



L'émergence des comportements pro-environnementaux en milieu du travail: une recherche exploratoire dans divers contextes organisationnels

Thèse

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Résumé

Les organisations - publiques, privées et à but non lucratif - sont responsables pour une large part des impacts environnementaux. Selon certaines estimations, les activités manufacturières représentent 30 % des émissions mondiales de CO₂, alors que les services commerciaux et publics représentent 10 % de ces émissions. Étant donné que cette pollution est le résultat d'activités humaines au sein des organisations, une attention accrue doit être portée aux comportements individuels des employé(e)s. En favorisant et en encourageant les comportements plus écoresponsables chez les employé(e)s, il est possible de minimiser l'impact négatif des organisations et s'assurer d'un avenir plus durable. Cependant, la transformation des comportements individuels nécessite l'examen minutieux d'un grand nombre de facteurs, dont certains ont été peu ou pas explorés dans la littérature scientifique. Composée de trois études distinctes mais étroitement liées, cette thèse entend contribuer à la littérature sur les comportements individuels pro-environnementaux dans les organisations. Spécifiquement, la thèse est centrée sur la question de recherche suivante : Pourquoi certain(e)s employé(e)s sont-ils(-elles) plus enclins que d'autres à adopter des comportements verts dans leur milieu de travail et quelles mesures peuvent être prises par les organisations pour stimuler les initiatives pro-environnementales de leur personnel?

Le premier article de la thèse propose une revue systématique de la littérature sur les comportements pro-environnementaux des employé(e)s. Cet article a démontré que peu d'études dans le domaine étaient basées sur les théories comportementales, ce qui est surprenant en considérant la nature comportementale du phénomène. Aussi, seulement quelques études ont été faites en dehors des entreprises, démontrant l'impossibilité de généraliser les résultats à d'autres contextes organisationnels. Finalement, les études démontraient également une séparation entre les suggestions pratiques et les barrières qui influencent les comportements, ce qui peut entraîner des actions promotionnelles inefficaces au sein des organisations. Les deux autres articles de la thèse répondent à ces lacunes à partir d'études empiriques.

Ainsi, l'objectif du deuxième article est d'évaluer l'importance de chaque obstacle associé aux comportements verts des employé(e)s non académiques d'une université. Basée sur la théorie du comportement planifié, cette étude examine les croyances des employé(e)s envers deux types de comportements pro-environnementaux : l'utilisation des transports alternatifs et la suggestion d'idées écologiques. Les résultats de cette recherche démontrent qu'il est possible de prédire l'intention des individus d'exercer des actions vertes au travail, mais aussi de les amener à modifier

ces actions grâce à des interventions. Plus important encore, les facteurs associés au milieu de travail, tels que l'opinion des collègues et la nécessité de remplir des formulaires officiels afin de changer les routines administratives, ont joué un rôle significatif dans les décisions des employé(e)s de s'engager à accomplir des comportements verts. Cela signifie que les organisations sont en mesure d'accroître la fréquence des comportements pro-environnementaux en ciblant ces facteurs à travers des pratiques de gestion qui sont expliquées dans l'article.

En ce qui concerne le troisième article, celui-ci porte sur les facteurs qui entravent l'émergence d'innovations pro-environnementales de la part des employé(e)s dans des ministères et organismes publics québécois. Les résultats de cette recherche indiquent que deux aspects contextuels déterminent les facteurs qui influencent de telles innovations : le type d'organisation et l'initiateur de l'idée. En lien avec la littérature, les innovations initiées dans les organismes publics où le développement durable est profondément intégré dans les pratiques quotidiennes faisaient face à moins de barrières en comparaison avec les organismes où le développement durable est intégré de façon superficielle. Simultanément, contrairement à ce qui était initialement prévu, les employé(e)s travaillant sur des tâches en lien avec l'environnement ont eu plus de facteurs à considérer avant de lancer les innovations (par exemple, la nécessité d'être transparent(e)s aux yeux de la population et la prise en compte de l'agenda politique), comparativement aux employé(e)s qui travaillent dans d'autres départements. Cette recherche met en lumière deux types d'innovations pro-environnementales (proactives et contributives) et donne quelques conseils pratiques afin de favoriser l'émergence de ces idées.

Bien que les trois recherches portent sur des contextes organisationnels différents, elles offrent des perspectives complémentaires au même phénomène. Généralement, les résultats de cette thèse sont les premiers pas vers une vue plus nuancée des comportements verts exercés par les employé(e)s, comportements qui ne doivent pas être considérés comme un seul type monolithique d'actions.

Abstract

Various types of organizations (public, private, non-profit) bear a large part of responsibility for the constantly deteriorating environment. According to some estimates, manufacturing activities account for 30% of global CO₂ emissions, and commercial/public services account for 10% of such emissions. As this pollution is the result of human activities within organizations, an increased attention should be paid to individual behaviors of employees. Greening daily actions of employees can minimize negative impacts of organizations and lead to a more sustainable future. However, the transformation of individual behaviors requires a careful examination of a large number of factors, many of which have not been explored in the academic literature. In this context, this thesis, composed of three distinct but tightly connected studies, is dedicated to the following research question: Why some employees are more inclined to perform green behaviors in the workplace than others and what steps can be undertaken by organizations to increase the likelihood of voluntary pro-environmental activities among personnel?

The first article of the thesis is a systematic review of the literature on pro-environmental behaviors in the workplace. It provides a comprehensive mapping of the literature on previously explored obstacles to such behaviors and managerial practices that are applied to encourage these individual actions. Also, this article points out several literature gaps that require further investigation, notably: the lack of studies based on behavioral theories (which is surprising given the fact that individual actions should be studied through the lens of psychological frameworks), the quantitative nature of most research in the domain (which means a relatively limited critical approach), the lack of articles with samples of employees working outside of the private sector (which points at the impossibility of generalizing results to other types of organizations), as well as the disconnection between practical suggestions and barriers that influence behaviors (which might lead to inefficient promotional measures within organizations and, as a consequence, useless expenditures). The two other articles of the thesis address these issues.

The objective of the second article is to evaluate the relative importance of each obstacle associated with green behaviors of non-academic university employees. Based on the theory of planned behaviour, this study examines employees' beliefs towards two pro-environmental behaviors: the use of alternative transportation and the suggestion of ecological ideas at work. The results of this research demonstrate that it is possible to predict the intention of employees to perform green behaviors, and, as a consequence, they can be changed through an intervention. More importantly,

various factors linked with the workplace context (for example, the opinion of colleagues and the necessity to fill in forms to change administrative routines) played a significant role in the decision of employees to get involved in green behaviors. This signifies that organizations are capable of increasing the frequency of pro-environmental behaviors by targeting these factors through a range of managerial practices described in the article.

Concerning the third article, it is based on a qualitative approach and discusses factors that impede the emergence of employee-driven pro-environmental innovations within ministries and public organizations in Quebec. The results of this research indicate that two contextual aspects determine which factors influence such innovations: the type of organization and the initiator of the idea. In line with the literature, innovations initiated in public organizations where sustainability was profoundly integrated in daily practices faced fewer barriers in comparison with organizations where sustainability is taken into account superficially. At the same time, and contrary to the initial expectations, employees with environment-related duties have more factors to consider prior to launching innovations (for instance, the necessity of being transparent in the eyes of the population and the existence of the political agenda) in comparison with their colleagues from other departments. This study sheds light on two types of pro-environmental innovations (proactive and contributory) and the aspects that determine the likelihood of these ideas emerging in public organizations.

Although the three studies of the thesis discuss different organizational contexts, they offer complimentary perspectives on the same phenomenon. In general, the results of this dissertation are one of the first steps towards a more nuanced view of workplace green behaviors that should not be considered as a monolithic type of individual actions performed by employees.

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Liste des abréviations

AMOS	Analysis of Moment Structures
AT	Attitude
CFI	Comparative fit index
CO ₂	Carbon dioxide
EPA	Environmental Protection Agency
IBM	International Business Machines
INT	Intention
IPCC	Intergovernmental Panel on Climate Change
ISO	International Organization for Standardization
NGO	Non-governmental organization
NNFI	Non-normed fit index
NS	Not significant
OCB	Organizational Citizenship Behavior
OCBE	Organizational Citizenship Behavior for the Environment
PA	Public Administration
PBC	Perceived Behavioral Control
PhD	Doctor of Philosophy
QDA	Qualitative Data Analysis
RMSEA	Root mean square error of approximation
SD	Standard Deviation
SDA	Sustainable Development Act
SN	Subjective Norm
SPSS	Statistical Package for Social Sciences
STARS	Sustainability Tracking Assessment and Rating System
TPB	Theory of Planned Behavior
UNEP	United Nations Environmental Program
UNGC	United Nations Global Compact
UK	United Kingdom
US	United States of America
USA	United States of America
USD	United States dollar

Remerciements

It took me almost five years to finish this thesis. Most of these five years were filled with hard but exciting work. However, this thesis would never be completed without the help and constant support of many people, and I would like to express my sincere appreciation to all those who assisted me in this long and unforgettable journey.

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her. She was, is, and forever will be my inspiration in everything I do in life, and this thesis is no exception. Her support during these five years was unparalleled and extraordinary. She helped me to think outside the box when it came down to theorization and philosophical discussions. She assisted me with difficult analyses of data. She did not mind me staying long hours in the library, whether on weekday or weekend. Whenever needed, she cooked, so that I can concentrate better on my writing. She even wrote polite emails for me, at the times when I did not have any more patience. Finally, she provided me with mental support and encouraged to move on during the hardest times of this journey. I do not believe that I would be capable of finishing even a half of this thesis without her help. I love her, and I know that together we can do anything.

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Avant-Propos

Cette thèse est composée de trois articles. L'article 1 de la thèse (Chapitre 1)¹, intitulé « Overcoming the barriers to pro-environmental behaviors in the workplace: A systematic review », a été publié dans la revue *Journal of Cleaner Production*. L'article a été initialement soumis à la revue le 18 septembre 2017, puis a été publié le 5 février 2018. La version préliminaire de l'article a été présentée à la conférence de la *Society for Business Ethics* en 2017, pour laquelle j'ai reçu le *Emerging Scholar Award*. L'article a été rédigé par quatre auteur(e)s :

- **Alexander Yuriev**. L'auteur principal. Le rôle et les responsabilités de l'auteur : la rédaction de toutes les parties de l'article, la collecte et l'analyse des données, le développement d'une grille d'analyse et le processus complet de la révision-resoumission à la revue (la révision du manuscrit et la préparation de la réponse aux évaluateurs);
- **Olivier Boiral**. Le rôle et les responsabilités de l'auteur : l'idée initiale de l'article, la révision de la grille d'analyse et son ajustement, la relecture de l'article avant la soumission, ainsi que pendant le processus de la révision-resoumission;
- **Virginie Francoeur**. Le rôle et les responsabilités de l'auteure : le triage des articles, la préparation de certaines parties de la méthodologie et le formatage de l'article selon les règles de la revue;
- **Pascal Paillé**. Le rôle et les responsabilités de l'auteur : la contribution conceptuelle au début de la recherche, la révision de la section théorique, le choix des revues potentielles et la rédaction des lettres à l'éditeur.

L'article 2 (Chapitre 2)², intitulé « Evaluating determinants of employees' pro-environmental behavioral intentions », est dans le processus de la révision-resoumission dans la revue *International Journal of Manpower*. L'article a été initialement soumis à la revue le 21 août 2019, puis resoumis après révision majeure le 2 décembre 2019. En août 2019, il a été présenté à la conférence annuelle de l'*Academy of Management* à Boston. L'article a été rédigé par trois auteur(e)s :

¹ Yuriev, A., Boiral, O., Francoeur, V., & Paillé, P. (2018). « Overcoming the Barriers to Pro-Environmental Behaviors in the Workplace: A Systematic Review », *Journal of Cleaner Production*, 182, 379-394.

² Yuriev, A., Boiral, O., & Guillaumie, L. (en révision-resoumission) dans la revue *International Journal of Manpower*. « Evaluating determinants of employees' pro-environmental behavioral intentions ».

- **Alexander Yuriev.** L'auteur principal. Le rôle et les responsabilités de l'auteur : la rédaction de toutes les parties de l'article, la collecte et l'analyse des données qualitatives et quantitatives, l'interprétation des résultats, le développement du questionnaire et le processus complet de la révision-resoumission à la revue (la révision du manuscrit et la préparation de la réponse aux évaluateurs);
- **Olivier Boiral.** Le rôle et les responsabilités de l'auteur : l'idée initiale de la recherche, la révision et l'ajustement du questionnaire d'entrevue (la partie qualitative de l'étude), la révision et la relecture de l'article;
- **Laurence Guillaumie.** Le rôle et les responsabilités de l'auteure : la rédaction de certaines sections théoriques (modèle conceptuel), la révision des hypothèses et du questionnaire (la partie quantitative), la contribution à l'analyse et à l'interprétation des résultats, ainsi que la relecture avant la soumission à la revue.

L'article 3 (Chapitre 3), intitulé « Is There a Place for Employee-Driven Pro-environmental Innovations? The Case of Public Organizations », sera soumis à la revue *Public Management Review* au début de 2020. Il est possible qu'il soit présenté lors de la conférence annuelle de l'*Academy of Management* en août 2020, à Vancouver. L'article a été rédigé par deux auteurs :

- **Alexander Yuriev.** L'auteur principal. Le rôle et les responsabilités de l'auteur : la rédaction de toutes les parties de l'article, la collecte et l'analyse des données, et l'interprétation des résultats.
- **Olivier Boiral.** Le rôle et les responsabilités de l'auteur : l'idée initiale de la recherche, la révision et l'ajustement de la grille d'entrevue, la révision et la relecture de l'article.

Introduction

Humanity's negative impact on the environment has been growing constantly. According to a popular estimate of the world's environmental footprint, global consumption of resources in 2019 exceeded the planet's capacity to regenerate them by 1.75 times, almost twice as much as 40 years ago (Earth Overshoot Day, 2019). Climate change's devastating effects cannot be underestimated, and each year, its repercussions can be witnessed worldwide. For instance, strong tropical hurricanes are associated with the changing climate (Michener, Blood, Bildstein, Brinson, & Gardner, 1997). Steadily rising sea levels, which potentially can put billions of people in danger, are a consequence of melting Arctic ice from increased CO₂ emissions (Charbit, Paillard, & Ramstein, 2008) For example, measurements indicate that the sea level in certain parts of Prince Edward Island (Canada) rose by 36 cm in the past century (1911 to 2011), with an additional 100 cm rise expected over the next century (IPCC, 2013). Such drastic climatic changes carry enormous economic repercussions. According to some long-term predictions, 4.6% of the planet's population will be flooded annually by 2100, with an expected loss of up to 9.3% of global gross domestic product, requiring USD \$71 billion per year in expenditures for protection, maintenance, and relocation costs (Hinkel et al., 2014). This is why governments actively have taken part in promoting and financing international programs to tackle these problems. For instance, the Global Environment Fund received USD \$55 million from the top 10 countries-contributors in 2018 (UNEP, 2019). Similarly, almost 10,000 companies adhere to the United Nations Global Compact, an initiative that encourages companies to adopt sustainability and socially responsible practices (UNGC, 2019).

Regarding this last point, the transformation of business operations is crucial for overcoming climate-change issues, partly because companies and other organizations bear a large share of responsibility for the deteriorating natural environment. For example, according to the U.S. Environmental Protection Agency, commercial and industrial activities account for more than 30% of greenhouse gas emissions in the U.S. (EPA, 2019). In Quebec, the numbers are similar: Transportation produces 41% of CO₂ emissions, with 26% from heavy industries (Canada Energy Regulator, 2019). Efforts by contemporary organizations that strive to be socially responsible are numerous, including emission-reduction targets, technology modernization, disclosure commitments, trading schemes, training sessions, and local sourcing, among others. These sustainability actions frequently are planned, controlled and executed with the help of formal environmental policies and management systems. Although such document-based approaches might

take various forms, the most widespread environmental management system is ISO 14001, which over 350,000 companies have adopted worldwide (ISO, 2018). According to many scholars, following this standard's guidelines tends to be associated not only with improved environmental performance, but also with such aspects as improved relationships with stakeholders (Poksinska, Dahlgaard, & Eklund, 2003), customer satisfaction (Alemagi, Oben, & Ertel, 2006; Castka & Corbett, 2016), company image (González-Benito & González-Benito, 2008; Poksinska et al., 2003), and increased productivity (Bansal & Hunter, 2002).

However, merely adopting a management system or an environmental policy does not guarantee the aforementioned benefits, as these initiatives' success depends, among other things, on employees' involvement (Boiral, 2007; Darnall & Kim, 2012; Jiang & Bansal, 2003). Without a continuous implication and determined engagement among personnel, the implementation of formal management systems tends to become ceremonial and inefficient (Boiral, 2005, 2002; Christmann & Taylor, 2006). The importance of employees' role in ameliorating environmental performance is emphasized in the latest version of ISO 14001. According to this standard, organizations must «determine the necessary competence of person(s) doing work under its control that affects its environmental performance...» (ISO, 2015, p. 11). This formal prescription is related principally to so-called in-role behaviors (Ramus & Killmer, 2007), which refer to certain employees' direct duties. For instance, it is the environmental manager's responsibility to initiate new activities for better recycling within an enterprise or to control contamination levels. Similarly, some factory-level workers also are responsible for ensuring that toxic or hazardous materials do not end up in water reservoirs and instead are disposed of in accordance with the law.

Nevertheless, other employees also can play a significant role in reducing organizational environmental footprints. Each worker's role in achieving sustainability can be best described by a famous phrase from the Canadian philosopher Marshall McLuhan: «There are no passengers on spaceship Earth. We are all crew» («This Spaceship Earth», 2015, para. 1). Indeed, any employee can engage in numerous pro-environmental behaviors voluntarily, such as commuting to work via public transportation instead of a car, using videoconferencing instead of travelling, turning off lights when leaving the office, recycling waste after lunch, etc. Scholars refer to these voluntary green behaviors as organizational citizenship behaviors for the environment (OCBEs), defined as «individual and discretionary social behaviors not explicitly recognized by the formal reward

system and contributing to improve the effectiveness of environmental management of organizations» (Boiral, 2009, p. 223).

Although these behaviors might appear to be quite similar to those of individuals outside the workplace, studies have demonstrated that individuals' decisions to engage in pro-environmental behaviors depend on the context (Paillé, Raineri, & Boiral, 2017; Smith & O'Sullivan, 2012). In other words, employees who are environmentally conscious in non-work contexts might not perform green actions while at work, and vice versa. Therefore, different sets of factors influence green behaviors performed at home and OCBEs. Without a profound understanding of these factors, promoting OCBEs hardly can be efficient. Although existing empirical studies have addressed this question from different perspectives (e.g., Inoue & Alfaro-Barrantes, 2015; Lo, Peters, & Kok, 2012a; Norton, Parker, Zacher, & Ashkanasy, 2015), extant literature on the subject contains several weaknesses. First, relatively high dispersion characterizes this research stream, as the number of published studies has been growing rapidly in the past decade. For instance, only two articles on green workplace behaviors were published in 2000, but 16 were published in 2016 (Francoeur et al., 2019). Furthermore, available studies in this field cover a wide variety of intertwined topics, including organizational green culture, workplace leaders' role in behavioral change, pro-environmental interventions' efficiency, motivational states, and contextual and within-person variables' influence on such individual actions, among many others (Norton et al., 2015). Therefore, extant literature lacks structuration and theoretical refinement. Second, previous studies' results indicate that adopted theoretical frameworks do not allow scholars to go beyond identifying factors (Greaves et al., 2013; Norton et al., 2015). It is time for research to move toward trying to determine what aspects should be addressed to elicit positive behavioral changes. Third, most extant research in this field is conducted in similar organizational contexts, using somewhat similar quantitative methods. This leads to stagnation in extant literature, which requires a critical approach to open up new possibilities for research and to deepen our understanding of the phenomenon. To shed more light on how OCBEs can be promoted more efficiently, this doctoral thesis attempts to fill in these literature gaps. With the purpose of exploring factors that affect pro-environmental workplace behaviors in various organizational contexts, this thesis comprises three distinctive studies based on complementary methodological approaches and carefully selected theoretical frameworks.

The rest of the introduction contains four sub-sections. First, the importance of organizations' green behaviors is explained. Second, the difficulty in promoting these behaviors in organizational contexts is clarified. Third, the research question is presented, and the reasoning behind the three studies in the dissertation is outlined. Fourth, the general structure of the thesis is presented.

OCBEs' importance for organizations

Studying employees' pro-environmental behaviors is crucial for several reasons. Although one might think that OCBEs only exert positive effects on environmental management, these actions entail other far-reaching impacts that contribute to organizational operations' entire scope.

First, the large number of employees who potentially can perform these behaviors makes them significant (Boiral & Paillé, 2012). While amelioration from one employee's pro-environmental actions might be viewed as insignificant, OCBEs' potential cumulative effect across an organization with several thousand employees is considerable and should not be overlooked (Daily et al., 2009). For example, the giant information technology company IBM saved 325,500 megawatt-hours of electricity in 2014 after implementing over 2,200 employee-driven projects at 341 sites globally (Polman and Bhattacharya, 2016).

