	0.665 ***	0.765		
OCB	0.675 ***	0.624 ***	0.763	
ATES	0.370 ***	0.592 ***	0.445 ***	0.833

Note: M: Mean; SD: Standard deviation; CA: Cronbach Alpha. Significance of Correlations: *** $p < 0.001$.

The correlation matrix provides insight into the interrelationships among the variables. All the correlations have a relatively high magnitude. The robust and substantial correlations suggest the existence of relevant connections between EK, OCULT, OCB, and ATES. The scales utilized in this analysis have high internal consistency, indicating that the measurements are reliable.

Confirmatory factor analysis (CFA) is a widely acknowledged technique in structural equation modeling (SEM) for validating measurement models in both route and structural studies (MacCallum et al. 2010). Table 3 displays the evaluation of the construct's reliability. Composite and maximum reliability values exceeding 0.7 imply strong construct dependability. Convergent validity is demonstrated when the composite reliability is higher than 0.7, and the average variance extracted is higher than 0.5 (Malhotra 2021). Gaskin and Lim (2016) state that the model should have an average variance extracted greater than 0.5 and a MaxR(H) (maximal reliability) greater than 0.7. Hence, Table 4 demonstrates the reliability and validity of the model.

The composite reliability (CR) values for all constructs indicate high internal consistency (EK, 0.883; OCULT, 0.848; OCB, 0.807; and ATES, 0.901), ensuring the model's reliability. Additionally, all constructs demonstrate good values for the average variance extracted, exceeding 0.5 (EK, 0.0654; OCULT, 0.585; OCB, 0.583; and ATES, 0.695). The Maximum Share Variance (EK, 0.456; OCULT, 0.442; OCB, 0.456; and ATES, 0.351) and maximum reliability (EK, 0.892; OCULT, 0.864; OCB, 0.808; and ATES, 0.908) further confirm the high level of reliability of the constructs, providing a strong foundation for the

model's validity. In order to improve reliability, the following variables were eliminated: EK1, OCULT1, and OCB4.

Table 3. Model Fit Measures.

Factor/Item	FL	CR	AVE	MSV	MaxR(H)
EK		0.883	0.654	0.456	0.892
EK2	0.764				
EK3	0.792				
EK4	0.795				
EK5	0.880				
OCULT		0.848	0.585	0.442	0.864
OCULT2	0.861				
OCULT3	0.684				
OCULT4	0.740				
OCULT5	0.763				
OCB		0.807	0.583	0.456	0.808
OCB1	0.783				
OCB2	0.758				
OCB3	0.749				
ATES		0.901	0.695	0.351	0.908
ATES1	0.764				
ATES2	0.882				
ATES3	0.867				
ATES4	0.815				

Notes: FL: Factor Loading; CR: composite reliability; AVE: average variance extracted; MSV: maximum shared variance; MaxR(H): maximal reliability—extraction method: maximum likelihood.

The Heterotrait–Monotrait Ratio (HTMT) is a quantitative measure used to evaluate the degree of distinctiveness across various traits or constructs in structural equation modeling. Discriminant validity assesses the degree to which a notion is genuinely distinct from other concepts. The findings of the HTMT ratio are presented in Table 4, and all of them were lower than the specified threshold of 0.85 (Henseler et al. 2015). Therefore, discriminant validity was achieved.

Table 4. HTMT Analysis.

	OCULT	EK	OCB	ATES
OCULT				
EK	0.576			
OCB	0.507	0.576		
ATES	0.491	0.342	0.86	

The HTMT values for all constructs are significantly lower than the threshold of 0.85, suggesting that each construct captures a distinct feature of the broader model and is not merely a reflection of other constructs. The robustness of discriminant validity is crucial for assuring the reliability and validity of the measurement model.