Second, participation in voluntary pro-environmental activities does not require that organizations allocate additional time or financial resources. Indeed, these behaviors always are performed simultaneously through direct duties, so they do not affect workday flows. For example, an employee need not change his or her agenda merely by deciding to turn off his or her desk computer at the end of the day. In this context, while a decreasing environmental footprint usually is associated with monetary investments, behavioral modifications frequently are viewed as the least expensive and fastest solution for improving organizational processes (Azhar & Yang, 2019). Moreover, some pro-environmental behaviors allow organizations to economize time significantly and, as a consequence, generate more revenue. For instance, telemedicine is believed to save time for patients and health workers while maintaining care quality for certain services (Hilty et al., 2013; Kairy et al., 2009). More recently, online consultations with patients have been linked to environmental benefits. In fact, doctors' use of videoconferencing for client consultations at a Swedish hospital resulted in a 40-fold decrease in carbon emissions compared with physical visits (Holmner, Ebi, Lazuardi, & Nilsson, 2014).

Third, OCBEs could make integration of environmental management systems significantly more successful by limiting superficial and symbolic adoption (Boiral, 2009). Taking ISO 14001 as an example, most benefits do not derive from being compliant with this standard, but rather from the degree of employee mobilization that the system creates (Kitazawa & Sarkis, 2000; Yin & Schmeidler, 2009). If more voluntary pro-environmental behaviors are performed, objectives that environmental management systems seek can be achieved more rapidly. Furthermore, implementation of ISO 14001 or other environmental management systems supposes a certain change in internal workplace culture (Kitazawa & Sarkis, 2000; Cayer, Raufflet, & Delannon, 2011), which seems easier to achieve for organizations in which OCBEs are ubiquitous (Boiral, Paillé, & Raineri, 2015; Terrier, Kim, & Fernandez, 2016). This results from a higher level of environmental consciousness generally demonstrated by employees who engage in green activities (Boiral, Baron, & Gunnlaugson, 2014; Cleveland, Kalamas, & Laroche, 2005).

Fourth, OCBEs also play a major role in developing tacit knowledge, which is known to be difficult to codify and internalize (Nonaka & von Krogh, 2009). Due to certain employees' proximity to contamination sources, they are frequently more aware of technical problems or accidental spills than their managers (Boiral, 2002). However, organizations frequently rely on employees' discretion when it comes to sharing this type of information, as it hardly can be controlled through formal procedures. In this context, OCBEs not only might lead to an increased competitive advantage from a higher level of personnel competency, but they also could help organizations prevent potentially polluting accidents and ensure more rapid reactions in emergencies (Boiral, 2009).

Finally, these behaviors' importance appears to be even greater for certain employees, such as individuals working in the public sector. Regardless of job title, these employees are expected to work in society's best interests (Azhar & Yang, 2019), and conserving the environment currently is a priority in many countries (Happaerts, 2012; Vlaamse Regering, 2011). Furthermore, such actions might lead to economic benefits through reduced consumption of resources (Stritch & Christensen, 2016), which is particularly important considering that relatively fewer economic resources are dedicated to environmental protection in the public sector (Gerbet, 2019). In this context, public employees' pro-environmental behaviors contribute to social well-being and, consequently, improve government services' quality (Azhar & Yang, 2019; Stritch & Christensen, 2016). Similarly, OCBEs are also very important for non-academic university personnel. In fact, students

can perceive pro-environmental behaviors that universities' administrative personnel perform as a behavioral example and engage in such positive practices more frequently (Fonseca et al., 2011).

Undoubtedly, employees' pro-environmental behaviors offer multiple benefits, and organizations should not overlook them. Nevertheless, several challenges discussed in the next sub-section hinder their promotion.

How difficult is it to promote pro-environmental behaviors in the workplace?

Encouraging OCBs is associated with several challenges that originate from certain peculiarities tied to these individual actions, namely diversity, visibility, traceability, and discretion. First, the promotion of such behaviors is complicated because it is hardly possible to create an encompassing list of OCBs. These actions' plurality is explained by their contextual nature and each job's specificity. For example, mining workers' potential pro-environmental actions are completely different from green behaviors among employees working in an office. OCBs' diversity is also one of the reasons why formal systems are inefficient in promoting them (Boiral, 2009). Not only is documentation of each behavior cumbersome and time-consuming, but it also increases organizational bureaucracy levels, which slow down business operations (Boiral, 2007; Jiang & Bansal, 2003).

Second, pro-environmental workplace behaviors' outcomes rarely are visible (Boiral, 2009), which means that it frequently is difficult to determine whether or not actions have been taken. In fact, most OCBs are not directed at people (Boiral, 2009), so employees can perform these behaviors without others even noticing. For instance, few people would be interested in meticulously watching how someone is throwing items into a recycling bin or redistributing incorrectly placed garbage. Due to OCBs' untraceable nature, they hardly can be promoted through a «carrot-and-stick» approach (Boiral, 2009).

Third, not every pro-environmental behavior has the same discretion level (Norton et al., 2015), which might make it challenging for managers to choose appropriate encouraging measures. For example, dividing waste requires less effort at an office in which recycling bins with explanatory stickers are already in place than in an office where such bins are absent. However, the real issue lies in the paradoxical nature of promoting OCBs, which are, by definition, voluntary actions (Boiral, 2009; Daily et al., 2009). Efforts to increase the number of employees performing OCBs

might decrease their discretion levels and lead to the creation of somewhat compulsory behaviors. Several scholars working on organizational citizenship behaviors (OCBs) have acknowledged this phenomenon. For instance, Vigoda-Gadot (2007) argues that «while forcing someone to act in an altruistic manner would seem to be a contradiction in terms, it is possible to put pressure on an individual to help and support others, even against his/her free will and even when the employee did not intend to become involved in such behavior in the first place» (p. 380). In this context, the hasty promotion of OCBEs might lead to the creation of compulsory citizenship behaviors, which are associated with increased anxiety and frustration levels among personnel (Vigoda-Gadot, 2007; Yam, Klotz, He, & Reynolds, 2014).

To overcome these difficulties, it is necessary to delve more deeply into the obstacles associated with employees' pro-environmental behaviors. The next sub-section introduces the general research question of the thesis and the reasoning behind its three studies.

Research question and the reasoning behind the three studies in the thesis

This doctoral thesis is focused on employees' engagement toward environmental protection. More specifically, the present dissertation explores factors that affect pro-environmental workplace behaviors in various organizational contexts. Although the thesis comprises three distinct studies, they all attempt to answer the following research question: Why are some employees more inclined than others to perform green behaviors in the workplace, and what steps can organizations take to increase the likelihood of voluntary pro-environmental activities among personnel?

Being a complex and multifaceted question, each article in the thesis tackles it from different perspectives. The dissertation's three chapters address the following sub-questions:

1. What are the barriers to voluntary pro-environmental behaviors for employees, and how can they be overcome? (Article 1)
2. How can psychosocial and organizational factors that affect the adoption of pro-environmental organizational citizenship behaviors be identified, and how can their importance be evaluated? (Article 2)
3. How do the specificities of public administration affect governmental employees' pro-environmental behaviors? (Article 3)

Article 1's objective is twofold: to provide a comprehensive mapping of empirical findings on obstacles to employees' individual green actions and identify practical recommendations that organizations can apply to promote such behaviors. In contrast to existing literature reviews in this particular field (Inoue & Alfaro-Barrantes, 2015; Lo et al., 2012a; Norton et al., 2015), this study is based on a systematic approach (Staples & Niazi, 2007; Tranfield, Denyer, & Smart, 2003). Having carefully screened the body of extant literature on voluntary pro-environmental behaviors, 43 studies ultimately were selected and analyzed. Obtained results shed some light on the plurality of factors that affect employees' decision to engage in greening activities. Specifically, the article differentiated between two large groups of obstacles: personal and organizational. To move beyond generalization, the article also suggested several sub-categories of barriers. For instance, organizational obstacles were found to include four categories: corporate values (e.g., Greene, Crumbleholme, & Myerson, 2014; Lamm, Tosti-Kharas, & King, 2015); expression of green «self» (e.g., Lo, Peters, & Kok, 2012b; Ruepert et al., 2016); support (e.g., Bissing-Olson, Iyer, Fielding, & Zacher, 2013; Boiral & Paillé, 2012; Ramus, 2001); and resources (e.g., Greaves, Zibarras, & Stride, 2013; Paillé, Boiral, & Chen, 2013). Furthermore, in an attempt to overcome the confusion surrounding numerous existing terms employed to describe pro-environmental behaviors in the workplace (Ciocirlan, 2016), the article pointed at such activities' variable discretionary nature. Finally, this study also gathered numerous practical suggestions that are expected to increase workers' likelihood of behaving in an ecological manner. Such pieces of advice were classified into nine categories and arranged according to their propensity to influence organizational or personal obstacles. In other words, this is the first study to analyze numerous dispersed studies' principal findings on factors that affect pro-environmental behaviors in the workplace, as well as clarify several theoretical points in the field, while simultaneously providing managers with concrete recommendations to encourage employees to engage in such behaviors more frequently. Importantly, this article's results defined the content of the present doctoral thesis, i.e., the reasoning behind Articles 2 and 3 largely is based on the initial systematic literature review's outcomes.

According to the data analyzed in Article 1, scholars working on issues related to employees' pro-environmental behaviors rely on a few theoretical frameworks. For instance, over a third of the selected articles were based on social exchange theory (e.g., Paillé & Mejía-Morelos, 2014; Paillé & Raineri, 2016; Raineri, Mejía-Morelos, Francoeur, & Paillé, 2016). As a result, several theories that are used widely and successfully to explore individual behaviors in other fields (such as healthcare and psychology) rarely are applied to investigate green activities in the workplace. One of these

overlooked frameworks, the theory of planned behavior (Ajzen, 1991), is particularly well-suited for the objective of this thesis and was used in Article 2 to study two non-academic university employees' behaviors: using alternative modes of transportation to travel to work and making eco-friendly suggestions at the office. This theory allows scholars to identify and, consequently, evaluate antecedent beliefs' importance in promoting specific behaviors. However, its principal advantage over other behavioral theories is its adaptability to the context and studied behavior (Ajzen, 1991, 2011). To ensure that every population's specific features are taken into account, the theory is based on a two-step approach: a qualitative phase, during which factors that affect studied behaviors are identified, and a quantitative phase, during which these factors' relative importance is evaluated. During the period when Article 2's study was conducted, only Greaves et al. (2013) had applied the theory of planned behavior in a comprehensive manner using a two-step approach. While carrying out Article 2's study, interviews conducted with 14 employees led to the identification of 27 beliefs that influence the use of alternative transportation and 21 beliefs associated with making eco-suggestions. In line with best practices (e.g., Ajzen, 2002; Greaves et al., 2013; Lee, Cerreto, & Lee, 2010), these beliefs were used to construct a questionnaire that 318 employees filled out. The analysis of their responses explained up to 79% of the variance in employees' intentions to act in a certain way, confirming the pertinence of the theory of planned behavior in studying pro-environmental behaviors in the workplace, as suggested by several scholars in this field (Boiral, Talbot, & Paillé, 2015; Gao, Wang, Li, & Li, 2017). At the same time, this framework's high predictive power (the percentage of explained variance) for studying voluntary behaviors indicates that organizational citizenship behaviors might not be as spontaneous as they are expected to be by definition (Boiral, 2009; Daily et al., 2009). Furthermore, the study empirically confirmed organizational and psychosocial factors' disproportionate influence on employees' greening activities. This result calls into question certain organizational efforts' efficiency in promoting voluntary greening activities in the workplace. The article suggests several strategies for increasing pro-environmental behaviors' frequency among employees based on extant literature on organizational citizenship behaviors (e.g., Organ & Ryan, 1995; Vigoda-Gadot, 2007) and breaking habits (e.g., Adriaanse, Gollwitzer, de Ridder, de Wit, & Kroese, 2011; Holland, Aarts, & Langendam, 2006).

Aside from the importance of diversifying theories applied to study employees' green activities to move beyond the mere identification of barriers and quantitatively evaluate their importance, Article 1 also revealed that most studies on the subject have been conducted in the private sector. Research contexts' homogeneity is dangerous for the academic community, as it might hinder the

advancement of knowledge in the field. In this context, new studies' objectives frequently boil down to verifying hypotheses instead of critically assessing the phenomenon. To overcome this issue, Article 3 applies a qualitative approach to explore employee-driven pro-environmental innovations within public organizations. Indeed, not only is the reasoning behind public employees' engagement in pro-environmental behaviors different from their counterparts in the private sector, but these actions' cumulative effect also cannot be underestimated. For example, in the U.S. alone, more than «3 million federal civilian employees and 15 million state and local government employees» exist (Stritch & Christensen, 2016). In Quebec, public organizations (including ministries, educational institutions, and healthcare facilities) employ almost 500,000 workers (Leduc, 2018), which is equivalent to approximately 11% of the province's total active population (Demers & Rabemananjara, 2019). Moreover, public organizations' missions usually are in line with societal interests, i.e., in principle, employees working in governmental agencies are expected to engage intrinsically in activities (including pro-environmental behaviors) that contribute to the public good (Azhar & Yang, 2019; Tsai, Stritch, & Christensen, 2016). Finally, public employees' greening activities become even more significant in the light of recent governmental initiatives that aim to reduce the public sector's environmental footprint (e.g., the Sustainable Development Act that Quebec has adopted, or the «Leading by example» program that British Columbia has developed). However, only four studies (Azhar & Yang, 2019; Greaves et al., 2013; Stritch & Christensen, 2016; Temminck, Mearns, & Fruhen, 2015) have attempted to identify the peculiarities of public employees' pro-environmental activities. Aiming to fill this research gap, Article 3 is based on an analysis of 33 interviews conducted with sustainability specialists from public organizations to identify obstacles impeding the emergence of employee-driven pro-environmental innovations in the public sector. In this context, Article 3 brings together the theoretical foundations of three bodies of literature: organizational citizenship behavior for the environment (Boiral, 2009; Daily et al., 2009); creativity in the workplace (Rangarajan, 2008; Unsworth, 2001); and neo-institutionalism (Meyer & Rowan, 1977; DiMaggio & Powell, 1983; Selznick, 1996). The combined knowledge from these distinct fields made it possible to refine the existing theoretical framework on voluntary innovations in the public sector. The results also offer several important insights on the promotion of pro-environmental innovations among various categories of employees and within various types of organizations.

General structure of the thesis

The introduction explained the reasoning behind the thesis and the three included studies. Each of these studies represents an article that takes the form of a chapter for the purpose of this thesis:

Chapter 1:

Overcoming the barriers to pro-environmental behaviors in the workplace: A systematic review

Chapter 2:

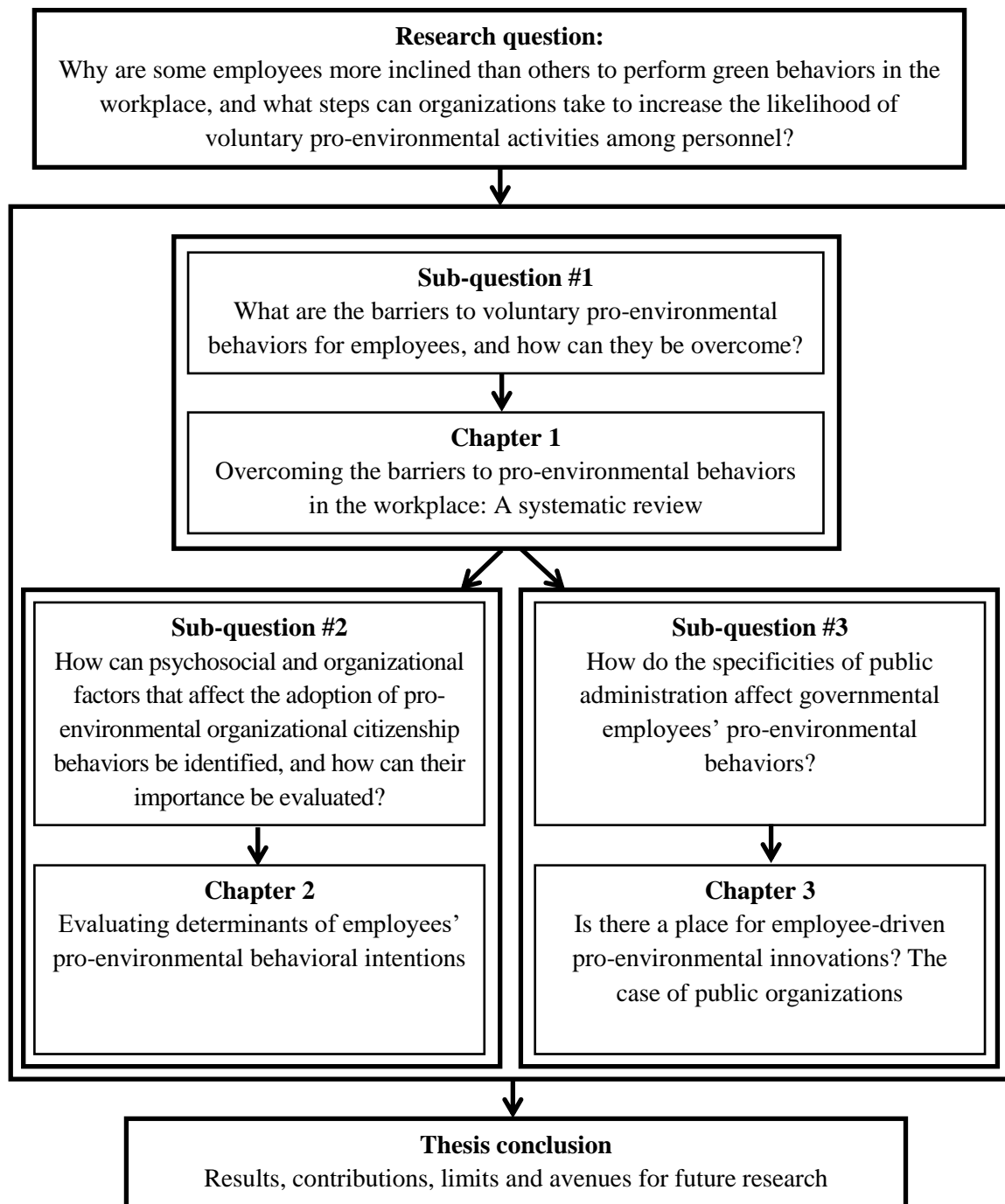
Evaluating determinants of employees' pro-environmental behavioral intentions

Chapter 3:

Is there a place for employee-driven pro-environmental innovations? The case of public organizations

The conclusion of the thesis provides summarized results of the three studies, discusses contributions of the dissertation and outlines avenues for future research. The structure of the thesis is schematically depicted in Figure 1.

Figure 1. Thesis structure



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Chapitre 1. Overcoming the Barriers to Pro-Environmental Behaviors in the Workplace: A Systematic Review³

Résumé

La performance environnementale des organisations dépend, en grande partie, de l'implication des employé(e)s dans ce domaine. De façon volontaire, les travailleur-euse-s peuvent exercer plusieurs comportements environnementaux, tels que le recyclage, le covoiturage ou l'utilisation de la vidéoconférence au lieu de se déplacer. Pourtant, dans de nombreuses organisations, ces comportements sont quasiment inexistantes et les obstacles associés à leur adoption n'ont pas fait l'objet d'études approfondies. L'objectif de cet article est d'analyser, à partir d'une revue systématique de la littérature empirique, les obstacles à de telles actions et les moyens pour les surmonter. L'article remet en question la nature discrétionnaire de certains comportements et propose différentes catégories de comportements individuels pro-environnementaux. Les obstacles personnels et organisationnels à ces comportements sont mis en évidence. Alors que les obstacles personnels sont associés à la fois aux intentions et aux comportements, il a été constaté que les obstacles organisationnels affectaient principalement les comportements.

Mots-clés : Comportements pro-environnementaux; Comportements discrétionnaires; Barrières organisationnelles; Obstacles individuels; Écologisation du milieu de travail.

³ Yuriev, A., Boiral, O., Francoeur, V., & Paillé, P. (2018). « Overcoming the Barriers to Pro-Environmental Behaviors in the Workplace: A Systematic Review », *Journal of Cleaner Production*, 182, 379-394

Abstract

The environmental performance of organizations largely depends on the voluntary participation of employees in greening activities. Workers in any organization can voluntarily perform numerous environmental behaviors, such as recycling, carpooling, or using video-conferencing rather than travelling. Yet, in many organizations, these behaviors remain limited and the obstacles to their development have not been the object of specific studies. Pro-environmental behaviors are not monolithic and may vary considerably according to the degree of discretion involved. The objective of this paper is to analyze, through a systematic review of the empirical literature on pro-environmental behaviors in the workplace, the obstacles to green actions for employees and how such barriers might be overcome. The discretionary nature of certain behaviors is questioned and different categories of pro-environmental individual conduct are proposed. The paper sheds more light on the personal and organizational barriers to voluntary pro-environmental behaviors: while the former are associated with both intentions and actions, the latter have so far been found to primarily affect actual behaviors. Suggestions for future research and practical implications for managers are also proposed.