4.2. Structural Model Assessment

We incorporated all control variables into our analyses to mitigate the risk of potential endogeneity in the structural equation model. The independent factors include age, gender, education, and income. A structural equation model constructed using AMOS was employed to examine the relationships. A fitting model is considered excellent if the CMIN/df value is less than 5, and the goodness-of-fit (GFI) indices (Hair et al. 2017), the Tucker and Lewis (1973) indicator (TLI), and the confirmatory fit index (CFI) (Ullman 2006) are all greater than 0.90 (Hair et al. 2017). Furthermore, a model was considered suitable if the estimated value of the standardized root mean square residual (SRMR) in AMOS was less than 0.05 and

the root mean square error approximation (RMSEA) fell between the range of 0.05 to 0.08 (Hair et al. 2017). All structural equation modeling (SEM) indices meet the required criteria: CMIN/df = 2.249; GFI = 0.940; TLI = 0.961; CFI = 0.971; SRMR = 0.036; and RMSEA = 0.058; PClose = 0.123. In Table 5, the results of the hypotheses validation are presented.

Table 5. Hypotheses validation.

Hypothesis			S.E.	C.R.	*p*-Value	Decision
H1a: OCULT	→	EK	0.071	10.505	***	Supported
H1b: OCULT	→	ATES	0.053	9.532	***	Supported
H1c: OCULT	→	OCB	0.104	2.652	0.008	Supported
H2a: EK	→	OCB	0.082	6.257	***	Supported
H3a: ATES	→	OCB	0.088	2.122	0.034	Supported

Notes: S.E.: Standard error; C.R.: Critical ratio; *** $p < 0.001$.

The relationship between OCULT and EK is strongly supported (b = 0.661, t = 10.505, $p < 0.001$). The high C.R. and the highly significant *p*-value demonstrate that OCULT significantly enhances EK. This finding suggests that the cultural environment and context play a vital role in developing and disseminating EK. Therefore, hypothesis H1a is supported. Similarly, the relationship between OCULT and ATES is strongly supported (b = 0.587, t = 9.532, $p < 0.001$). Hence, hypothesis 2 is supported. These results suggest that OCULT is crucial in shaping how individuals perform and their ATES in the workplace. Therefore, hypothesis H1b is supported. The analysis evaluating the relationship between OCULT and OCB presents a positive relationship (b = 0.228, t = 2.652, $p = 0.008$), but the effect size is smaller than other significant relationships. Results suggest that OCULT has a modest but meaningful impact on OCB, likely because cultural values and norms influence how individuals engage with and support their organization. Hence, H1c is supported.

The impact of EK and OCB was analyzed, and this hypothesis is strongly supported. (b = 0.474, t = 6.257, $p < 0.001$). This finding implies that higher levels of EK significantly enhance OCB, possibly because knowledgeable individuals are more capable and willing to contribute positively to their organization. Therefore, H2a is supported. Results indicate a moderate effect when evaluating the relationship between ATES and OCB (b = 0.133, t = 2.122, $p = 0.034$). This suggests that ATES positively influences OCB, possibly due to the assessments capturing important behavioral traits or competencies that translate into positive organizational behaviors. Hence, H3a is supported.

4.3. Mediation Analysis

Table 6 and Figure 2 depict the mediation analysis. The study evaluates the mediation role of EK on the relationship between OCULT and OCB. The assessment presents that EK's strength and significance mediate the relationship (b = is 0.379, t = 4.79, $p = 0.001$). These results imply that OCULT enhances EK, boosting OCB. Therefore, H2b is supported. The study evaluates the mediation role of ATES on the relationship between OCULT and OCB. The analysis shows a small, marginally non-significant indirect effect, with a standardized estimate of 0.074. The analysis indicates that ATES significantly mediates the relationship between OCULT and OCB (b = 0.095, t = 1.696, $p = 0.035$). The significance of this mediation suggests that ATES, influenced by OCULT, plays a critical role in shaping OCB. Hence, H3b is supported.

Table 6. Mediation analysis.

Hypothesis	Direct Effect	Indirect Effect	Lower	Upper	*p*-Value	Standardized Estimate	Decision
H2b: OCULT→EK→OCB	0.276	0.313	0.264	0.523	0.001	0.344 ***	Mediation
H3b: OCULT→ATES→OCB	0.276	0.078	0.019	0.205	0.035	0.078 *	Mediation

*** $p < 0.001$; * $p < 0.05$.

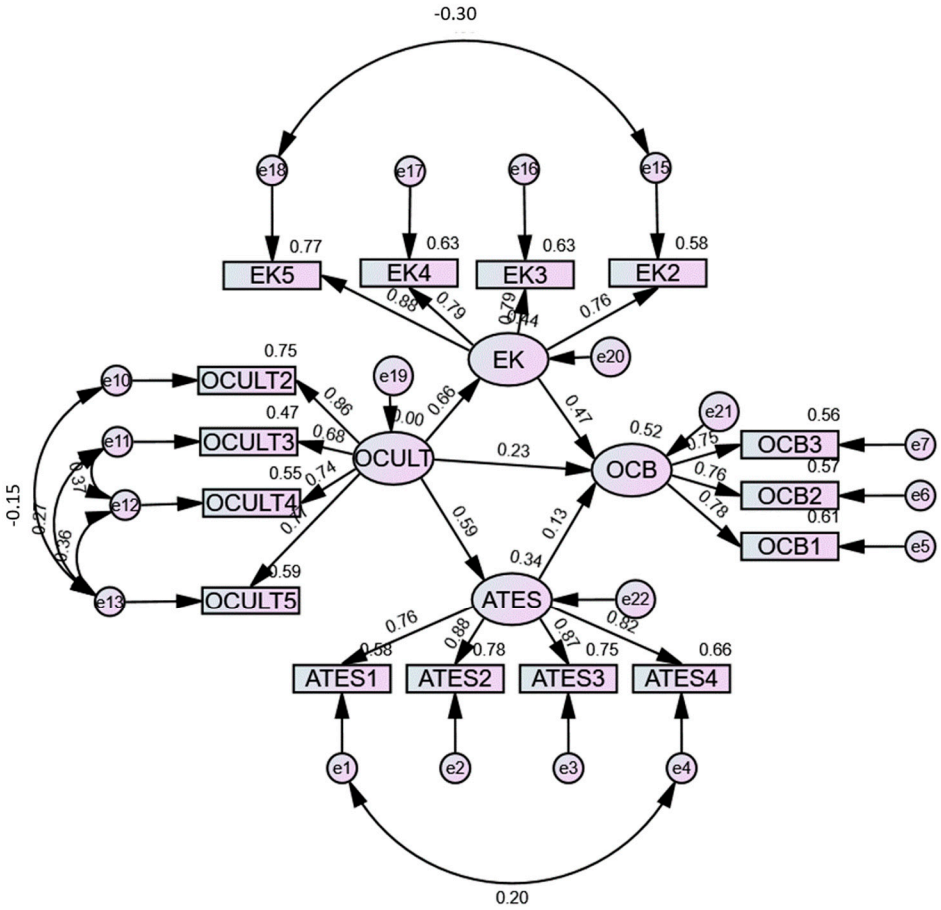

Figure 2. Structural Equation Modeling.

5. Discussion

The findings of this study expose the complex dynamics between organizational culture (OCULT), environmental knowledge (EK), attitudes towards energy savings (ATES), and organizational citizenship behavior (OCB). The study provides compelling evidence that OCULT is essential in shaping EK and ATES and significantly influences OCB.

OCULT significantly impacts EK and ATES. The results are consistent with the theoretical propositions of Schein (2010), who argued that the shared values and norms within an organization significantly shape employee behavior and attitudes. This study reinforces that a robust OCULT prioritizing sustainability can enhance employees' EK and ATES. These findings align with previous studies, such as those by Cameron et al. (2014), which highlighted the critical role of OCULT in promoting environmental performance and competitive advantage. Moreover, the significant relationship between OCULT and EK suggests that organizations with strong cultures of sustainability are more likely to disseminate EK effectively. This is supported by Gold et al. (2001), who found that knowledge-sharing practices within organizations are crucial for enhancing environmental performance and providing employees with an effective strategy to improve their organization's environmental performance. Thus, fostering a culture that values and promotes sustainability can lead to a knowledgeable workforce that actively engages in environmentally friendly practices.