Keywords: Pro-environmental behaviors; Discretionary behaviors; Organizational barriers; Individual obstacles; Workplace greening.

Introduction

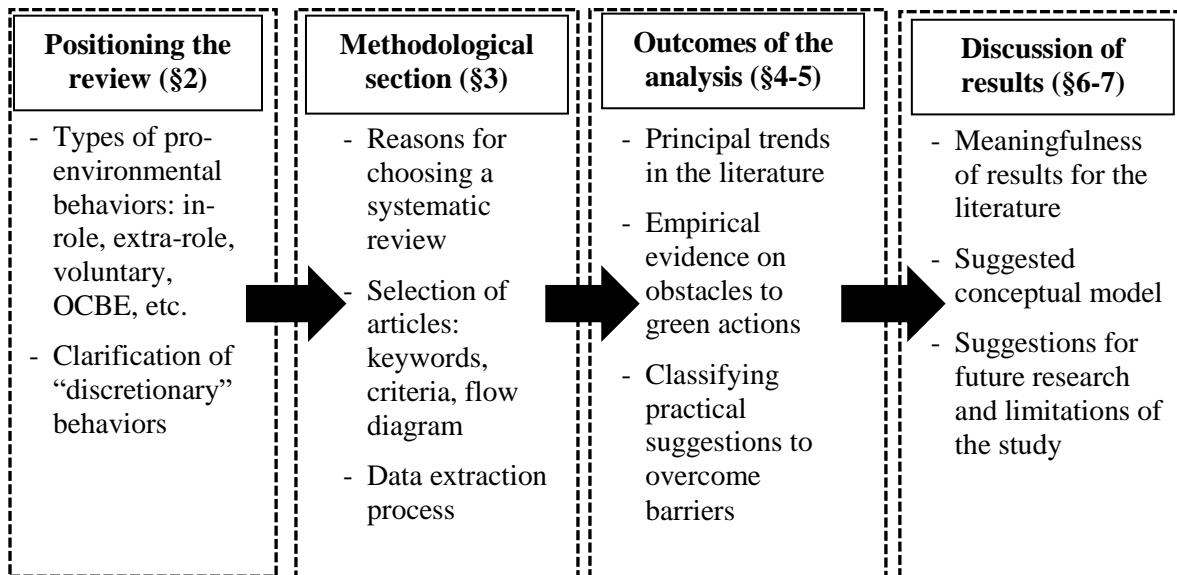
The attempts organizations make to introduce internal green policies, implement environmental management systems, and adopt certifiable standards tend to be symbolic and remain inefficient without proper employee integration (Boiral 2007; Christmann and Taylor 2006). The active participation of workers is one of the principal factors influencing the successful integration of environmental standards and policies, including ISO 14001 (Boiral 2003, 2007; Christmann and Taylor 2006).

Yet formalized systems cannot efficiently promote all types of behaviors. For instance, such behaviors as recycling, turning off lights and electric appliances, opting for videoconferences instead of travelling, using public transportation, or drinking from reusable cups and bottles contribute to cleaner production and the reduction of the environmental impacts of organizations (for instance, the production of unnecessary waste and the inefficient use of energy or water), but they are not necessarily explicitly included in management systems. While on the individual level these activities might appear to be insignificant, they tend to have a large cumulative influence on the overall environmental performance of an organization (Boiral 2009; Lamm *et al.* 2013; Tsai *et al.* 2016). Furthermore, managers often ignore certain behaviors that are not described by official documents (Boiral 2003). For example, employee suggestions to reduce the organization's environmental footprint are frequently overlooked by superiors due to their spontaneous nature (Daily *et al.* 2009). In this sense, pro-environmental workplace behaviors depend on the efficient management of human resources, which is difficult to achieve through formal approaches only.

A number of other barriers impede employees from going green. According to Andersson *et al.* (2005) and Stern *et al.* (1999), the context in which behaviors are exercised is directly linked to these obstacles. For example, citizens at home might be influenced by monetary costs of utilities, while employees generally do not consider this factor at work (Siero *et al.* 1989). Empirical studies confirm this difference: Lee *et al.* (1995) report that the rate of recycling at home is higher than at work for the same employees, and Lo *et al.* (2012b) have found significant differences between energy-saving behavior inside and outside the office. Some obstacles to pro-environmental behaviors are thus related to individual characteristics while others depend on the organizational setting (Norton *et al.* 2015).

Information on these barriers is scattered across the body of literature on pro-environmental conduct (e.g., Al-Shemmeri and Naylor 2017; Boiral *et al.* 2016; Kim *et al.* 2014; Paillé *et al.* 2016), but the obstacles associated with such behaviors have not been the object of in-depth studies. Environmental researchers typically focus on employees' motivations to exercise such behaviors (Blok *et al.* 2015; Greaves *et al.* 2013), while frequently overlooking the negative effects of barriers (Norton *et al.* 2015). Understanding the nature of these obstacles might shed more light on the success of pro-environmental behaviors in some organizations as compared to others. Furthermore, because some articles in the field emphasize the voluntary aspect of behaviors (Boiral 2009; Daily *et al.* 2009), while others do not differentiate between obligatory and discretionary actions, the literature provides confusing information on the obstacles associated with pro-environmental behaviors. Behaviors that are exercised with minimal external influence (voluntary) might indeed have different barriers than those that are promoted, encouraged, or required (Norton *et al.* 2015). The following research question is therefore pursued: What are the barriers to voluntary pro-environmental behaviors for employees and how they can be overcome?

Figure 1. Principal elements of the study framework



This question is addressed through a systematic review approach defined as «a specific methodology that locates existing studies, selects and evaluates contributions, analyses and synthesizes data, and reports the evidence in such a way that allows reasonably clear conclusions to be reached about what is and is not known» (Denyer and Tranfield 2009, p. 671). Compared to a traditional narrative literature review, a systematic review is a rigorous and transparent approach that ensures the selection of the most pertinent publications (Kitchenham 2004; Staples and Niazi

2007), which is essential for the analysis of sometimes contradicting results (Petticrew and Roberts 2008). Figure 1 provides a diagrammatic overview of the study.

1. The elastic nature of pro-environmental behaviors

1.1. Obligatory, encouraged, and voluntary: current understanding

According to Ramus and Killmer (2007), green actions performed by workers can be divided into two groups: in-role and extra-role. Behaviors associated with the first refer to actions that constitute an ordinary part of a job (Ones and Dilchert 2012), and hence failure to perform them may invoke penalties – occasionally serious ones. For example, an operator working with contaminating equipment must obey environmental laws or legal prosecution might be undertaken. Environmental managers are similarly expected to develop and improve existing internal policies or control pollution; if these duties are not performed, an employee might be sanctioned. In contrast with these prescribed behaviors, extra-role behaviors are discretionary actions «that are neither required nor formally rewarded» (Van Dyne et al. 1995, cited as in Ramus and Killmer 2007, p. 557). The majority of employees are not obliged to engage in eco-friendly activities, and the decision to perform extra-role behaviors remains at their discretion.

Scholars working on extra-role green behaviors have developed multiple notions to describe similar phenomena: Ones and Dilchert (2012) found fourteen such concepts, and Boiral et al. (2015a) identified eleven terms to describe them. Some examples include eco-initiatives, individual environmental initiatives, behaviors directed toward the environment, and behaviors toward sustainability in the workplace. In addition, new terms are constantly being introduced: environmental workplace behaviors and environmental counterproductive workplace behaviors (Ciocirlan 2016), workplace environmentally friendly behavior (Saifulina and Carballo-Penela 2017), green practices of employees (Chan et al. 2014), sustainable work styles (Greene et al. 2014), and environmental management practices (Paillé et al. 2013) are some examples of more recent terms. Further, some researchers investigate precisely defined behaviors that fall within the category of extra-role green behaviors, such as walking to work (Adams et al. 2017), participation in pro-environmental events (Tsai et al. 2016), helping colleagues on green issues (Paillé et al. 2016), and energy reduction activities (Lo et al. 2012b).

One of the main characteristics of most of the above-mentioned behaviors is their voluntary nature, which is at the core of the concept of organizational citizenship behaviors for the environment

(OCBEs), a concept that stems from OCB (organizational citizenship behaviors). Daily et al. (2009) define OCBEs as «discretionary acts by employees within the organization not rewarded or required that are directed toward environmental improvement» (p. 252). Boiral (2009) provided a similar definition: «individual and discretionary social behaviors not explicitly recognized by the formal reward system and contributing to improve the effectiveness of environmental management of organizations» (p. 223). Lamm et al. (2013) developed yet another definition, emphasizing, once again, the discretionary nature of these actions: «voluntary behavior not specified in official job descriptions that, through the combined efforts of individual employees, help to make the organization and/or society more sustainable» (p. 165).

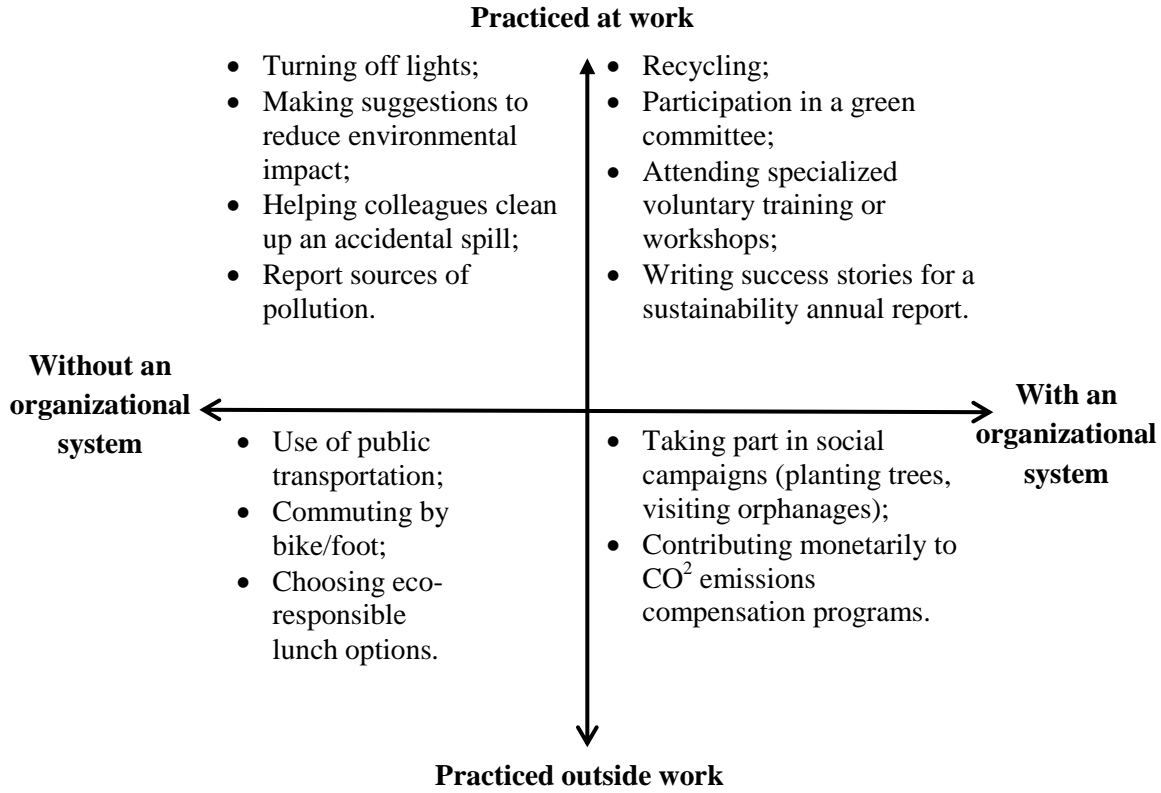
To the best of our knowledge, at the time of writing this manuscript, scholars working on extra-role workplace green conduct have not so far questioned whether different behaviors are equally voluntary. In comparison, the literature on OCBs does acknowledge the existence of «compulsory OCB» (Vigoda-Gadot 2007; Yam et al. 2014). For instance, Vigoda-Gadot (2007) argues, «while forcing someone to act in an altruistic manner would seem to be a contradiction in terms, it is possible to put pressure on an individual to help and support others, even against his/her free will and even when the employee did not intend to become involved in such behavior in the first place» (p. 380). In the same vein, Yam et al. (2014) claim that workers frequently engage in OCB because of the influence of external forces which make them feel obliged to act in a certain way. While Paillé and Boiral (2013) have empirically demonstrated that OCBs and OCBEs are distinct concepts, they are still very tightly connected. One might suggest that somewhat compulsory OCBEs also exist, thus questioning the discretionary nature of pro-environmental behaviors performed by employees.

1.2. What can be considered «voluntary»?

The ambiguity of the voluntary nature of many OCBEs can be illustrated by the example of recycling. Although recycling is generally considered to be a discretionary activity (e.g., Boiral and Paillé 2012; Lamm *et al.* 2013), dividing waste at home and at work requires different efforts: recycling bins with stickers are usually already in place in offices, whereas in households people have to install such containers themselves. A situation in which an employee independently sets up several recycling bins in the office is rare, and it would more properly be termed an eco-initiative (Boiral and Paillé 2012).

Scholars working on volunteering and volunteerism suggest that discretion should be measured in terms of personal costs: «if various individuals engage in different volunteer activities with different relative net costs, then the volunteer with the greatest expected net costs would be ranked highest» (Cnaan *et al.* 1996, p. 375). Yet, this yardstick is hardly applicable to the green conduct of employees, as the majority of such behaviors can be performed without sacrificing personal resources. The only aspect that can be assessed is the surrounding context, or the existence of an «organizational system» established by the administration. Following McFreely (1983), an organizational system is defined in this paper as «a series of components so interfaced and interrelated that they work together towards the achievement of the worthy and legitimate objectives of the enterprise» (p. 38). In the case of recycling, labeled waste bins encourage employees to think about the necessity of separating recyclables from garbage to reduce environmental impact. Similarly, «updating environmental procedures, » considered by Boiral and Paillé (2012) to be an OCBE, is possible only when an organization has already established a green policy and has thus interacted with employees on the basis of pro-environmental behaviors. The words «voluntary» (e.g., Kim *et al.* 2014) and «discretionary» (e.g., Lamm *et al.* 2013) are used interchangeably in the present review to describe the pro-environmental behaviors of workers that are not promoted, enforced, or monetarily recompensed by direct employers, are exercised on the individual level, and are not a part of a worker's formal duties.

Figure 2. Categorization of pro-environmental workplace behaviors



Beyond the degree of discretion involved, some OCBs are not directly related to the organization. For instance, people go to work on a daily basis because they have to, but they are free to choose their means of transportation. Lamm *et al.* (2013) asked employees about their preference for reusable water bottles or paper cups, which is clearly not related to their duties. In contrast to these actions, other behaviors can be exercised only in a workplace setting, including «helping the environmental service identify sources of pollution,» «asking colleagues to be involved in a new green committee,» or «contribut[ing] to the annual sustainability report» (Boiral and Paillé 2012). It is possible to distinguish between voluntary pro-environmental behaviors practiced at work and outside of it. Figure 2 illustrates categories of discretionary green conduct with several examples that might vary depending on the internal organizational context (for example, the existence of a training program or schemes for monetary compensation). It seems that voluntary behaviors are not homogenous; they differ depending on the degree of discretion involved. The more pro-environmental behaviors are encouraged by organizational systems, the less voluntary they appear.

Studies of pro-environmental behaviors have not purposefully taken into consideration their elastic, voluntary nature or their place of execution. Yet, some researchers have unintentionally attempted to better understand behaviors that fall on the left side of Figure 2. This paper systematically analyzes information on employee green conduct that occurs outside the purview of an organizational system in order to shed more light on the obstacles to them, as these obstacles may differ from the obstacles to employee green conduct more generally.

2. Methodology

2.1. Pertinence of the systematic review

Two narrative reviews (Inoue and Alfaro-Barrantes 2015; Lo *et al.* 2012a) and one systematic review (Norton *et al.* 2015) on pro-environmental worker activities were published in recent years. Lo *et al.* (2012a) analyzed 21 studies to identify and compare determinants of employee green behaviors and possible interventions. Their principal focus was to make a comparative analysis of pertinent publications by taking into account such aspects as «effect sizes of bivariate analyses» and «degree of correspondence with the dependent variable» (p. 2937). It should be noted that the selection of articles was performed in 2008-2009, when the literature on voluntary pro-environmental behaviors was just emerging. In another review conducted by Inoue and Alfaro-Barrantes (2015), 17 quantitative studies were chosen to investigate antecedents of green behaviors for workers. The coders extracted the principal information from articles that discuss individuals' pro-environmental behaviors at their workplace but did not attempt to distinguish between the various motivations or reasoning of employees who engage in such activities. The most complete review has been provided by Norton *et al.* (2015), who attempt to extract various moderating and mediating relationships between antecedents of employees' green behaviors and their outcomes. Having extracted information on «variables at the institutional, organizational, leader, and team levels» (p. 110), the authors analyzed the significance of various relationships between predictors of green behaviors.

However, none of previously mentioned publications distinguished between behaviors with lower and higher degrees of discretion. Only Norton *et al.* (2015) discussed the importance of voluntary pro-environmental behaviors, but no inclusion or exclusion decisions were made on the basis of this parameter. Prior reviews mainly concentrated on antecedents of green conduct, while this article looks into organizational and individual barriers to pro-environmental actions. Also, the works by

Inoue and Alfaro-Barrantes (2015), Lo *et al.* (2012a), and Norton *et al.* (2015) do not strictly follow the systematic literature review approach: either the selection is not transparent, as chains of keywords are missing (Inoue and Alfaro-Barrantes 2015; Norton *et al.* 2015), or the coding process appears ambiguous and lacks a clear grid (Lo *et al.* 2012a), or the criteria for article selection are limited and lack precision (Inoue and Alfaro-Barrantes 2015).

There are three main reasons for the choice of a systematic literature review in the present paper. First, a rigorous methodological process leads to the selection of the most relevant articles, thus diminishing the possibility of missing important information (Kitchenham 2004; Staples and Niazi 2007). Inclusion and exclusion criteria serve as the basis of such a review, and the final choice is therefore reproducible (Petticrew and Roberts 2008; Tranfield *et al.* 2003). Second, the growing number of empirical studies on green workplace behaviors has generated a considerable volume of results, some of which are contradictory. According to Petticrew and Roberts (2008), a systematic review can be of particular value when taking single studies «in isolation can be misleading» (p.11). Third, this review identifies and categorizes various recommendations provided by scholars to managers for overcoming barriers to green behaviors. Considering that practitioners usually do not spend much time reviewing academic literature and given that the frequency of systematic reviews in management is growing (Tranfield *et al.* 2003), a short summary of such advice might become increasingly useful.

2.2. Review protocol

The elaboration of a review protocol in many ways determines the outcomes of the synthesis of the literature (Kitchenham 2004; Staples and Niazi 2007). Following the research question, a search strategy to identify the largest possible number of articles discussing barriers to pro-environmental workplace behaviors or suggestions to overcome them was developed. The timeframe used for search was from January 2000 to the 30th of June 2017. The starting date was selected based on the publication year of the most cited article in the field of pro-environmental individual behaviors, which was written by Stern (2000). It is worth noting that a manual search of articles using Google Scholar did not yield any relevant publications prior to the year 2000, and the starting date was therefore considered appropriate.

Only peer-reviewed journals that publish articles in English were selected, excluding such sources of information as books, theses, conference proceedings, and essays. The search was performed in

three electronic databases: ABI/Inform Complete, Business Source Complete, and Academic Search Complete. Two coders composed a comprehensive list of approximately 60 words in two categories: pro-environmental behaviors and types of employees (see Appendix A for the full list). As initial attempts to find a list of potentially pertinent articles through full text searches led to the identification of more than 80,000 papers, the search was limited to «abstract only» for the «employee» category. This change decreased the number of articles to 8030. After the elimination of duplicates or articles without authors, there were 6426 publications left for review, which was performed with the help of the EndNote software.

2.3. Inclusion and exclusion criteria

Two coders proceeded with the selection of pertinent articles in an independent manner. According to Petticrew and Roberts (2008), the performance of this task by several coders reduces bias in the search process, and the results produced tend to be more accurate. In order to exclude articles not meeting the objective of the present research and following common practices for systematic reviews (Kitchenham 2004; Staples and Niazi 2007), a set of inclusion and exclusion criteria was developed (Table 1). While the primary focus of these criteria was to select the most pertinent studies for subsequent analysis, some criteria were necessary due to available resources (i.e., language proficiency of authors) or trustworthy data sources (i.e., books or theses). For the purposes of this study, a pertinent article discusses barriers to OCBs, makes recommendations to overcome them, and/or examines the circumstances in the workplace in which these discretionary actions are performed.