The impact of EK in mediating the relationship between OCULT and OCB is particularly significant. This suggests that improving employees' EK can enhance the favorable effects of OCULT on citizenship behaviors. This finding is consistent with the perspectives of Nonaka and Takeuchi (1996), who emphasized the importance of knowledge in driving organizational behavior. The results suggest that by investing in environmental education and training, organizations can cultivate a workforce that understands the importance of sustainability and translates this understanding into proactive citizenship behaviors.

ATES also mediates the relationship between OCULT and OCB. This aligns with the theory of planned behavior (Ajzen 1991), which posits that attitudes are crucial predictors of behavior, and the Value-Belief-Norm Theory proposes that environmental behaviors are shaped by a sequential series of factors, initiating with personal values, progressing via beliefs, and culminating in norms that govern conduct. The study's findings suggest that a positive OCULT can foster favorable ATES, enhancing OCB. This highlights the importance of shaping organizational norms and values to support energy conservation efforts, as Steg (2008) suggested. However, it is interesting to note that while ATES significantly influenced OCB, its impact on EK was not supported. This divergence indicates that while ATES directly influence citizenship behaviors, they may not necessarily translate into higher EK. This points to the potential complexity of attitude–behavior relationships and suggests that different mechanisms may be at play in how attitudes and knowledge interact to influence behavior.

6. Conclusions

The study illustrates that cultural influences substantially impact attitudes, knowledge, and sustainability-related organizational citizenship actions. More precisely, the impact of OCULT on ATES is notably positive, as evidenced by a sizeable path coefficient of 0.587 and a highly significant p-value ($p < 0.001$). This finding implies that ATES relevant to a specific culture is essential for improving performance and results. Similarly, the link between OCULT and EK is strong, as indicated by a path coefficient of 0.661 and a very significant p-value ($p < 0.001$). This highlights the crucial significance of cultural factors in influencing knowledge within companies, corroborating Hofstede's (1984) research on cultural dimensions. In addition, the study found that OCULT has a positive effect on OCB, with a path coefficient of 0.228 and a p-value of 0.008. This suggests that cultural factors considerably influence OCB, which is consistent with the findings of Organ and Ryan (1995).

The research underscores the empowering role of knowledge in improving organizational behaviors. It demonstrates a highly significant correlation between EK and OCB, with a robust path coefficient of 0.675 and a significant p-value ($p < 0.001$). This finding highlights the potential of knowledge sharing within an organization to significantly enhance the behaviors of individuals, aligning with the research conducted by Podsakoff et al. (2000). It emphasizes that organizations can empower their workforce by prioritizing knowledge enhancement, thereby fostering a more engaged and proactive workforce.

The mediation analysis provides a detailed and subtle understanding of the mechanisms by which cultural influences impact OCB. EK is crucial in mediating the connection between OCULT and OCB, as evidenced by the standardized estimate of 0.344 and the highly significant p-value ($p < 0.001$). This finding underscores the significance of understanding cultural impacts and translating them into favorable organizational results, informing the employees about the complexities of organizational dynamics. Similarly, although with a lighter impact, the study found mediation analysis ATES and EK, as evidenced by the standardized estimate of 0.078 and on-tail significant p-value ($p < 0.005$). This suggests that culture in organizations positively impacts ATES and, together with it, can improve OCB.

The study highlights the profound impact of OCULT on OCB, both directly and indirectly, through EK and ATES. The significant relationships emphasize the need for organizations to integrate cultural considerations into their knowledge management and assessment practices. By doing so, organizations can foster a more engaged and proactive workforce, enhancing overall organizational performance.

The study indicates that corporate environmental policies positively impact employees' environmental responsibility. In the context of emerging Latin American countries, increasing the visibility of these policies—particularly by showcasing the economic advantages of various environmental initiatives, such as reducing electricity or water consumption—can further enhance employees' commitment to environmental responsibility. This research underscores the role of a robust organizational culture that fosters awareness and attitudes

toward energy conservation in improving organizational citizenship behavior (OCB). Consequently, it highlights the significance of embedding sustainability into organizational strategies to cultivate a more engaged and proactive workforce.