Table 1. Inclusion and exclusion criteria

Inclusion criteria	Topic:	Voluntary pro-environmental behaviors of employees
	Barriers and recommendations:	At least one barrier or practical suggestion for the promotion of behaviors
	Circumstances of behavior:	Not promoted, enforced, or recompensed
	Methodology:	Qualitative/quantitative/mixed methods
	Language:	English
	Composition of sample:	Full-time workers with salary
Exclusion criteria	Research level:	Organization as a whole, departments, branches Theoretical

	Nature of articles: Books, theses, conference proceedings, etc.
	Type of sources: Entrepreneurs, informal workers, volunteers
	Participants: Third-party national surveys and other means
	Data collection methods: not specifically elaborated for a study

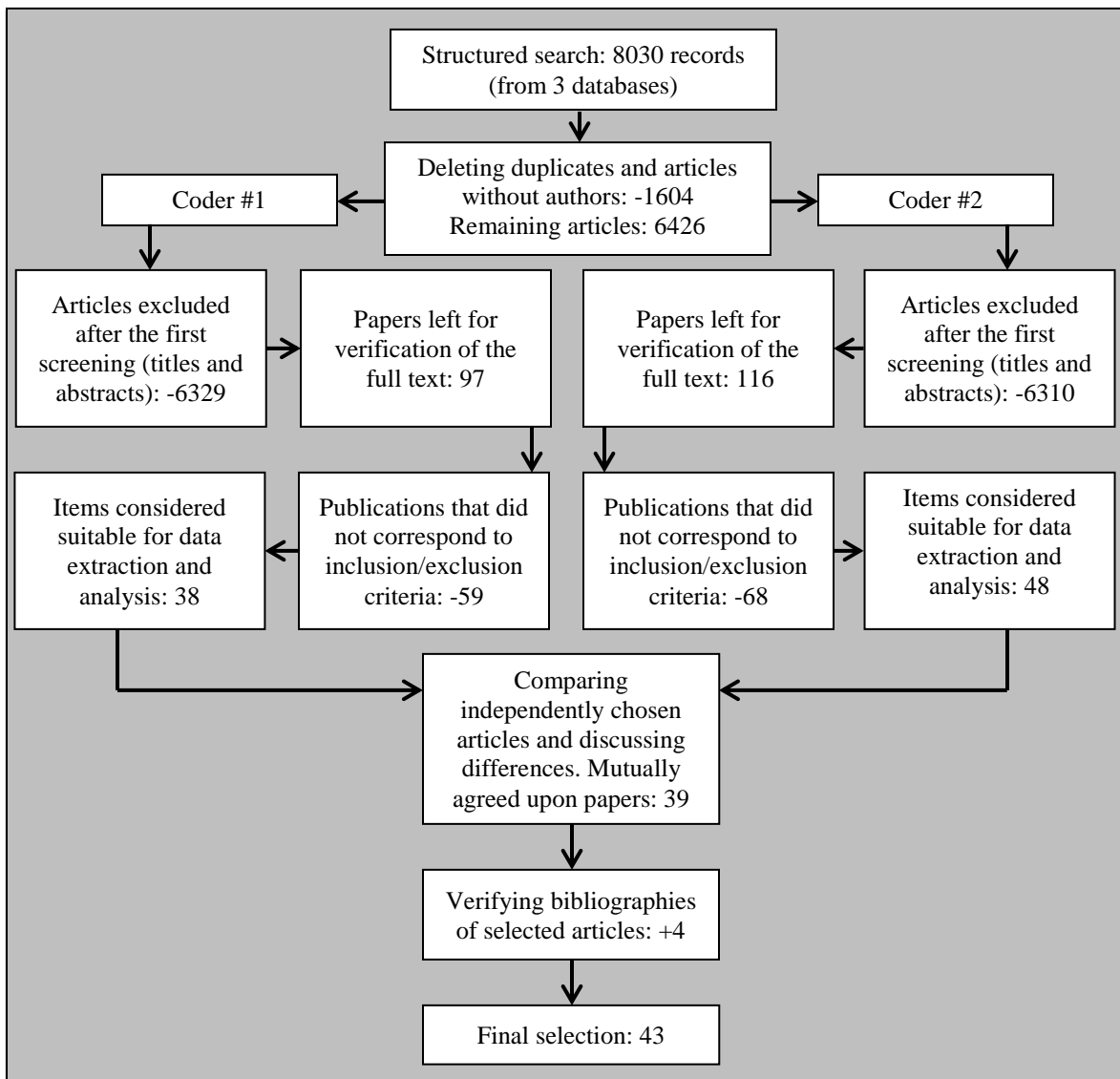
During the first screening, articles were eliminated mostly due to an irrelevant focus. Only papers primarily focused on pro-environmental voluntary behaviors practiced by employees were retained. No distinction was made between behaviors performed by workers in the office (e.g., recycling, turning off electric appliances, helping colleagues) or outside of it (e.g., commuting, choice of eco-responsible lunch, reusable utensils). Also, no theoretical papers were selected, as only empirically confirmed results were targeted. Coders evaluated these criteria by reading the titles and abstracts of chosen articles. During this scan, more than 6300 papers were discarded; this is comparable to other reviews with a high initial number of articles (e.g., Caiado et al. 2017; Boehm and Thomas 2013).

The remaining articles were read in full with the purpose of verifying their appropriateness with respect to other inclusion and exclusion criteria. Particular attention was paid to behavioral context: either selected studies should have explicitly emphasized the discretionary nature of the actions concerned, or the circumstances of the behaviors examined were not directly and clearly influenced by a comprehensive organizational system (e.g., an environmental management system such as ISO 14001, organizational program, policy, training, promotional materials). Publications that investigated multiple behaviors at the same time (for example, recycling with pre-installed bins and turning off electric appliances) were not excluded, but publications with samples composed of both workers and non-employed students at the same time (not to be confused with multiple studies or experiments described in the same article) were excluded. Additionally, articles based on third-party national surveys (for example, governmental ones) and other means of data collection not specifically elaborated for a particular study were not considered in this review. Such data sources are generally not reliable in terms of respondents, and it would be highly unlikely to find a survey that used the same criteria as this study. Following these criteria, the two coders eliminated 59 and 68 additional papers respectively. They compared and discussed their results, agreeing on 39 publications. After performing a cross-referencing check of chosen publications, four additional studies were included; the ultimate selection is thus composed of 43 publications. The list of these articles along with key information about them (title, authors, year of publication, main objective,

sample size) can be found in Appendix B. The selection process is illustrated in a flow diagram (Figure 3).

The data extraction was based on the method of qualitative content analysis, which is defined by Holsti (1969) as a «technique for making inferences by objectively and systematically identifying specified characteristics of messages» (p. 14). It is frequently used in qualitative studies to interpret collected material by assigning text passages to various themes and sub-themes (Thomas 2006). While it is a qualitative technique, its simplified variant (assigning «yes»/«no» in a grid) allows authors to quantify certain results obtained and present them in a structured and clear manner (Elo and Kyngäs 2008).

Figure 3. Flow diagram of the selection process



First, a coding grid with two levels (characteristics of papers and obtained results in relation to the review's goals) was developed by the research team based on the recommendation of Tranfield et al. (2003). Nine variables were targeted at the level of general information about articles: year of publication, research type (quantitative/qualitative/mixed), method of data collection, applied theoretical framework, sample size, industry of study, country of investigation, respondents' occupations, and behaviors or intentions explored. This information was collected with the purpose of identifying the primary trends in the literature on voluntary pro-environmental behaviors. The following two large themes were targeted with respect to the results of the studies: barriers to the execution of green behaviors and recommendations for practitioners. A distinction was made between studies that focused on intentions to perform pro-environmental behaviors and those that explored actual behaviors in order to examine whether barriers are associated with a willingness to perform a specific action or with the action itself. The extraction of this information is directly related to the research question, as the main goal of this review was to identify recurrent sub-themes in order to give a comprehensive overview of the literature on barriers to voluntary pro-environmental behaviors and recommendations for encouraging green conduct. In order to do so, two coders coded several publications individually, attempting to develop their own categories. Both of them applied an inductive approach, commonly used in qualitative analyses (Thomas 2006), and created a list of possible barriers and recommendations.

Table 2. Themes and sub-themes used for coding

Main themes	Barriers to the execution of voluntary pro-environment behaviors		Recommendations
Sub-themes	<ul style="list-style-type: none"> - Lack of knowledge; - Non-exemplary role of leaders; - Perception of poor infrastructure; - Lack of colleagues' support; - Not willing to change habits; - Lack of awareness; - Lack of organizational resources; - Poor attitude towards environmental questions; - Lack of commitment to the organization; - Social norms; 	<ul style="list-style-type: none"> - Lack of communication; - Lack of autonomy; - Lack of self-efficacy; - Non-authentic environmental goals; - Lack of support from supervisor or organization; - Time constraints; - Non-green internal culture; - Lack of organizational resources - Other; 	<ul style="list-style-type: none"> - Establishing quality relationships; - Managers playing an exemplary role; - Transforming daily tasks; - Environmental policies; - Wide dialogue on the environment; - Reshaping decision-making processes; - Rewards and recognition; - Training; - Internal culture; - Technical solutions; - Interventions - Surveys and questionnaires; - Other;

Second, the sub-themes obtained were compared and discussed (see Table 2 for the complete final list). After agreeing on various categories and their definitions, the two coders independently coded 20% of selected studies. This double data extraction process is essential for systematic reviews as it helps to significantly decrease bias (Buscemi et al. 2006). Using an Excel table, two coders assigned «1» (a theme is discussed) or «0» (it is not discussed) to specific sub-themes for each article from the sample.

Third, the percentage of inter-coder agreement for the articles analyzed by both coders was calculated to be 83%, which is an agreement similar to those of other reviews applying analogous measurements (Hughes et al. 2016; Rose et al. 2012). A Cohen's kappa coefficient (Landis and Koch 1977), frequently used in systematic syntheses to verify the agreement between two raters,

was obtained with the help of SPSS v.22 software: 0.714 ($p < .0005$). According to Landis and Koch (1977), this figure represents a substantial strength of agreement between raters. One of the authors analyzed the remaining articles with the help of the categorization tool that had been developed by two coders together.

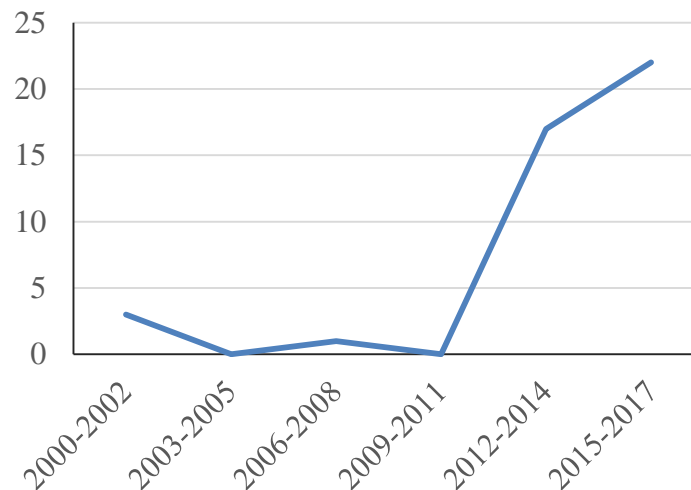
3. Trends in the literature

The systematic approach is well suited to the analysis of principal trends in the literature. The review of articles on voluntary green behaviors of employees revealed several previously unknown tendencies: growing interest in the subject, low geographical and methodological dispersion, and the reliance of scholars on few theories.

3.1. Growing interest

The number of published articles on the subject has grown rapidly in the last few years (Figure 4). Since 2011, almost 40 studies have investigated various questions related to voluntary green workplace behaviors, with 22 papers appearing in less than three years (from 2015 until June 2017). This sudden increase might be partially explained by the publication of a theoretical paper by Ramus and Killmer (2007) in which authors explain the importance of pro-environmental workplace behaviors and which may have attracted the attention of scholars.

Figure 4. Number of articles per year



3.2. Low geographical and methodological dispersion

Although the quantity of articles that investigate ecologically friendly voluntary behaviors of employees is increasing, 81% of these studies are based on data from three countries: the USA (14),

Canada (12), and the UK (9). Workers from South America, Australia, and Africa are not present in any study. Some studies examined data from more than one country: 25% of papers claimed to have analyzed data from two countries, and only three articles gathered information from three or more. The remaining publications (29) focused on one country only. These numbers indicate that scholars have not yet accounted for the cultural differences linked to these behaviors. Unique cultural elements might play an important role in shaping people's values and beliefs (e.g., De Long and Fahey 2000; Spataro 2005), which has not been explored in studies on discretionary green workplace conduct, with the exception of a few articles (Paillé and Mejía-Morelos 2014; Paillé et al. 2016).

While the geographical distribution of articles seems to be linked to the universities to which researchers are affiliated, another important aspect, methodological approaches, has no link with educational institutions. The literature on the subject is characterized by the prevalence of quantitative studies (78%) and the comparatively small proportion of publications based on qualitative and mixed methodologies (9% and 12% respectively). The tendency to choose quantitative methods might have ambiguous outcomes: a qualitative approach tends to critically assess motivations for and barriers to pro-environmental behaviors, which is nearly impossible with numerical data. This observation, in conjunction with the fact that only six studies looked at the specific role of participants (managers), while 86% of publications did not differentiate between kinds of employees, suggests that the literature is dominated by uncritical studies with rather poorly defined samples. Without meticulous control for the occupation of participants some important job-related specificities might be missed. Additionally, only two articles (Bissing-Olson et al. 2013; Walker et al. 2015) are longitudinal. In studies on OCBs (e.g., Koys 2001; Robinson et al. 1994) long observation periods reduced method bias, increased ability to identify relationships between individual behaviors and business outcomes, and provided relatively reliable proof of causality, which is still absent in the literature on OCBEs.

3.3. Reliance on few conceptual perspectives

The literature on voluntary pro-environmental workplace behaviors has focused on few theories (Table 3). Only three conceptual frameworks were used more than five times: social exchange theory, theory of planned behavior, and an OCBEs as an extension of OCBs perspective (which is not a theory in itself, but rather a distinct branch of social exchange theory). While social exchange theory was used with much success for exploring discretionary green behaviors (e.g., Paillé et al.

2016; Paillé and Raineri 2015; Raineri et al. 2016), the theory of planned behavior was applied only partially in several studies (e.g., Adams et al. 2017; Chan et al. 2014), and hence it has not yet been efficiently implemented. According to a few publications (Adams et al. 2017; Boiral et al. 2015), this theory should be applied in a systematic way in order to generate meaningful results. With regard to the perspective of OCBEs as an extension of OCBs, papers in this category attempted to clarify the initial definition proposed by Boiral (2009) and Daily et al. (2009), and their main goal was to refine the theoretical framework through empirical validation (e.g., Boiral and Paillé 2012; Paillé and Boiral 2013; Temminck et al. 2015; Tosti-Kharas et al. 2017).

Other prospective theories that might yield significant results remain overlooked. For instance, habit theory (Walker et al. 2015), the transformational leadership perspective (Robertson and Barling 2013), and self-determination theory (Graves et al. 2013; S.-H. Kim et al. 2016), all of which are tightly connected to constructs underlying individual behaviors, were only applied in one or two articles (see the section «various approaches» in Table 3 below). Surprisingly, no theories were identified in 9% of studies, which is most likely explained by these papers having employed new conceptual approaches. In contrast, 16% of publications were based on several theoretical frameworks (e.g., Chou 2014; Lamm et al. 2015; Pinzone et al. 2016), which is a promising way to investigate complex behaviors, provided authors possess deep knowledge of the applied concepts and models.

Table 3. Applied theoretical frameworks

Conceptual framework	Description of the foundations of the theory	Articles*	Percentage of total**
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	Social exchange theory	«The voluntary actions of individuals that are motivated by the returns they are expected to bring and typically do in fact bring from others» (Blau 1964, p. 91).	23, 25, 26, 27, 29, 40, 43	14%
Extensions of social exchange theory	OCBEs as an extension of OCBs	«Cumulative patterns of environmental contributions to people with whom one is involved in some collective enterprise» (Organ <i>et al.</i> , 2006, cited as in Daily <i>et al.</i> , 2009, p.246).	7, 9, 16, 18, 19, 22, 28, 38, 39	21%
	Organizational support	«Employees form general beliefs concerning how much the organization values their contributions and cares about their well-being» (Eisenberger <i>et al.</i> 2001, p.42).	10, 38	5%
	Theory of planned behavior	«Intentions to perform behaviors of different kinds can be predicted with high accuracy from attitudes toward the behavior, subjective norms, and perceived behavioral control» (Ajzen 1991, p.179).	1, 5, 9, 11, 14, 40	14%
	Value-belief-norm theory	«Individuals who accept a movement's basic values, believe that valued objects are threatened, and believe that their actions can help restore those values experience an obligation (personal norm) for pro movement action that creates a predisposition to provide support» (Stern <i>et al.</i> 1999, p.81).	12, 20, 35	7%
	Qualitative techniques	These methods are used for theory building, usually through coding and analysis processes.	6, 15	5%
	Various approaches			
	Focused on willingness,	Including: theory of stages of consciousness; capability perspective;	3, 8, 13, 17, 28, 32, 34,	21%

	consciousness, habit	transformational leadership perspective; Ability Motivation Opportunity theory; habit theory; theory of situational strength; social cognitive theory; self-determination theory	41, 43	
	Focused on individual characteristics	Including: theory of positive emotions; connectedness to nature perspective; public service motivation; aging theory	4, 37, 42	7%
	Focused on societal influence	Including: social information processing theory; social marketing perspective	36, 43	5%
	Other	Organizational climate; strategic human resource management; value-identity-personal norms	12, 24, 33	7%
	Not specified		2, 21, 30, 31	9%

*These numbers correspond to the articles numbered in Appendix B.

**Note that the total does not equal 100%: some studies used two or more theories.

4. Understanding voluntary green behaviors in the workplace

The main goal of the review was to shed more light on barriers that impede employees from performing pro-environmental behaviors and how they can be overcome. The systematic approach led to the extraction of multiple examples of barriers (see Table 4) as well as suggestions to mitigate or eliminate them (see Figure 5).

Figure 5. Practical recommendations to promote pro-environmental behaviors

Propensity to influence organizational barriers	<p>Establishing quality relationships</p> <ol style="list-style-type: none"> 1. Feedback about initiatives (Chou, 2014) 2. Meet and consult employees (Boiral, 2002) 3. Supporting words with actions (Paillé et al. 2013) 4. Better communication: listening and evaluating (Temminck et al. 2015) 	<p>Managers' exemplary role</p> <ol style="list-style-type: none"> 1. Individual actions in line with organizational goals (Boiral et al. 2016, 2015) 2. Commitment from management (Cantor et al. 2012) 3. Transformational leadership capacity (Graves et al. 2013) 	<p>Transforming daily tasks</p> <ol style="list-style-type: none"> 1. Explain how to execute behaviors (Lo et al. 2012b) 2. Encourage workers to set their own green goals (Tosti-Kharas et al. 2016) 3. Integrate environmental actions in work routines (Lo et al. 2012b) 	<p>Environmental policies</p> <ol style="list-style-type: none"> 1. Creation of environmental policies (Stritch and Christensen 2016; Tosti-Kharas et al. 2016; Zientara and Zamojska, 2016) 2. Codification of tacit knowledge (Boiral 2002)
	<p>Wide dialogue on the environment</p> <ol style="list-style-type: none"> 1. Develop an environmental vision (Ramus 2002) 2. Provide information on negative effects of non-environmental behaviors (Greaves et al. 2013) 3. Concentrate a part of business on a green issue (Ramus 2001) 	<p>Reshaping decision-taking processes</p> <ol style="list-style-type: none"> 1. Decentralized decision-making (Boiral and Paillé 2012) 2. Encourage contribution to green practices (Alt and Spitzack 2016) 3. Open decision-oriented environmental meetings (Kim et al. 2016) 	<p>Rewards and recognition</p> <ol style="list-style-type: none"> 1. Green employee of the month and competitions (Manika et al. 2015) 2. Express gratitude; praise value of suggestions (Lamm et al. 2013) 3. Publicly recognize environmental initiatives (Ramus 2002) 	<p>Training</p> <ol style="list-style-type: none"> 1. Customized training for specific occupations (Boiral 2002) 2. Environmental education for new employees (Chou 2014) 3. Specialized workshops (Paillé et al. 2014)
	<p>Internal culture</p> <ol style="list-style-type: none"> 1. Organizational climate supporting environmental protection (Bissing-Olson et al. 2013) 2. Setting that encourages green behaviors (Paillé and Boiral 2013) 3. Culture of environmental sustainability (Paillé and Mejía-Morelos 2014) 	<p>Technical solutions</p> <ol style="list-style-type: none"> 1. Rapidly fix evident leaks (Lo et al. 2012b) 2. Decrease the time required to execute behaviors (Greaves et al. 2013) 3. Establish a carpooling platform; shift parking spaces further (Adams et al. 2017) 	<p>Interventions</p> <ol style="list-style-type: none"> 1. Introduce regular voluntary campaigns (being a vegetarian once a week/give recycled materials to charities) (Chou 2014) 2. "Fun" activities mixed with "serious" messages (Greene et al. 2014) 	<p>Recruitment and surveys</p> <ol style="list-style-type: none"> 1. Recruit new employees based on environmental attitudes (Chan et al. 2014; Kim et al. 2014) 2. Interior surveys based on the theory of planned behavior and address identified beliefs (Greaves et al. 2013)

Propensity to influence individual barriers

4.1. Personal Obstacles

Reviewed articles generally mentioned two to three obstacles related to individual psychological elements and perceptions (Table 4). Following the commonly accepted theorization in individual psychology literature (e.g., Deci and Ryan 1999; Schwartz and Boehnke 2004), obstacles were divided into two groups: within (barriers associated with personal deliberation) and between (barriers related to communication with other employees or organizational systems).

Barriers from the «within» group tend to influence individuals as employees and individuals as citizens. The most reported barrier, attitude towards pro-environmental activities (e.g., Graves et al. 2013; Ruepert et al. 2016; Scherbaum et al. 2008) – which in this review includes the moral obligation to perform such activities, a concern for nature, and personal values – seems unlikely to

be different for individuals in the office and in the privacy of their home (e.g., Kollmuss and Agyeman 2002). A similar line of thinking applies to the stage of consciousness development of individuals (Boiral *et al.* 2016; Tosti-Kharas *et al.* 2017), which is «assimilated throughout one's life in order to adapt to the challenges of one's environment or to fulfill certain potentials» (Boiral *et al.* 2014, p. 366). In this sense, workers' lack of knowledge (e.g., Chan *et al.* 2014; Lo *et al.* 2012b), feelings of self-efficacy (e.g., Smith and O'Sullivan 2012; Stritch and Christensen 2016) and awareness (e.g., Boiral *et al.* 2016; Tosti-Kharas *et al.* 2017) are tightly linked with personal lives of workers. Individuals' prior experiences and habits affect their willingness to change behaviors in a workplace setting (e.g., Adams *et al.* 2017; Greene *et al.* 2014), which inevitably has a role in the willingness of workers to act in pro-environmental ways at the office.

In contrast to barriers of the «within» group, obstacles related to the «between» group depend on the perceptions of employees on three aspects that might increase or decrease their desire to perform green behaviors at the workplace: social norms, infrastructure, and the organization itself. In relation to social norms, the work of Pinzone *et al.* (2016) «captures social processes among employees that lead to a shared perception of OCBEs as the standard way of behaving on environmental issues» (p. 207). According to some authors (e.g., Blok *et al.* 2015; Paillé *et al.* 2013; Pinzone *et al.* 2016), green internal culture and management practices within organizations lead to the consideration of green behaviors as normal, and workers are more inclined to perform them. Similarly, employees tend to act in a more responsible way when the infrastructures and facilities that enable green behaviors (for example, parking, choice of ecological options of food, self-adjustable air-conditioning) are perceived as easily accessible (e.g., Adams *et al.* 2017; Lo *et al.* 2012b; Manika *et al.* 2015). Commitment to the organization was also reported to have some influence on the likelihood of green conduct. For instance, according to Lamm *et al.* (2013), «both employee attitudes about their organization and their attitudes about sustainability in general relate to OCB-Es» (p. 186), and Temminck *et al.* (2015) and Tosti-Kharas *et al.* (2016) reported that workers committed to their organization tend to perform pro-environmental behaviors more frequently.

Importantly, most of the personal barriers – whether associated with the «within» or the «between» group – were found to be applicable not only to actual behaviors but also to behavioral intentions (obstacles related to intentions as well as behaviors are labeled with «***» in Table 4). This observation is in line with the theory of planned behavior (Ajzen 1991), according to which

intentions to act in a certain way are influenced by individual attitudes, subjective norms, and perceived behavioral control. Such barriers as the perception of the infrastructure, personal values, time required, and social expectations, among many others, form part of employees' underlying beliefs that affect the likelihood that they perform certain behaviors. For instance, Blok *et al.* (2015) studied the intention to act pro-environmentally among employees of an educational institution, and such personal factors as social norms and attitudes towards green behaviors were reported to influence their plans to behave environmentally responsibly. Scherbaum *et al.* (2008) similarly found that «environmental personal norms mediated the relationship between environmental worldviews and reported conservation behaviors and behavioral intentions» (p. 831).

Table 4. Obstacles to performing voluntary pro-environmental behaviors at the workplace

		Barriers	Articles*	Percentage of total**
Personal	Between	Commitment to the organization	19, 21, 22, 27, 38, 39, 40	19%
		***Social norms	5, 7, 14, 23, 25, 26, 28	19%
		***Perception of infrastructure	1, 20, 21, 33, 41	12%
	Within	***Attitude (including moral obligation, values, concern)	4, 5, 7, 9, 12, 13, 16, 17, 19, 20, 21, 32, 33, 34, 35, 36, 38, 40, 43	44%
		***Time required	1, 2, 9, 14, 15, 19, 20	16%
		***Lack of knowledge of green behaviors in the workplace	2, 8, 11, 14, 17, 19, 20, 24, 27, 34, 35	26%
		***Self-efficacy	7, 9, 17, 20, 21, 35, 36	16%
		***Not willing to change habits	1, 7, 11, 15, 41	12%
		Awareness about environmental problems	8, 39	5%
	Other		Age (1, 17, 42), negative mood (4), educational level (8, 40), gender (34)	28%

Organizational	Corporate values	Non-green internal culture	3, 4, 8, 12, 15, 18, 19, 21, 22, 31, 33, 34, 36, 39, 43	35%
		Non-authentic goals	10, 12, 27, 30, 36	12%
	Expression of green «self»	Lack of communication	3, 6, 7, 13, 20, 30, 32, 36	19%
		Lack of autonomy	5, 6, 13, 28, 30, 33, 36, 41, 42	21%
		Lack of exemplary role models	5, 6, 7, 23, 24, 30, 31, 36	19%
	Support	***Colleagues' influence	4, 7, 11, 15, 20, 26, 29, 31, 36	21%
		Supervisors' support	4, 5, 7, 10, 19, 21, 23, 25, 27, 29, 31, 36, 38	31%
	Resources	***Internal resources (financial, human capital, etc.)	6, 14, 15, 20, 24, 25, 27, 33, 36	21%

* These numbers correspond to the articles numbered in Appendix B.

**Note that the total does not equal 100%: most studies discussed more than one barrier.

*** Barriers that were empirically proven to influence both intentions and actions.

4.2. Organizational Obstacles

Based on the articles analyzed, organizational barriers can be divided into four categories: corporate values, expression of green «self,» support, and internal resources (Table 4).

Obstacles associated with corporate values are related to the lack of green culture within companies (e.g., Greene *et al.* 2014; Lamm *et al.* 2015; Manika *et al.* 2015) as well as to the symbolism of pro-environmental goals (e.g., Cantor *et al.* 2012; Chou 2014). According to scholars working on internal culture and values (e.g., Stead and Stead 1992; Harris and Crane 2002), green organizations are characterized by the incorporation of environmental considerations throughout all business processes, an intergenerational perspective on solving problems, and embracing intrinsic valuation and respect. In this sense, every third article analyzed in this systematic review mentioned a non-green internal culture as one of the principle barriers to voluntary green behaviors. Lamm *et al.* (2015) empirically confirmed that when organizations are known for being green, employees tend to act more responsibly. Similarly, Paillé and Boiral (2013) suggest that «a work setting that fosters employee willingness to engage in environmentally friendly behaviors» (p. 126) could significantly

influence the likelihood of green actions in the office due to an increased sensitivity to corporate values and objectives. In general, a weak pro-environmental atmosphere in an organization makes it less likely that employees will perform green behaviors (Chou 2014; Lamm *et al.* 2015; Ruepert *et al.* 2016).

The second sub-group combines barriers that are linked with the ease with which employees can express their «green self» at the workplace: appropriate communication channels, providing sufficient autonomy to subordinates, and superiors acting as green role models. The literature on citizenship behaviors has recognized the importance of alleviating hierarchical structures, as they might impede employees from behaving in a positive way (e.g., Bolino *et al.* 2002). The articles analyzed in this review contain similar ideas regarding green actions: for example, in the work of Ruepert *et al.* (2016) «some employees indicated that they would more often engage in pro-environmental actions at work when the organization would create the right conditions for acting upon their feelings of moral obligation, by securing sufficient autonomy and control over pro-environmental behavior» (p. 65). Lo *et al.* (2012b) also reported that «poor organisational communication was perceived to be a main contributor to low self-efficacy in this domain» (p. 243). In addition, Boiral *et al.* (2015) claim that green actions performed by managers at the workplace encourage subordinates to do the same. They emphasize that «leaders' integrity and coherence between the professed values and the displayed behaviors» (p. 535) are critical for increasing employees' commitment to eco-friendly conduct. In fact, the non-exemplary role of top management has been marked as one of the key reasons for behavioral ignorance in 19% of articles (e.g., Boiral *et al.* 2016; Paillé *et al.* 2013; Ramus 2002). An organization's ability to facilitate the expression of employees' and managers' «selves» (e.g., Alt and Spitzbeck 2016; Ramus 2001; Robertson and Barling 2013), when these staff members have green intentions, is therefore primordial for pro-environmental workplace actions.

The third sub-group of barriers stems from the lack of support from managers and colleagues. Consistent with the observations of Norton *et al.* (2015), this factor was identified as an important obstacle in a quarter of reviewed studies (e.g., Bissing-Olson *et al.* 2013; Boiral and Paillé 2012; Ramus 2001). Ignorance of suggested initiatives (Alt and Spitzbeck 2016; Temminck *et al.* 2015), inability to motivate subordinates (Pinzone *et al.* 2016; Smith and O'Sullivan 2012), and poor leadership (Blok *et al.* 2015; Graves *et al.* 2013; Robertson and Barling 2013) seem to significantly affect the willingness of employees to put forward new ideas or to perform eco-friendly behaviors.

For example, Smith and O'Sullivan (2012) witnessed several situations in which «individuals or teams had created new ways of working which potentially had a far wider impact on the organization and had lobbied management to introduce and support change» (p. 484).

The last sub-section of organizational barriers is related to a lack of internal resources (financial, human capital, time), which frequently impedes managers and employees from integrating green measures. However, a lack of resources can also encourage green actions in some cases. For instance, Greaves *et al.* (2013) found that the potential to save time was a significant facilitator to the use of video-conferencing, while the time to start up was an important obstacle to switching off computers when leaving the desk. Paillé *et al.* (2013) also suggested that organizations are capable of fostering green actions by granting supervisors the necessary resources to develop and experiment with new ideas. Hence, a lack of internal resources might slow down the process of greening the organization.

Contrary to personal barriers, most organizational obstacles have not yet been found to affect employees' intentions. This result is probably due to the low number of studies carried out on the basis of behavioral theories, as many identified barriers should theoretically influence both intentions and actions. For instance, a lack of autonomy is directly linked to perceived behavioral control (Ajzen 2006) and non-authentic organizational goals lead to a poor internal culture that is known to influence employees' commitment (Silverthorne 2004). Importantly, the role of supervisors often has a role in shaping local behavioral norms in the workplace (Dineen *et al.* 2006).

4.3. Recommendations

Of the articles analyzed, 90% suggested multiple practical recommendations to overcome previously described barriers. Following the inductive approach described in the methodological section, authors revealed 12 principal groups of practical suggestions (see Figure 5): establishing quality relationships (between superiors and employees or between workers), managers playing an exemplary role, transforming daily tasks (to integrate pro-environmental facets), environmental policies and vision, wide dialogue on the environment, reshaping decision-making processes, rewards and recognition initiatives, training, amelioration of internal atmosphere, technical solutions, interventions, and using surveys or research for changing attitudes or selecting employees.

The majority of these recommendations influence both individual barriers and the internal organizational context. For example, introducing environmental policies and establishing a green organizational vision might contribute to employee awareness of pro-environmental issues as well as to the development of the company's green goals. Yet, advice in the «establishing quality relationships» category seems to address a lack of organizational communication more than any individual-related barrier. Figure 5 is based on the recommendation's propensity to affect organizational and personal barriers; the positions of the recommendations in the figure do not signify the importance of the recommendation but the likelihood that they tackle individual- or company-related barriers.

5. Discussion

The aim of this article was to analyze the empirical literature on the barriers that impede employees from performing voluntary pro-environmental behaviors and how such obstacles might be overcome. In the process of conducting this systematic review, particular attention was paid to the «voluntary» and «discretionary» nature of behaviors. Having theoretically distinguished between green behaviors with different degrees of discretion, a literature search for pertinent articles was performed and led to the identification of 43 relevant studies that were systematically analyzed.

Abundant information about the two main themes of this review (barriers that impede employees from practicing green behaviors and recommendations from academia to overcome these obstacles) was extracted from selected articles. For categorization purposes, individual and organizational barriers were distinguished. The former include, but are not limited to, such factors as environmental attitude and values (e.g., Boiral and Paillé 2012; Greaves *et al.* 2013; Lamm *et al.* 2013), lack of knowledge (e.g., Al-Shemmeri and Naylor 2017; Lo *et al.* 2012b; Paillé *et al.* 2014), social norms (e.g., Greaves *et al.* 2013; Lamm *et al.* 2013), perception of self-efficacy (e.g., Manika *et al.* 2015; Scherbaum *et al.* 2008; Smith and O'Sullivan 2012), and time pressures (e.g., Greaves *et al.* 2013; Greene *et al.* 2014). The analysis revealed that while the majority of these barriers are not directly related to the workplace setting, they were found to significantly influence employee intentions towards green actions. According to several meta-analytic reviews (e.g., Armitage and Conner 2001; Webb and Sheeran 2006) intentions are generally considered good predictors of behaviors; encouragement activities from Figure 5 might alleviate multiple obstacles and lead to a

higher proportion of employees contemplating the very idea of performing pro-environmental behaviors.

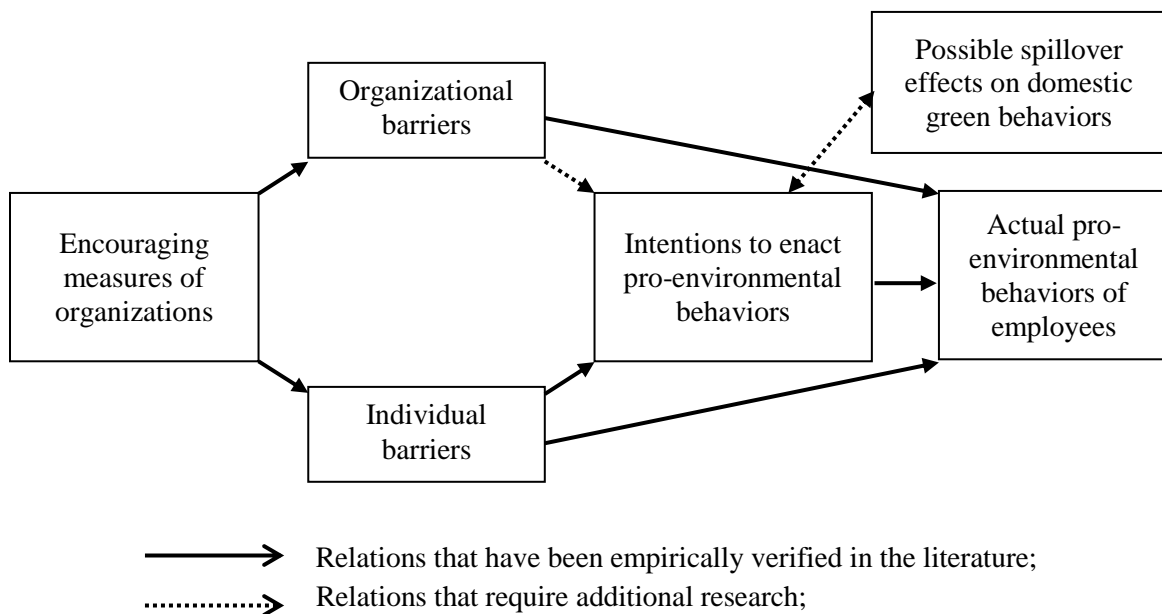
For their part, organizational barriers include such issues as non-green corporate values (Ramus 2001; Ruepert *et al.* 2016; Saifulina and Carballo-Penela 2017), poor communication about ecological issues (e.g., Robertson and Barling 2013; Smith and O’Sullivan 2012), lack of management commitment and support (e.g., Graves *et al.* 2013; Lamm *et al.* 2013; Manika *et al.* 2015; Paillé *et al.* 2013), and non-authentic pro-environmental goals (e.g., Chou 2014; Paillé and Raineri 2015; Ramus 2002), all of which reduce the likelihood of green conduct for employees. Yet, most of these organizational barriers have been so far proven to influence actions but not intentions. More research is thus needed to draw clear conclusions on what organizational barriers affect employees’ intentions and how they can be changed.

The analysis of recommendations for overcoming various obstacles also led to some interesting discussions between the authors of this review. While such practical suggestions affect both organizational and personal barriers, they seem to reduce the «voluntariness» of employees’ pro-environmental behaviors. Almost any activity tends to influence, at least to a degree, individual perceptions of green conduct. For instance, providing information about the environmental impact of certain behaviors (e.g., Greaves *et al.* 2013), such as driving versus cycling to work, might inspire personnel to change their mode of transportation. Likewise, while turning off lights is a discretionary behavior, an employee might feel «out-of-group» if his/her colleagues and managers leave the office in dark for the night, but he/she does not. Note that this «out-of-group» feeling may be unintentionally caused by managers or employees trying to act as role models (e.g., Cantor *et al.* 2012; Graves *et al.* 2013). Furthermore, some scholars suggest introducing environmental policies (Stritch and Christensen 2016; Tosti-Kharas *et al.* 2017), codifying knowledge (Boiral 2002), integrating pro-environmental goals into regular tasks (Lo *et al.* 2012b; Tosti-Kharas *et al.* 2017), or even rewarding workers through regular «green» competitions. Paradoxically, most recommendations are intended to promote and encourage discretionary green behaviors, and in so doing, make them a little less discretionary.

This line of thinking led to the construction of a conceptual model that reflects the role of organizations in the promotion of voluntary pro-environmental behaviors of employees (see Figure 6 below). Solid arrows on the graphic illustrate empirically proven relations, while dotted arrows

are related to gaps in the literature identified by this systematic review. In other words, practical measures aimed at promoting green actions of employees clearly influence both organizational and individual obstacles. While selected articles reported that both of these obstacles influence actual behaviors, only personal factors were found to have an effect on intentions to act in responsible way (solid arrow from «Individual barriers» to «Intentions of pro-environmental behaviors» in Figure 6). This might be explained by the low number of studies that take internal corporate factors into consideration when exploring pro-environmental behaviors.

Figure 6. The role of organizations in the promotion of voluntary pro-environmental behaviors of employees*



* Please note that arrows in the figure represent influence, not direction

Importantly, Figure 6 also includes a suggestion of spillover effects between domestic and workplace green behaviors (dotted arrow between «Intentions to enact pro-environmental behaviors» and «Possible spillover effects on domestic green behaviors»). Indeed, individuals at home and at work tend to have the same knowledge and habits, experience similar emotions, and logically would have similar levels of intrinsic motivation toward eco-responsibility. These elements were mentioned in several articles analyzed in this review (e.g., Blok *et al.* 2015; Paillé *et al.* 2014; Chan *et al.* 2014; Bissing-Olson *et al.* 2013; Ramus 2001), and academics thus seem to be aware of the possibility of such links. For example, Smith and O’Sullivan (2012) mentioned that «participants described their domestic and work selves as a continuum in terms of environmental attitudes and behaviour, reflected in the nature of activities reported» (p. 480). In the same vein,

Robertson and Barling (2013) state the following: «Our study identified environmental descriptive norms as an antecedent of environmentally-specific transformational leadership and leaders' workplace pro-environmental behaviors, indicating that what leaders' friends and family do (i.e., descriptive norms) can spill over to the internal organizational context and influence members' behaviors» (p. 187). However, empirical validation of the direct (home to work) and indirect (work to home) connections between contexts is missing.

Conclusion

This review contributes to the literature on pro-environmental workplace behaviors by providing a mapping of empirical findings associated with principal barriers to these actions, as well as a classification of the practical recommendations that have been suggested to overcome them. In contrast to previous reviews on the topic (Inoue and Alfaro-Barrantes 2015; Lo *et al.* 2012a; Norton *et al.* 2015), this research emphasizes the importance of various obstacles associated with green behaviors of employees. One of the most important findings concerns the focus of the articles analyzed. Although some studies explored intentions (e.g., Blok *et al.* 2015; Scherbaum *et al.* 2008) and others concentrated on behaviors (e.g., Alt and Spitzack 2016; Boiral 2002; Paillé *et al.* 2014), most individual barriers were mentioned in both types of studies. This is not the case for organizational obstacles, presumably due to the limited number of theoretical frameworks that have been employed so far in the field of green workplace behaviors.

From a practical point of view, practitioners might find this article useful as it allows them to estimate which obstacles have the most weight in their organization and adjust their actions accordingly. While a pro-environmental leader working in a responsible company with clearly defined goals might benefit more from addressing the personal barriers of all employees, a manager of a less proactive organization that does not act as a role model to his/her employees could begin with the transformation of his/her own actions.

This literature review opens up opportunities for future research, mainly associated with the suggested conceptual model (Figure 6). Other possibilities for further investigations stem from the four main limitations of this study. First, and most importantly, selected studies did not specifically investigate barriers that impede employees from performing green behaviors. Future research should critically assess various barriers identified in this review, as well as in the paper by Norton *et al.* (2015).