6.1. Practical Implications

The significant mediation effect of ATES between OCULT and OCB underscores the importance of culturally relevant ATES. Organizations should ensure that assessment tools are culturally aligned to enhance effectiveness and promote positive organizational behaviors. This is supported by the work of Ang et al. (2006), which highlights the role of cultural intelligence in improving assessment outcomes. Organizations should prioritize enhancing knowledge within their cultural context. EK's strong direct and mediating effects suggest that culturally tailored training programs and knowledge-sharing initiatives can significantly boost OCB. Nonaka and Takeuchi's (1996) knowledge creation theory emphasizes such initiatives' importance for organizational success.

6.2. Theoretical Implications

The study has several theoretical implications. First, the findings reinforce culture's critical role in shaping organizational knowledge and behavior. Cultural factors significantly influence assessment outcomes and knowledge, affecting organizational behaviors. This aligns with Hofstede's (1984) cultural dimensions theory, which highlights the profound impact of culture on organizational processes. Second, the study provides evidence for specific mediation mechanisms, particularly the roles of ATES and EK in translating cultural influences into organizational behaviors. This underscores the importance of considering both direct and indirect pathways in theoretical models of organizational behavior, as discussed by Baron and Kenny (1986). Third, several studies have analyzed components of the TPB (Fatoki 2023; Qalati et al. 2022; Gao et al. 2017) and VBN (Liu and Wu 2020; Ibtissem 2010) theories in the context of energy saving, but integrating OCULT and OCB in a research model is a novelty. Finally, this study enhances comprehension of the mediating role of ATES and EK between OCULT and OCB. The results suggest that the components of the TPB and VBN theories and the other factors considered in the research model are sufficient to enhance the understanding of energy savings in the workplace by improving OCULT and developing employee knowledge. The current research findings validate that the goal of conserving energy directly and indirectly impacts energy-saving behavior.

6.3. Limitations

This study has three main limitations that should be considered when interpreting the results. Firstly, the study's cross-sectional design limits the ability to infer causal relationships between organizational culture, environmental knowledge, attitudes toward energy savings, and organizational citizenship behavior. Longitudinal studies provide a better understanding of these dynamics over time. Secondly, the data was collected from a developing country, Colombia, which may limit the generalizability of the findings to other settings or industries. Thirdly, relying on self-reported measures can introduce biases such as social desirability bias, where participants may respond in a manner they perceive as favorable. Future research should address these limitations by employing longitudinal designs, exploring diverse organizational contexts, incorporating objective measures, and considering additional moderating and mediating variables.

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Appendix A

Table A1. Questionnaire.

Variable	Items
Organizational Culture (Van den Berg and Wilderom 2004).	1. Individuals working in different departments have a common view toward energy savings. (Eliminated in the CFA analysis). 2. Our ethical values help us differentiate right from wrong and guide our energy-saving behavior. 3. There is an ethical code that guides our behavior and tells us right from wrong. 4. My organization has a very strong culture toward energy savings 5. In my organization, there is a clear agreement about the right and wrong ways to do things.
Environmental Knowledge (Haron et al. 2005).	1. I know that I buy products and packages that are environmentally safe (Eliminated in the CFA analysis). 2. I know more about energy saving than the average person. 3. I am very knowledgeable about environmental issues, especially in energy saving. 4. I understand the various phrases and symbols related to the environment on energy saving. 5. I know how to select products and packages that reduce the amount of energy waste.
Attitude Toward Energy Savings (Ajzen 2002)	1. I think saving energy in my company is useful to protect the environment. 2. I think saving energy in my company significantly reduces carbon emissions. 3. I think saving energy in my company is valuable to alleviating energy shortage issues. 4. I think saving energy in my company is a wise action.
Organizational citizenship behavior (Lee and Allen 2002)	1. Willingly give my time to help others with work-related energy-saving problems. 2. Show genuine concern and courtesy toward coworkers, even under the most trying business or personal situations related to energy saving. 3. Assist others with their duties related to energy savings. 4. Demonstrate concern about the image of the organization about energy saving. (Eliminated in the CFA analysis).

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