Second, although this review highlighted the ambiguous nature of discretionary behaviors, additional clarification seems necessary. While it is theoretically possible to distinguish between several levels of voluntary conduct (some behaviors are more discretionary and others are less so), none of the selected articles performed such empirical verifications.

Third, due to the inclusiveness of the selection criteria used in the review, studies were not excluded based on the level of statistical rigor or sample size. While irrelevant or clearly low-quality publications were eliminated by two independent coders during the scanning process, a later review of this literature – with a consequently larger sample to draw from – could be more discerning about the quality of empirical studies.

Fourthly, the recommendations for overcoming various obstacles need further categorization that can only be done with the help of additional research. In this article, recommendations were subdivided based on the propensity to influence institutional or organizational barriers; the information currently available is not sufficient for creating a more encompassing model. Further research should assess the success rate of practical recommendations and develop clear implementation plans for organizations willing to evolve in a responsible and environmentally friendly direction.

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Chapitre 2. Evaluating determinants of employees' pro-environmental behavioral intentions⁴

Résumé

Bien que la prise en compte des questions environnementales par le biais de la mobilisation des employé(e)s soit de plus en plus étudiée, l'influence des facteurs individuels et organisationnels sur le sentiment de citoyenneté environnementale et sur les comportements associés demeure méconnue. Le but de cette étude est d'identifier et d'évaluer les facteurs qui influencent les intentions des employé(e)s envers deux comportements pro-environnementaux: l'utilisation d'un moyen de transport écologique et les éco-suggestions proposées au travail. Au total, 318 employé(e)s ont rempli un questionnaire basé sur la théorie du comportement planifié. L'analyse des données a révélé que le cadre théorique choisi expliquait jusqu'à 79 % de la variance. Bien que les obstacles organisationnels n'aient joué aucun rôle dans la prédiction de l'intention des employé(e)s de choisir un moyen de transport écologique, certains obstacles organisationnels ont influencé l'intention des travailleur-euse-s de proposer des idées pro-environnementales au travail.

Mots-clés : comportements de citoyenneté organisationnelle pour l'environnement (OCBE); théorie du comportement planifié (TPB); barrières organisationnelles.

⁴ Yuriev, A., Boiral, O. & Guillaumie, L. (en révision-resoumission) à la revue *International Journal of Manpower*. « Evaluating determinants of employees' pro-environmental behavioral intentions »

Abstract

Although greening organizations through employee engagement has grown in popularity, little is known about the extent to which individual and organizational factors impede or facilitate a sense of environmental citizenship (and associated behaviors) within organizations. The aim of this study was to identify and evaluate factors influencing intentions of two pro-environmental behaviors: employee use of alternative transportation and eco-suggestions made by employees at work. A total of 318 employees filled out a self-administered questionnaire based on the theory of planned behavior. Analysis of the data suggested the selected theoretical framework was useful for predicting employees' intention to perform pro-environmental behaviors (the model explained up to 79% of variance). While organizational barriers did not play any role in predicting the intention of employees to use alternative transportation, some organizational obstacles (opinion of colleagues, required paperwork) influenced workers' intention to suggest eco-friendly ideas at work. The analyzed data shed light on the disproportionate influence of organizational and psychosocial factors on pro-environmental workplace behaviors. The article concludes by identifying practical implications and avenues for future research.

Keywords: Organizational citizenship behaviors for the environment (OCBEs); theory of planned behavior (TPB); organizational barriers; green human resource management.

Introduction

Greening organizations is a complicated endeavor that consists of multiple interconnected measures, such as developing internal environmental policy, obtaining an appropriate certification, modifying the production cycle (Jabbour & Santos, 2008; Ramus, 2002). Nevertheless, human activity is the main catalyst of climate change, and changing employees' behaviors is frequently considered to be the most important step in corporate greening (Boiral, 2009; Daily, Bishop, & Govindarajulu, 2009; Robertson & Barling, 2013). Considering that pro-environmental behaviors are numerous (e.g., adjusting thermostats, recycling, energy-saving measures), it is difficult to control them efficiently through formal approaches (e.g., policies, strategies) (Daily et al., 2009; Robertson & Barling, 2013). For instance, the success of an environmental management system based on the ISO 14001 in many ways depends on the daily actions of employees rather than on a mere adoption of the standard (Boiral, 2007; Yin & Schmeidler, 2009).

In an attempt to develop efficient recommendations for promoting pro-environmental behaviors among employees, scholars have explored factors that influence such actions. Previous studies reported that the likelihood of these behaviors depends mainly on organizational and psychosocial (individual) factors (Norton, Parker, Zacher, & Ashkanasy, 2015; Yuriev, Boiral, Francoeur, & Paillé, 2018). Principal factors associated with individual characteristics of employees include self-efficacy (Boiral & Paillé, 2012; Boiral, Talbot, & Paillé, 2015), attitude (Bissing-Olson et al., 2013; Blok et al., 2015), social norms (Greaves, Zibarras, & Stride, 2013; Paillé, Boiral, & Chen, 2013), and awareness of environmental problems (Tosti-Kharas, Lamm, & Thomas, 2016). Among the most influential organizational factors, scholars emphasize supervisors' support (e.g., Boiral et al., 2015; Robertson & Barling, 2013), internal green culture (e.g., Pham, Hoang, & Phan, 2019), and autonomy of employees (e.g., Blok et al., 2015; Ramus, 2002).

Due to the existence of numerous factors, the challenge is to identify those that most influence the adoption of pro-environmental workplace behaviors. This identification process remains a subject of confusion in the scientific literature. For example, Chan et al. (2014) studied only individual factors (environmental knowledge, concern, and awareness), thus overlooking the importance of organization-related aspects. At the same time, some articles that do integrate both types of factors (e.g., Manika et al., 2015) seem to neglect the importance of quantitatively assessing their separate influences. In fact, few studies have explored pro-environmental workplace behaviors by systematically identifying individuals' beliefs associated with such actions and consecutively

assessing their relative importance (for a rare exception, see Greaves et al., 2013). Given this context, the objective of this study was to present a step-by-step approach to identify both the psychosocial and the organizational factors that should be targeted to promote the adoption of pro-environmental behaviors among employees.

The remainder of this article is organized as follows. First, the current state of the literature on green workplace behaviors and foundations of the theoretical framework are explained to formulate several hypotheses. Second, various details of the methodological approach are presented. Third, the results of the study are discussed. The manuscript concludes with the discussion of theoretical and managerial implications as well as limitations and possibilities for future research.

1. Literature review and hypothesis development

1.1. Pro-environmental workplace behaviors – current state of knowledge

Some green workplace behaviors stem from the job description. For instance, daily ecology-preserving duties are part of an environmental manager's job description (Ramus, 2002). In contrast, numerous other behaviors cannot be imposed. For example, internal environmental policies can rarely force employees to turn off computers when finishing their workdays (Greaves et al., 2013) or to wear more clothes rather than increasing the temperature (Blok et al., 2015). These individual actions are commonly referred to as organizational citizenship behaviors for the environment (OCBEs): «individual and discretionary social behaviors not explicitly recognized by the formal reward system and contributing to improve the effectiveness of environmental management of organizations» (Boiral, 2009, p. 223).

As with other pro-environmental workplace behaviors, OCBEs are affected by organizational and psychosocial factors (Francoeur et al., 2019; Yuriev et al., 2018). Although some studies have reported that certain psychosocial factors associated with household activities are applicable to the workplace context as well (Robertson & Barling, 2013; Smith & O'Sullivan, 2012), recent publications have indicated that the spillover effect between the two contexts is rarely automatic (McDonald & Oke, 2018; Paillé, Raineri, & Boiral, 2017). This might be due to such organizational factors as a lack of autonomy (Robertson & Barling, 2013), the absence of supervisors' support (Boiral, Talbot, & Paillé, 2015), a non-green internal culture (Moktadir et al., 2019; Tosti-Kharas et al., 2016), or a lack of financial or human capital in the organization (Smith & O'Sullivan, 2012). Depending on the type of behavior, the influence of these factors can vary (Norton et al., 2015;

Yuriev et al., 2018). In this context, the development of efficient promotional measures depends on the assessment of antecedent beliefs' relative importance.

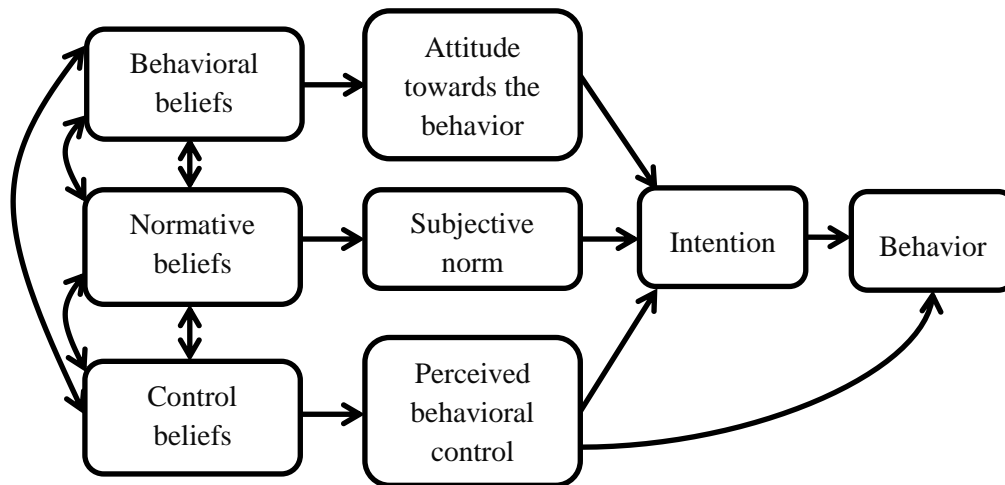
This can be done through the use of the theory of planned behavior (TPB), one of the most successful models for identifying and assessing antecedent beliefs towards individual behaviors. Several studies on green workplace behaviors based on this theory (e.g., Boiral et al., 2015; Zhang, Wan & Zhou, 2014) applied it only partially without exploring all variables included in this model. Furthermore, according to Yuriev et al. (2018), OCBs have been studied only using a handful of theoretical frameworks (e.g., social exchange theory, value-beliefs-norm), and thus other approaches are necessary to shed light on which factors impede the emergence of such behaviors.

1.2. Foundations of the TPB

The TPB is a theoretical model that allows scholars to identify psychosocial factors that determine studied behaviors (Ajzen, 1991). It has frequently been used in the health-care sector, where the identification of these factors is a crucial part of intervention plans to promote healthy behaviors among individuals (Conner, Norman, & Bell, 2002; Cooke, Dahdah, Norman, & French, 2016). The TPB has also successfully been used in several studies on management issues (e.g., Jimmieson, Peach, & White, 2008; Jaén & Liñán, 2013).

According to the TPB (see Figure 1), the immediate precursors of behavior are intention and perceived behavioral control (PBC). Intention refers to the motivation to adopt a given behavior (Ajzen, 1991) and is predicted by three antecedents: attitude, subjective norm, and PBC (Ajzen, 1991). Attitude refers to the perceived advantages of adopting the behavior, subjective norm refers to the perceived social pressures from relevant others to perform the behavior, and PBC refers to the perceived control over performing the targeted behavior (Ajzen, 1991). Each determinant of intention (attitude, subjective norms, and PBC) is further defined by sub-constructs: behavioral beliefs, normative beliefs, and control beliefs (Ajzen, 1991).

Figure 1. The theory of planned behavior (Ajzen, 1991)



The successful application of the TPB requires a two-step approach: a qualitative exploration of beliefs followed by their quantitative evaluation (Ajzen, 2006); however, few researchers have applied the TPB in such a systematic way. For instance, Greaves et al. (2013) explored intentions of employees to switch-off computers when leaving their offices, using video-conferencing instead of travelling, and recycling waste. The model explained between 46% and 61% of employees' intentions to perform these behaviors, and the authors were able to identify specific factors that should be prioritized to increase the number of employees who act ecologically. Similarly, Blok et al. (2015) conducted a survey among university employees to shed light on factors that influence their intention to perform a large number of green behaviors. Their research identified multiple beliefs that were reported to be significant for the studied behaviors. In contrast to these articles, the majority of studies in the field of pro-environmental behaviors of employees used only one or several variables of the TPB but did not explore behavioral, normative, or control beliefs, thus overlooking the principal force of the theory (e.g., Boiral et al., 2015; Zhang et al., 2014).

1.3. Hypotheses formulation

Articles based on the main constructs of the TPB (attitude, subjective norm, PBC) successfully predicted the intention to perform several pro-environmental behaviors. For example, Greaves et al. (2013), who applied Ajzen's model to three workplace behaviors (videoconferencing, recycling, and switching off computers), reported relatively high levels of explained variance (from 46% to 61%) in the intention to engage in these behaviors. In a similar way, Laudenslager, Holt, and Lofgren (2004) explained almost 35% of employees' intention to recycle and to engage in

carpooling. Remarkably, these studies emphasized the importance of integrating all three antecedents of intention. Therefore, the following hypothesis is proposed:

H1: Attitude, subjective norm, and perceived behavioral control positively predict the intention of employees to engage in OCBs.

To identify potential targets for interventions promoting pro-environmental workplace behaviors, Ajzen (1991) suggests regressing the intention on behavioral beliefs, normative beliefs, and control beliefs when their associated main construct (i.e., attitude, subjective norm, and PBC) is found to significantly predict intention. As demonstrated by Greaves et al. (2013), it is important that a data collection tool embed these specific beliefs of the studied population to identify those that should be targeted in interventions—identifying the most impactful beliefs increases the chances that interventions will be effective. In an effort to demonstrate the crucial role of antecedent beliefs and to provide grounds for the development of an intervention plan for the studied organization, the following has been hypothesized:

H2: Antecedent behavioral beliefs, normative beliefs, and control beliefs have a direct effect on intention and an indirect effect on the associated constructs of the TPB (attitude, subjective norm, PBC).

Of the studies based on the TPB, considerably more studies have investigated pro-environmental behaviors performed at home than such behaviors performed by employees at work. Although a spillover effect between the two contexts is possible (Paillé et al., 2017; Smith & O’Sullivan, 2012), an employee is exposed to organizational obstacles, and in certain cases, motivational factors that do not intervene in household behaviors (Norton et al., 2015; Yuriev et al., 2018). For instance, the opinion of colleagues was reported to significantly influence the intention to switch-off computers and to use videoconferencing facilities at work (Greaves et al., 2013). Similarly, Blok et al. (2015) found that leaders’ exemplary actions were significant predictors of intention to recycle, print double-sided, turn off heating, and conserve energy. Furthermore, in their study of 540 employees, Wesselink, Blok, and Ringersma (2017) found that institutional support, leadership behavior, and subjective norms influenced the intention to engage in pro-environmental workplace behaviors, while personal attitude towards environmental conservation did not. This might signify that rational

thinking is dominated by organizational factors when people decide whether they will perform green behaviors at work. Therefore:

H3: In comparison with personal beliefs, organization-related beliefs are more significant predictors of employees' intention to perform OCBs.

2. Methodology

2.1. Context and participants

The study was conducted among non-academic employees of a large Canadian university with over 43,000 students and over 4,000 non-academic employees. Such employees play an important role in activities related to sustainability within higher-educational institutions. For instance, they can be consulted by university management and may provide recommendations for the development of new initiatives (Bellou et al., 2017). Implementation and public recognition of such bottom-up initiatives are frequently identified as catalysts for the involvement of students in similar types of actions (Bellou et al., 2017). University employees are also important members of the campus community. Their OCBs can be perceived as exemplary by students and faculty members (Velazquez, Munguia, Platt, & Taddei, 2006).

2.2. Choice of behaviors

Two behaviors under study (travelling to the university using alternative transportation and making eco-suggestions directed towards workplace or work duties) were selected based on the results of a vote organized during a focus group discussion. Six full-time employees from different departments (position titles included receptionist, secretary, educational consultant, coordinator, and others) as well as two representatives of the university sustainability office participated in this meeting.

2.3. Identification of beliefs for questionnaire development

As the first step of applying the TPB, a pilot qualitative exploration was conducted. In accordance with the guidelines of Ajzen (2006), this methodological approach aims to identify behavioral beliefs (i.e., the perceived advantages and disadvantages), normative beliefs (the influencing persons or groups), and control beliefs (perceived barriers and facilitating factors) associated with performing each behavior under study within a particular population. A sample of 14 employees was recruited for individual one-hour, semi-directed interviews to discuss behavioral, normative,

and control beliefs regarding the two behaviors under study. The number of participants was determined by the criterion of saturation (O'Reilly & Parker, 2012). As responses were highly repetitive, the first eight interviews contained 95% of beliefs associated with both behaviors.

Double-blind coding, a technique frequently used in qualitative studies to decrease bias (Miles & Huberman, 1994), was performed by two coders. The inter-coder agreement was close to the ideal correspondence rate (86%) suggested by Miles and Huberman (1994). For additional verification, a Cohen's kappa coefficient (Landis & Koch, 1977) of 0.887 ($p < 0.0005$) was obtained with the help of the SPSS v.23 software. This number refers to an almost perfect level of matching between researchers (Landis & Koch, 1977). The use of alternative transportation was influenced by 27 beliefs, while making eco-suggestions was affected by 21 beliefs; however, only beliefs present in at least 70% of the interviews were ultimately retain for further analysis (see Table 1). This adjustment is consistent with studies based on the TPB (e.g., Conner et al, 2002; Greaves et al., 2013), and its objective is twofold: to focus the research on the most pertinent beliefs and to reduce the number of items in the questionnaire.

Table 1. Identified antecedent beliefs

	Alternative transportation	Eco-suggestions
Behavioral beliefs	Freedom of movement after work	Possibility to facilitate the work of others
	Environmental impact	Environmental impact
	Risk of accidents	Job benefits (promotion, being praised)
	Health benefits	
Normative beliefs	Family constraints (e.g., children)	Opinions of colleagues
	Previous agreements with colleagues (e.g., car-sharing)	Supervisor reaction towards suggestions
	Verbal comments of a supervisor	Efforts of the university community
Control beliefs	Arriving/departing times	Required paperwork
	Cost	High volume of work
	Trip duration	To whom can such ideas be communicated
	Bad weather	Lack of authority
	Rush hour	
	Parking	
	Distance	

2.4. Item creation

The beginning of the questionnaire had four questions: gender, age, job title, and length of employment at the university. The remainder of the questionnaire was created following the guidelines of Ajzen (2006) and the best practices in the field (e.g., Greaves et al., 2013; Francis et

al., 2004). All items were rated on a 5-point Likert scale because the majority of consulted management-related studies using the TPB employ this scale (e.g., Boiral et al., 2015; Greaves et al., 2013; Jimmieson, Peach, & White, 2008). It is also recommended by the guidelines for the construction of a questionnaire based on this theoretical framework (Ajzen, 2006; Francis et al., 2004). Previously identified significant antecedent beliefs were transformed into pairs of affirmations: one to evaluate the strength of the participant's belief and the other to assess the outcome of the belief. For example, the belief «freedom of movement after work» was reformulated into the following two statements:

Using alternative transportation to go to the office every working day in the forthcoming month will impede me from having freedom of movement after work (groceries, friends, sports, etc.)

Strongly agree : __1__ : __2__ : __3__ : __4__ : __5__ : Strongly disagree

For me, having freedom of movement after work is...

Not important at all : __1__ : __2__ : __3__ : __4__ : __5__ : Very important

In total, 28 affirmations targeted antecedent beliefs of using alternative transportation (four behavioral beliefs, three normative beliefs, and seven control beliefs), and 20 affirmations targeted beliefs associated with the eco-suggestions of employees (three behaviors beliefs, three normative beliefs, and four control beliefs).

Three direct determinants of intention were also measured in line with Ajzen's (2006) suggestions. Attitude measures contained three pairs of opposite adjectives. For instance, participants' attitudes towards suggesting eco-initiatives were evaluated with adjectives such as important – not important, positive – negative, and natural – atypical. Subjective norm was measured with four affirmations for each behavior (Ajzen, 2006) in an attempt to assess whether participants value opinions of others in relation to the studied behaviors. Examples of such items are: «Most people who are important to me will most likely use alternative transportation to go to the office every working day in the forthcoming month» and «It is expected of me that I use alternative transportation to go to the office every working day in the forthcoming month.» Measures of perceived behavioral control included three items that targeted the capacity of individuals to perform studied behaviors and their autonomy in the process (Ajzen, 2006). For instance, one of the items was formulated as follows: «It is mostly up to me to decide if I suggest new ecological initiatives to my supervisor/colleagues

whenever I come up with such ideas. » Finally, the questionnaire contained three items to measure intention for both behaviors (Ajzen, 2006). The first evaluated the planning («I plan to use alternative transportation...»), the second targeted the actual physical willingness of the action («I will try to use alternative transportation...»), and the third assessed willingness («I want to use alternative transportation...»).

Ten randomly chosen employees individually completed a printed version of the questionnaire in the presence of one of the researchers. The final questionnaire consisted of 77 items, and the ninth and tenth participants in the pre-testing process completed the questionnaire in 17 and 18 minutes, respectively.

2.5. Data collection

The questionnaire was sent electronically to 1,000 randomly chosen administrative employees. One of the researchers verified the titles of the selected personnel in the database to exclude employees involved in academic work. Prior to accessing the online tool, participants were informed of the general objectives of the research and the ethical guidelines (anonymity, confidentiality). The questionnaire was open for participation for two weeks. In total, 396 questionnaires were returned, which is a response rate of 39.6%. Seventy-eight not fully completed questionnaires were excluded, such that the final sample consisted of 318 respondents (sufficient sample size based on the total population of 4,000 and a 90% confidence level with a 5% margin of error). Participants were predominantly female (79.2%). The age of the respondents varied between 23 and 68 years, with an average age of 44.7 years (SD = 10.3 years). The number of years they had spent working at the university ranged from less than one to 43, with an average tenure of 11.2 years (SD = 8.4 years).

2.6. Analysis

The data analysis involved three stages. First, as recommended by Hu and Bentler (1999), the measurement model was assessed using the chi-square statistic, the root mean square error of approximation (RMSEA), the comparative fit index (CFI), and the non-normed fit index (NNFI). These indices were calculated with the help of AMOS software using the covariance matrix with a maximum likelihood estimation. Common recommendations indicate that the relative/normed chi-square (χ^2/df) should be between 2.0 and 5.0 (Tabachnick & Fidell, 2007), $CFI \geq .90$ and $NNFI \geq .90$ are recognized as indicative of a good fit (Hu & Bentler, 1999), and RMSEA values between 0.05 and 0.10 are perfect (MacCallum et al., 1996). The Cronbach's alpha, the common criterion of

internal consistency, of four principal TPB constructs (attitude towards behavior, subjective norm, perceived behavioral control, and intention) for both studied behaviors was also calculated at this stage.

Second, the mediating effects of each antecedent belief were evaluated using SPSS software. Both direct effects (the influence of antecedent beliefs on intention) and indirect effects (the influence of antecedent beliefs on intention through associated TPB constructs) were estimated. Mediation was considered significant when the bias-corrected confidence level (95%) did not include zero (Field, 2009). Beliefs that did not demonstrate the significant direct effect on intention were discarded.

Third, following the example of Greaves et al. (2013), a series of path analysis models were constructed in AMOS software to verify the complete TPB model. In contrast to the traditional step-by-step analysis, a path analysis allows researchers to simultaneously assess the model as a whole, to evaluate multiple mediation paths, and to compare indirect and direct effects of various variables (Baron & Kenny, 1986). Specifically, the influence of significant beliefs on associated TPB constructs and the influence of TPB constructs on intention were estimated with multiple linear regressions, which is the most widespread technique in TPB-based studies (e.g., Greaves et al., 2013; Blok et al., 2015).

3. Results

3.1. Assessment of model fit and construct reliability

The research model provided a good fit for the data on alternative transportation ($\chi^2 = 168.84$, $df = 32$, $p < .001$; CFI=.92; NNFI= .90; RMSEA=.12) and an excellent fit for the data on eco-suggestions ($\chi^2 = 80.98$, $df = 32$, $p < .001$; CFI=.96; NNFI= .93; RMSEA=.06). Although some fit indices seemed to be on the lower end of the thresholds, Hu and Bentler (1999) estimated that only two of the abovementioned criteria should be satisfied for the model to be considered acceptable. For internal reliability, the Cronbach's alpha ranged from 0.730 to 0.865 (see Table 2), which is considered a good level (Field, 2009). The means and standard deviations (SD) of antecedent beliefs that were found to be significant predictors of associated constructs are shown in Table 3.

Table 2. Inter-correlations and Cronbach's alpha of principal TPB constructs

	Alternative transportation (N=318)				Eco-suggestions (N=318)			
	AT	SN	PBC	INT	AT	SN	PBC	INT
AT	$\alpha=.825$				$\alpha=.726$			
SN	.517	$\alpha=.838$.422	$\alpha=.865$		
PBC	.627	.447	$\alpha=.855$.221	.325	$\alpha=.730$	
INT	.832	.523	.763	$\alpha=.9$.524	.471	.342	$\alpha=.833$

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Note: AT = attitude; SN = subjective norm; PBC = perceived behavioral control; INT = intention.

Table 3. Direct and indirect effects of antecedent beliefs on intention

Beliefs	Mean	SD	Direct(β)	Indirect(β)
Alternative transportation (N=318)				
<i>Behavioral beliefs</i>				
Freedom of movement	17.6	6.7	0.1* (.14, .61)	0.33* (.08, .48)
Environmental impact	13.1	6.8	-0.05* (-.52, -.2)	-0.15* (-.31, -.15)
Health benefits	13.3	8.5	-0.05* (-.43, -.13)	-0.15* (-.17, -.11)
<i>Normative beliefs</i>				
Family constraints	13.5	9.2	-0.12* (-1.1, -.5)	-0.06* (-.51, -.1)
<i>Control beliefs</i>				
Arriving and departing time	6.9	4.2	NS (-.19, .31)	0.23* (.07, .28)
Cost	9.7	6.5	0.09* (.3, .78)	0.22* (.43, .61)
Trip duration	13.3	8.1	0.08* (.27, .45)	0.2* (.28, .37)
Bad weather	8.3	4.1	NS (-.01, .28)	0.22* (.11, .17)
Parking	8.6	5.7	NS (-.4, .15)	0.08* (.2, .45)
Distance	7.8	6.6	0.1* (.11, .39)	0.21* (.06, .25)
Eco-suggestions (N=318)				
<i>Behavioral beliefs</i>				
Facilitate the work of others	10.3	6.7	0.09** (.2, .33)	0.07* (.15, .24)
Environmental impact	15.2	6.8	0.07* (.17, .23)	0.07* (.18, .29)
<i>Normative beliefs</i>				
Opinion of colleagues	7.1	3.7	NS (-.18, .03)	0.07* (.09, .37)
Efforts of the university community	5.1	3.4	NS (-.08, .56)	0.08* (.11, .44)
<i>Control beliefs</i>				
Required paperwork	6.1	4.2	0.11* (.37, .79)	0.03* (.47, .69)

Note: β was considered significant when confidence interval did not include 0 (reported in brackets); ** – $p<0.001$; * – $p<0.05$; SD – standard deviation; NS – not significant

3.2. Hypotheses testing

Hypothesis 1 predicted a positive relationship between the principal constructs of the TPB and the intention of employees to engage in the studied behaviors. The results support this hypothesis for both behaviors as demonstrated by the values of explained variance in the path analysis graphs (see Figures 2 and 3): all three constructs of the TPB (attitude, subjective norm, and PBC) were found to be statistically significant. In the case of the intention to use alternative transportation, the TPB

explained 79% of variance: attitude towards this behavior was the most significant factor (69.1%, $p < 0.001$) followed by the PBC (9.6%, $p < 0.001$) and the subjective norm (0.3%, $p < 0.05$). Significantly fewer representative results were obtained for intention to propose eco-suggestions, where the model explained 37.7% of the variance: attitude accounted for 27.4% ($p < 0.001$), subjective norm explained 7.6% ($p < 0.05$), and PBC added 2.7% ($p < 0.001$).

According to Hypothesis 2, antecedent beliefs were expected to have a direct effect on intention and an indirect effect on the associated TPB constructs; however, the analysis of confidence intervals of direct and indirect effects (Table 3) confirms this suggestion only partially. More precisely, in the case of alternative transportation, Hypothesis 2 was confirmed for three behavioral beliefs (freedom of movement – $\beta = 0.1$, environmental impact – $\beta = 0.05$, and health benefits – $\beta = 0.05$), one normative belief (family constraints – $\beta = 0.12$), and three control beliefs (cost – $\beta = 0.09$, trip duration – $\beta = 0.08$, and distance – $\beta = 0.1$). Regarding eco-suggestions, the hypothesis was supported by two behavioral beliefs (facilitate the work of others – $\beta = 0.09$ and environmental impact – $\beta = 0.07$) and one control belief (required paperwork – $\beta = 0.11$).

Hypothesis 3 suggested that organization-related beliefs would have a larger influence on employees' intention to engage in OCBEs than individual beliefs. A mediation analysis (Table 3) of the two behaviors indicated opposing results for each. In the case of alternative transportation, respondents did not seem to be influenced by any barriers related to the organization when deciding how to go to the office, thus invalidating Hypothesis 3. In comparison, intention to propose eco-suggestions was predominantly explained by organizational factors (the possibility to facilitate the work of others and the volume of bureaucratic procedures), thus supporting Hypothesis 3.

Figure 2. Path analysis for the use of alternative transportation with R² values and f² effect size

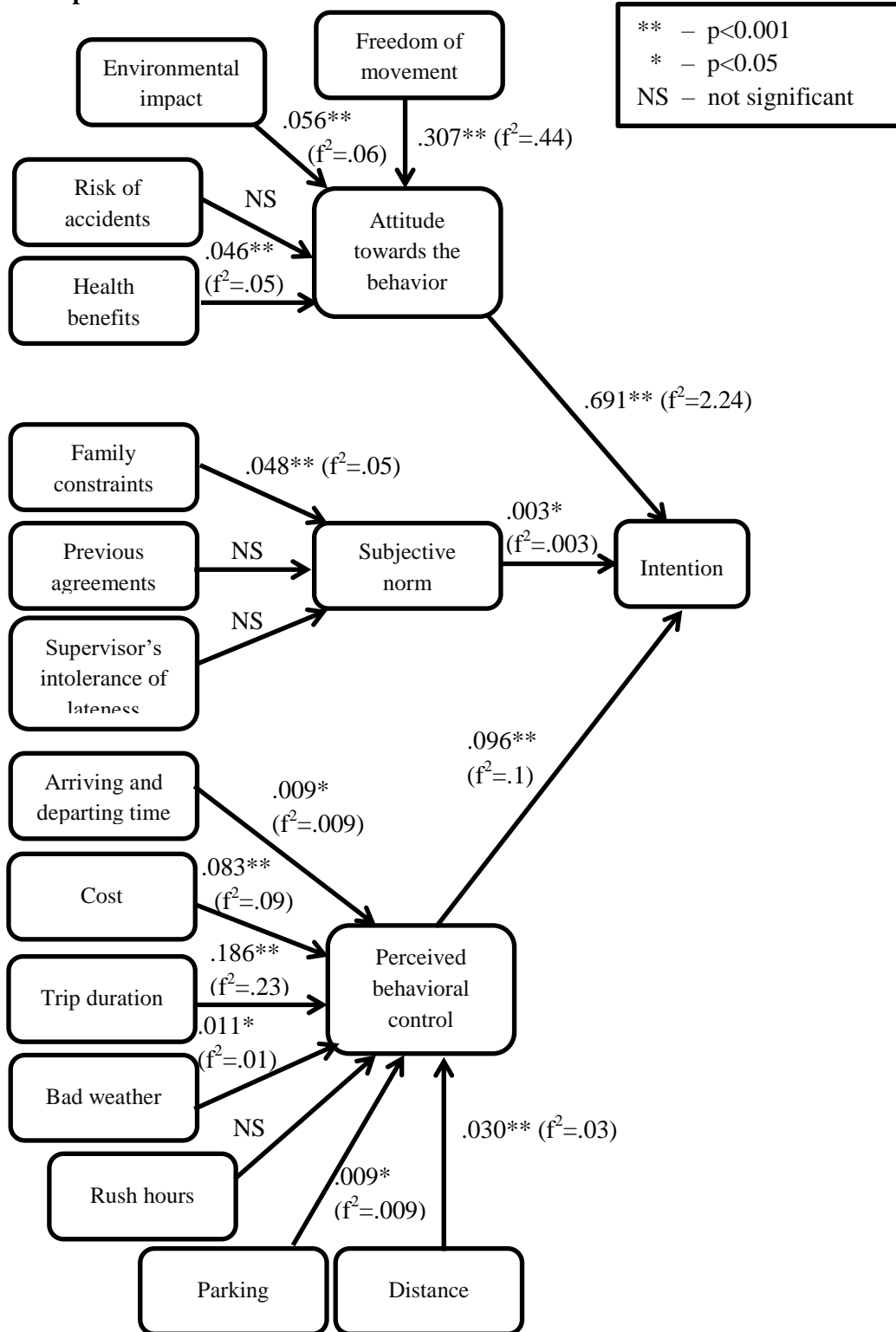
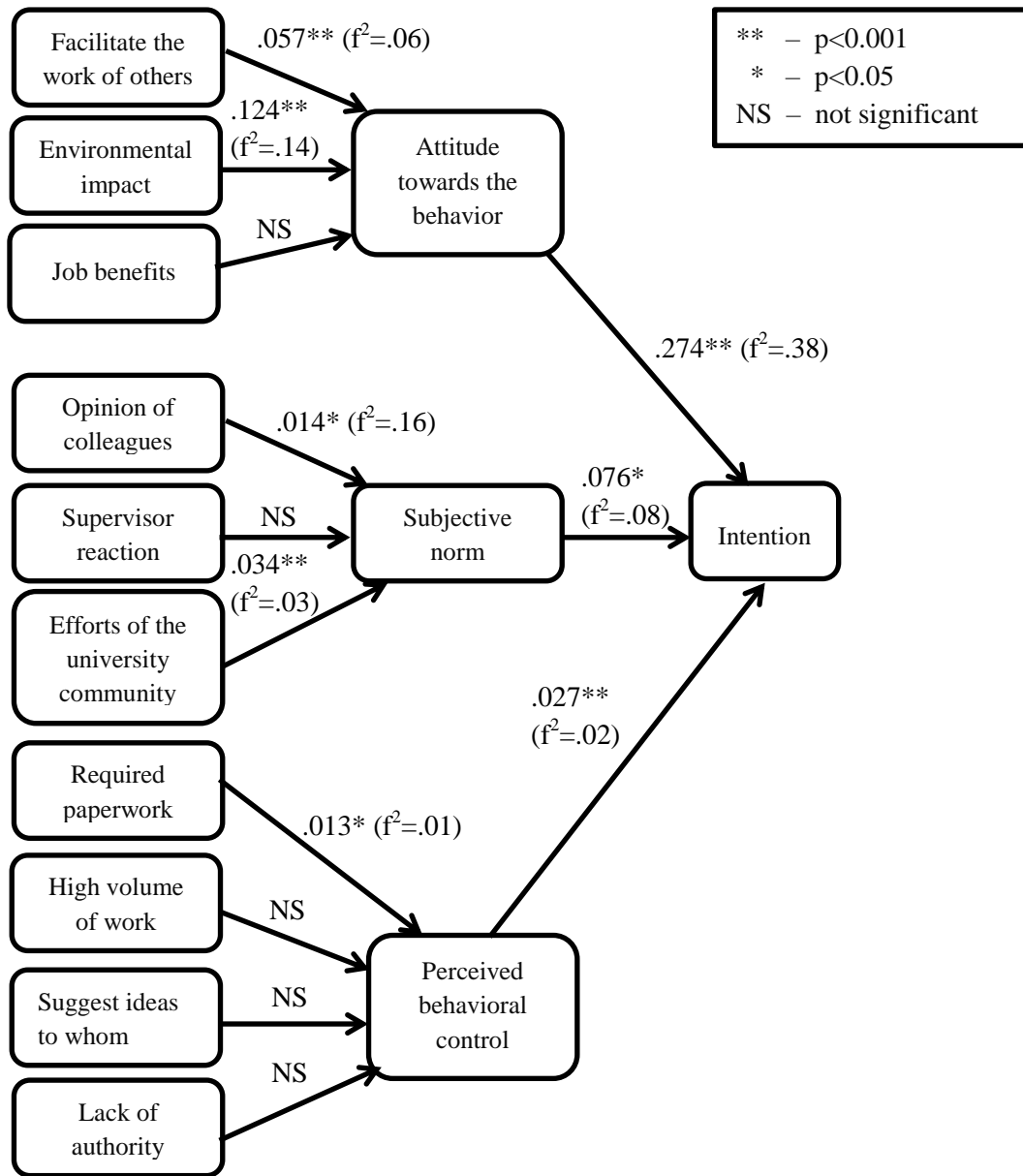


Figure 3. Path analysis for eco-suggestions with R² values and f² effect size



4. Discussion

In this study, the TPB framework was applied to explore the factors influencing the intentions of non-academic university personnel to perform two types of OCBs: the use of alternative transportation and making eco-suggestions at work. The findings indicate that the intention to perform both behaviors was significantly predicted by the main constructs of the TPB: attitude, subjective norm, and PBC. The analysis of antecedent beliefs identified several factors that must be prioritized to increase the success of promotional measures. Nevertheless, attitude was the most

important factor for the intention to perform both behaviors. This means that employees' perceptions of the advantages and disadvantages of these individual actions play the determining role in the intention to engage in such behaviors. The obtained results have important implications for scholars and managers.

4.1. Theoretical implications

This research demonstrates the pertinence of using the TPB to study individuals' intentions to engage in pro-environmental behaviors at work. Hypothesis 1 was supported by the collected data for both behaviors, which is consistent with several previous TPB-based studies on the green behaviors of employees (e.g., Greaves et al., 2013; Laudenslager et al., 2004). For instance, three antecedents of intention (attitude, subjective norm, and perceived behavioral control) were found to significantly influence intentions of university employees to put forward eco-suggestions; however, delving deeper in understanding the specific factors, this study indicated a much more important role of personal attitude in the formation of such behaviors. In this sense, as predicted by the original model of the TPB (Ajzen, 1991), the testing of Hypothesis 2 made it possible to disentangle the antecedent beliefs and to assess the relative importance of each of them.

For Hypothesis 3, the obtained results only partially supported it. Specifically, the analysis of antecedent beliefs demonstrated that two studied behaviors of university employees were affected by completely different types of factors: eco-suggestions were predominantly influenced by organizational factors, while the choice of transportation was not affected by any factors related to the workplace. This result calls into question the definition of OCBEs, and more precisely, their boundaries. Specifically, the insignificance of organization-related factors implies that certain behaviors classified as OCBEs could be performed by individuals who are not employees. In the present study, such «outsiders» could be students, professors, or even university visitors. For instance, a student at a cafeteria can close a leaking water tap just as efficiently as an employee can. Similarly, a visitor who closes an open front door of a building during cold weather is not functionally different from a guard who does the same. In this context, it seems reasonable to theorize regarding the existence of another type of behavior: customer citizenship behavior directed towards the environment. Drawing from the definition of customer citizenship behaviors (Groth, 2005), such actions can be conceptualized as discretionary behaviors of customers who are not required or rewarded by organizations but who help to improve their environmental performance. A thorough investigation of this new category of behaviors would be beneficial for the literature.

4.2. Practical implications

In view of the obtained results, managers could adopt two diametrically opposite strategies to increase the number of employees involved in pro-environmental behaviors. The first strategy is applying various green human resource management practices (Jabbour & Santos, 2008; Pham et al., 2019). Multiple measures could be useful to achieve this aim, including regular incentive campaigns (Smith & O'Sullivan, 2012), inter-departmental competitions (Manika et al., 2015), and public recognition of eco-suggestions (Ramus, 2002). The second strategy involves breaking habits or encouraging employees to form new ones (Holland, Aarts, & Langendam, 2006). The aim is to ask individuals to associate the execution of the behavior with a specific context: «When I have free time at work, I will think about ways to make my daily tasks more environmentally friendly» or «When it is sunny, I will not use my vehicle to come to work» (Holland et al., 2006).

More globally, findings indicate the need to differentiate between practical recommendations depending on the behavior. In the present study, two beliefs associated with organizational factors significantly predicted the intention to propose eco-suggestions, but no such beliefs were identified for the intention to choose alternative transportation. Hence, pro-environmental actions performed by employees outside their duties require long-term interventions. Therefore, the goal of organizations should be to remove these barriers to alternative transportation that affect the largest number of employees: offering reserved parking places for cars involved in the car-sharing program, providing employees with a flexible schedule, and creating informative graphics about the health benefits of using alternative transportation. In contrast, the number of eco-suggestions could be increased by overcoming factors that seem to impede employees from engaging in this behavior. Managers should consider reducing paperwork required for the submission of (and follow-up on) ideas. For example, gathering such suggestions could be done during a personnel reunion on a monthly or yearly basis depending on the size of the department.

4.3. Limitations and future research

Apart from the several future research avenues identified, three principal limitations of this research can help researchers identify areas that require additional exploration. First, due to the inexistence of validated measures of the studied behaviors, this research explored only intentions and not actual behaviors. The literature recognizes the necessity to explore the so-called intention-behavior gap (Ajzen, 2011; Sniehotta, Pousseau, & Araújo-Soares, 2014), and hence future studies could focus on

actual behaviors by integrating validated techniques to measure actions. For instance, Wang, Dong, and Yin (2018) measured recycling by weighing the contents of the bins, and Bissing-Olson et al. (2013) recorded behaviors with the help of daily diaries.

Second, the results of studies based on the TPB are tailored to the studied environment (Sniehotta et al., 2014). Each population, even if it belongs to the same type of organization, might have a different set of beliefs (Ajzen, 2006). This means that the findings of this study have limited generalizability and should only cautiously be transferred to other contexts. Despite this limitation, the relevance of the theory for exploring OCBEs should not be underestimated. Future studies could confirm or deny these suggestions related to organizational and personal barriers.

Third, the data collection tool relied solely on self-reported measures, and hence responses could have been affected by a social desirability bias. Although the design and the development process of the questionnaire strictly included recommendations outlined by the main guidelines for this theory (e.g., Ajzen, 2006), future studies should aim to limit the potential effect of social desirability bias by using alternative bias-mitigation methods, such as proxy subjects, the bogus pipeline, and special scales for measuring social desirability.

5. Conclusion

This article has presented a systematic application of the TPB to study the factors influencing the intentions of non-academic university employees to perform two pro-environmental behaviors: the choice of alternative transportation and proposing eco-suggestions. Having identified the plurality of factors associated with these behaviors through a qualitative exploration, a questionnaire was developed to evaluate their relative importance. The analysis of the collected data indicated that the TPB could be a powerful framework for exploring the intention of individual employees to engage in green actions as it explained up to 79% of variance. The study indicates that while the intention of choosing alternative transportation was not significantly affected by organization-related factors, the intention to propose eco-suggestions was found to be influenced by several factors related to the workplace, notably the opinion of colleagues, the authenticity of the environmental efforts of the organization, and the required paperwork. The results have led to the development of several practical recommendations and theoretical discussions.

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Chapitre 3. Is There a Place for Employee-Driven Pro-environmental Innovations? The Case of Public Organizations

Résumé

Les innovations environnementales initiées par les employé(e)s peuvent améliorer la performance des organismes publics et contribuer au bien-être social. En se basant sur les données collectées lors d'entretiens semi-structurés réalisés avec 33 gestionnaires et conseiller(ère)s en développement durable travaillant dans le secteur public, cette étude explore les principaux facteurs qui entravent l'émergence de telles innovations. L'analyse des données a permis d'identifier trois types d'obstacles: individuels, organisationnels et ceux qui sont liés aux spécificités du secteur public. Les résultats indiquent que les innovations pro-environnementales se heurtent à moins d'obstacles dans les organisations où les préoccupations environnementales sont intégrées substantiellement aux pratiques quotidiennes. Étonnamment, les employé(e)s œuvrant dans le domaine du développement durable sont influencé(e)s par davantage de facteurs lorsqu'ils ou elles tentent de lancer des innovations environnementales en comparaison avec leurs collègues travaillant dans d'autres départements.

Mots-clés : innovations initiées par des employé(e)s; innovation pro-environnementale; secteur publique; OCBE; créativité.

Abstract

Employee-driven pro-environmental innovations improve the performance of public organizations and contribute to social well-being. Based on semi-structured interviews with 33 managers and sustainability advisors in the public sector, this study explores the main factors that impede the emergence of such innovations. The data analysis led to the identification of three types of such factors: individual, organizational, and public sector specific. The results indicate that pro-environmental innovations encounter fewer obstacles in organizations where environmental concerns are substantially integrated with internal practices. Surprisingly, however, employees with sustainability-related duties are affected by more obstacles when attempting to launch eco-friendly innovations than their colleagues from other departments.

Keywords: Employee-driven innovation; pro-environmental innovation; public sector; OCBE; creativity.

Introduction

The integration of environmental concerns in public administration (PA) has recently been the target of multiple governmental policies (Happaerts 2012; Chiba, Talbot, and Boiral 2018). For example, the Canadian province of Quebec has adopted a sustainability law that aims to decrease the ecological footprint of over 100 PA bodies (Ministry of Sustainable Development, the Environment and the Fight against Climate Change 2015). Similarly, the government of the Flemish region in Belgium has created a sustainable development policy; one of its objectives is to involve each ministry in improving quality of life through the preservation of natural resources (Vlaamse Regering 2011).

Nevertheless, the mere adoption of such policies cannot lead to a significant improvement of environmental performance (Happaerts 2012; Brande, Happaerts, and Bruyninckx 2011). Among other things, the success of these formal approaches depends on employee engagement for several reasons (Min, Ugaddan, and Park 2016; Kruijen and van Genugten 2017). First, without profound employee involvement, organizations tend to adopt policies more symbolically than substantially (Boiral 2007; Jiang and Bansal 2003; Christmann and Taylor 2006). Second, document-based approaches can hardly incorporate an encompassing list of desired pro-environmental behaviours due to the specificities of workplaces and work duties (Daily, Bishop, and Govindarajulu 2009; Norton et al. 2015; Yuriev et al. 2018). Third, the routine of continuously performing the same tasks might in itself lead employees to develop pollution-reduction skills that may be tacitly transferred to colleagues (Ramus 2001, 2002; Boiral 2002). Last but not least, employees are an important source of creativity and may propose their own green innovations (Ramus 2001, 2002; Boiral and Paillé 2012). Some academic evidence indicates that, in private companies, such employee-driven innovations can indeed play an important role in reducing the company's environmental footprint (Ramus 2001; Beard and Hartmann 1997).

In the public sector, employee-driven pro-environmental innovations also seem to be essential and may take a variety of forms. For example, an employee of the U.S. Department of Transportation created a web-based tool for tracking personnel behaviours (e.g., teleworking, water and energy use, and recycling), and she then used this data to raise awareness among her colleagues (Mazmanian 2013). Several exploratory studies conducted in the public sector have also demonstrated that bottom-up innovations are ubiquitous (Borins 2002; Rangarajan 2008; Kruijen and van Genugten 2017). For instance, Walters analysed the ideas of the recipients of Government Innovation Awards

and concluded that innovation ‘has little regard for title’ (2002, 9). In fact, some scholars estimate that front-line personnel initiate almost 40% of the innovations in economically advanced countries (Borins 2002).

Nevertheless, the literature on employee-driven green innovations inside or outside of PA is scarce, and moreover, focuses mainly on research and development activities. For instance, several recent literature reviews on ‘eco-innovation’ focus on large innovative projects, not on small-scale initiatives (e.g., Hojnik and Ruzzier 2016; Díaz-García, González-Moreno, and Sáez-Martínez 2015; Adams et al. 2016). In the field of PA, large innovations usually contribute to the missions of public organizations (Kruyen and van Genugten 2017; Rangarajan 2008) or result from public pressure (Vries, Bekkers, and Tummers 2016). Furthermore, the above-mentioned statistics on innovations within PA reflect only the successful cases. The problem is the focus: scholars tend to explore the outcomes and not the drivers (Unsworth 2001; Rangarajan 2008).

Focusing on the latter, the objective of this research is to identify the factors affecting the emergence of employee-driven pro-environmental innovations in the public sector. Pursuing this objective might shed light on why some employee-driven innovations succeed while others fail. It might also help organizations integrate governmental sustainability policies more substantially by encouraging them to actively involve employees in green innovations and establishing the conditions that allow them to do so.

The remainder of the article is structured as follows. The next section examines various types of pro-environmental innovations and explains the article’s conceptual framework. Next, the methodological approach is described, followed by a presentation of the results. The manuscript concludes with a discussion of the analysis, contributions to theory and practice, the limits of the study, and suggestions for future research.

1. Conceptual Framework

1.1. A Blurry Line between Pro-environmental Initiatives and Innovations

Key to innovation are the creative and problem-solving skills of employees (Høytrup 2010; Tidd and Bessant 2009). In this context, creativity is commonly defined as ‘an employee’s ability to come up with new and useful solutions to improve work-related practices’ (Kruyen and van Genugten 2017, 826). The term ‘work-related practices’ is fairly broad and would seem to include any workplace activity. However, most studies on innovation in the private sector cover only research and development (Hojnik and Ruzzier 2016; Díaz-García, González-Moreno, and Sáez-Martínez 2015; Adams et al. 2016). This focus is well justified, as such innovations tend to solve business problems (Kogut and Zander 1992; Grant 1996). In the field of PA, the situation is similar. For instance, Rangarajan (2008) conducted interviews with the winners of Government Innovation Awards and reported that most creative ideas targeted specific problems identified by managers as opposed those ideas that create opportunity. Similarly, 43 managers from Dutch municipalities claimed that the principal benefit of employees’ innovations is to solve organizational problems, not necessarily to create added value (Kruyen and van Genugten 2017).

Nevertheless, not all innovations originate from external pressures. In this sense, scholars distinguish so-called ‘high-involvement innovations’ or employee-driven innovations (Wihlman et al. 2014; Tidd and Bessant 2009; Kesting and Ulhøi 2010; Høytrup 2010). In contrast to research and development activities, high-involvement innovations are voluntary (Buhl, Blazejewski, and Dittmer 2016): they emerge not from superiors’ demands but from employees’ volition and willingness to make a difference. These innovations are generally geared toward solving local issues, sometimes related to pollution. For instance, employees at a UK-based Unilever facility saved over 9 tonnes of paper annually by suggesting that 3 millimetres be cut off the end seals of tea bags (Polman and Bhattacharya 2016). Such employee-driven innovations exist in any organization.

However, their theoretical conceptualization is the source of much confusion. For instance, Ramus (2002, 152) uses the term ‘eco-innovations’ and defines it as ‘actions (or initiatives) taken by individuals and teams that improve the environmental performance of companies.’ This term thus does not differentiate between spontaneous, voluntary innovations and those that originate from a specific organizational demand. Another notion frequently used to describe similar activities comes from the literature on organizational citizenship behaviours for the environment (OCBEs) (Boiral

2009; Daily, Bishop, and Govindarajulu 2009). These behaviours have been empirically categorized and include what the authors term ‘eco-initiatives’, which are defined as ‘environmental actions in the workplace (behaviours for recycling, reducing water consumption, saving energy, etc.), pro-environmental suggestions, [and] voluntary initiatives aimed at reducing greenhouse gas emissions’ (Boiral and Paillé 2012, 440). Stritch and Christensen provide an alternative definition of eco-initiatives in a study conducted among public employees: ‘individual-level employee participation in discretionary pro-environmental behaviors that may be encouraged, but not mandated, by an organization’ (2016, 339). Considering eco-initiatives from these two perspectives implies that all pro-environmental workplace behaviours, including those that involve creativity, can be measured with identical items and, as a consequence, are influenced by the same factors.

Therefore, both ‘eco-innovations’ and ‘eco-initiatives’ include employee-driven pro-environmental innovations, but neither term is mutually exclusive. In this study, we propose to consider employee-driven pro-environmental innovations as a sub-category of the ‘eco-initiatives’ of the OCBE literature and define them as innovative practices, contributed by any employee in a voluntary manner, that improve environmental performance or processes within organizations. In addition to eliminating ambiguity, this conceptualization puts the emphasis on the context in which innovations take place. Currently, scholars using the terms ‘eco-initiatives’ and ‘eco-innovations’ explore either the process of how innovations originate in organizations (Raineri et al. 2016; Paillé and Raineri 2015) or their outcomes (Díaz-García, González-Moreno, and Sáez-Martínez 2015; Ramus 2002). In contrast, this study explores the influence of context on the emergence of such behaviours, in other words, who launches innovations and in what type of organization.

For the first contextual element (the who), this study applies Unsworth’s conceptual model of creativity (2001). In contrast with other models (e.g., Boden 1991; Sternberg 1999), Unsworth’s (2001) framework focuses on the initial triggers of innovations. It distinguishes between two types of voluntary innovations: ‘contributory’ and ‘proactive’ (Table 1).

Table 1. Types of Employee-Driven Pro-Environmental Innovations*

	Proactive	Contributory
Individual will	Voluntary	Voluntary
Problem	Not formulated	Clearly stated
Employees' duties	Not related to environmental concerns	Contribute to improving environmental performance
The role of environmental concerns	Secondary (might be motivated by other drivers such as convenience, economy, or common sense)	Primary (initiated mainly to improve environmental performance)
Definition	Such innovations 'occur when individuals, driven by internal motivators, actively search for problems to solve' (Unsworth 2001, 292)	Such innovations are 'self-determined and based upon a clearly formulated problem' (Unsworth 2001, 292)
Examples	An employee from a human resource department initiates a ride-sharing program A secretary suggests a certified eco-friendly hotel for hosting participants at an annual conference	An employee working in sustainability department initiates a ride-sharing program An environmental specialist suggests prioritizing green suppliers

* The content of this table is inspired by Unsworth (2001)

For the second contextual element (what type of organization), it is important to understand how the organization takes environmental issues into account. The following sub-section of this paper discusses the distinction between symbolic and substantial integration of environmental concerns.

1.2. Greening Organizations: Symbolic or Substantial Integration?

Even when organizations decide to consider environmental issues in their daily operations, green practices are not necessarily substantially integrated into the workplace (Castka and Prajogo 2013; Heras-Saizarbitoria and Boiral 2013). The principal distinction between a symbolic and a substantial integration lies in the extent and quality of environmental practices. While symbolic

integration is superficial, substantial integration implies significant changes in daily activities that lead to improved environmental performance (Testa, Boiral, and Iraldo 2015).

To explore the quality of the integration of environmental practices, multiple studies conducted in the private sector have adopted an institutional perspective (Boiral 2007; Delmas and Toffel 2008; Aravind and Christmann 2011; Yin and Schmeidler 2009). According to this perspective, organizations under institutional and regulatory pressures tend to incorporate practices that are externally viewed as legitimate over those that are efficient (Meyer and Rowan 1977; DiMaggio and Powell 1983). As such, organizations aim for social legitimacy and not necessarily the improvement of their environmental performance (Aravind and Christmann 2011; Boiral 2007; Delmas and Toffel 2008; Jiang and Bansal 2003; Vélchez 2017). For instance, the adoption of the environmental management system ISO 14001 is frequently dictated by the need to access new markets or client demands rather than an intention to improve environmental performance (Zutshi and Sohal 2004; Bansal and Hunter 2002; Psomas, Fotopoulos, and Kafetzopoulos 2011). The standard is frequently adopted superficially rather than substantially as a consequence (Boiral 2007; Delmas and Toffel 2008; Yin and Schmeidler 2009).

Scholars have long considered PA to be the primary source of institutional and regulatory pressures (Ashworth, Boyne, and Delbridge 2009), while overlooking the influence of these pressures on the internal practices of public organizations (Frumkin and Galaskiewicz 2004). However, several empirical studies have reported that PA bodies are, in fact, more susceptible to institutional and regulatory pressures than private companies (Ashworth, Boyne, and Delbridge 2009; Frumkin and Galaskiewicz 2004; Bellé et al. 2019). It's particularly important to consider this susceptibility to pressure in the light of mandatory governmental environmental policies, such as those in Quebec and Belgium, as there is a greater risk of PA bodies adopting inefficient practices.

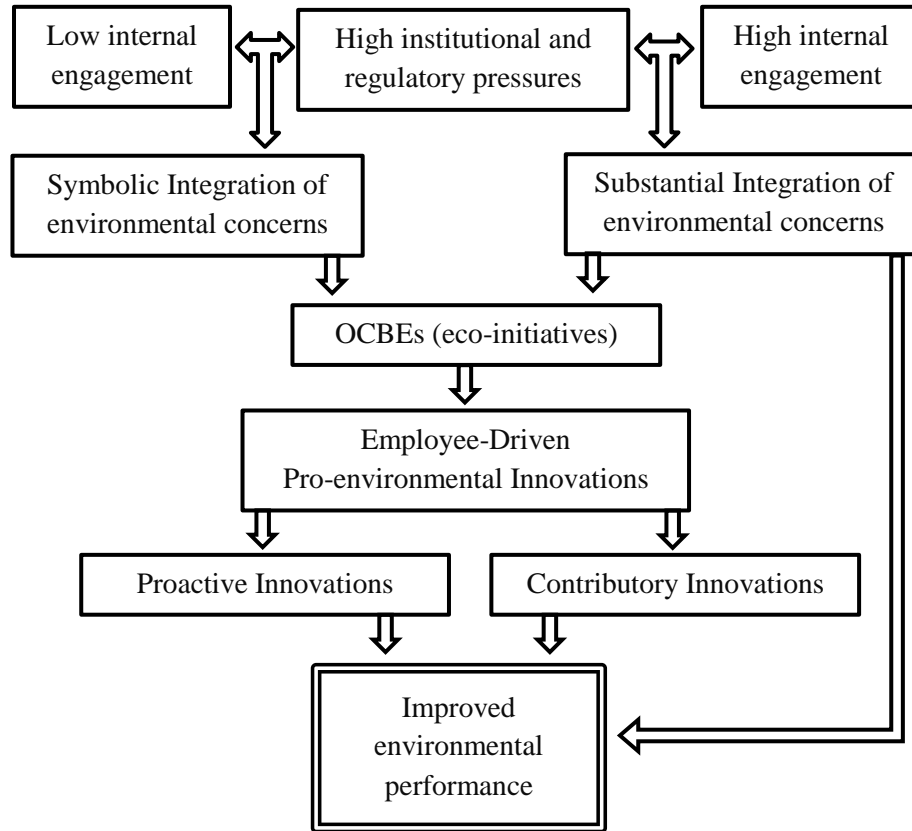
While such policies may be integrated without the active participation of employees, this tends to lead to poorer outcomes. For instance, Coutinho et al. (2018) analysed the results of sustainability workshops organized for Portuguese governmental employees; the public organizations had adopted sustainability-related efforts without consulting personnel, resulting in employees seriously doubting the usefulness of these initiatives. The absence of employee engagement can lead to a decoupling of environmental policy requirements and internal environmental practices (Aravind and Christmann 2011; Boiral 2007; Jamali 2010). Conversely, the greater the employee engagement in

organization-wide greening efforts, the better the results achieved. From this perspective, the substantial integration of environmental concerns can be defined as ‘people taking in values, attitudes, or regulatory structures, such that the external regulation of a behaviour is transformed into an internal regulation and thus no longer requires the presence of an external contingency’ (Gagné and Deci 2005, 334). Employees working in public organizations that substantially integrate governmental sustainability policies thus tend to act in accordance with the policy without being constantly controlled.

Certainly, employees can always go beyond established and substantially integrated policies by putting more effort into greening their daily practices through OCBEs (e.g., recycling, car-pooling, and energy and water saving) – individual actions that can hardly be efficiently influenced by formal approaches (Daily et al. 2009; Boiral 2009). As discussed above, creative public employees can develop pro-environmental innovations that may become widespread in organizations and thereby contribute to overall environmental improvement.

Our conceptual framework (see Figure 1) is thus based on three distinct bodies of literature: the neo-institutional perspective (symbolic or substantial integration), OCBEs (the voluntary nature of eco-initiatives), and creativity (the distinction between proactive and contributory innovations).

Figure 1. Conceptual framework



2. Methods

2.1. Context

This study was conducted in the province of Quebec, Canada. Considerable regulatory pressures for sustainability in the PA of this region made it a perfect fit for the theoretical model (see Figure 1). The Sustainable Development Act (SDA) adopted in Quebec in 2006 requires over 100 PA bodies (state-owned enterprises, ministries, governmental agencies, and administrative tribunals) to develop sustainability plans with specific targets and to report their performance in annual management reports (National Assembly of Quebec 2006). Furthermore, the SDA aims to increase public sector employees' sustainability consciousness (National Assembly of Quebec 2006), implied in the 'Development of knowledge and skills in relation to sustainability in public administration' objective (Government of Quebec 2015). However, the SDA does not explicitly encourage employee-driven innovations or other green behaviours. In this context, although the

mandatory nature of the SDA might affect internal environmental practices, employee-driven innovations remain voluntary.

2.2. Approach, Sampling, and Data Collection

This study aims to identify factors affecting the emergence of employee-driven pro-environmental innovations in the public sector. The scarcity of empirical studies on employee-driven innovations in PA and the exploratory nature of this research beg for a qualitative approach (Edmondson and McManus 2007; Eisenhardt and Bourgeois 1988). This study is based on three complementary techniques: interviews, document analysis, and observations.

Although each of these methods played a role, semi-structured interviews with 33 sustainability professionals working in Quebec public organizations were the principal sources of information (see Table 2). Contact information for potential participants was provided by the Ministry of Environment and Climate Change. A third of the professionals recruited were department heads; the remaining two thirds were not involved in managerial tasks. The participants' duties mainly consisted of integrating sustainability in organizational operations: developing sustainability targets, reporting on progress for predetermined objectives, launching promotional campaigns among personnel, and drafting the sustainability sections of annual reports. Data were collected between March 2018 and June 2019. In total, sustainability experts from 11 ministries and 14 state-owned enterprises participated in the study. Together, these 25 bodies employ over 60% of Quebec public organizations that are subject to the SDA. To provide an environment conducive to free expression and to limit social desirability bias (Elwood and Martin 2000; Boiral 2003), almost half of the interviews were conducted outside of respondents' workplaces. Nine interviews were conducted by phone due to geographic distance and participants' limited availability. According to multiple studies, results obtained from face-to-face versus telephone interviews are not significantly different (Holt 2010; Stephens 2007; Sturges and Hanrahan 2004; Vogl 2013). At the beginning of the interview, participants were provided with a copy of the research protocol indicating the objective of the study and guaranteeing their and their organizations' anonymity.

Table 2. Study sample (n=33)

Respondents	Heads of department (12)	Environmental experts (21)	Total* (33)
Public organizations			
- Ministries	7	9	16
- State-owned enterprises	5	12	17
Organization size			
- Small (fewer than 500)	3	3	6
- Medium (500 to 1000)	3	6	9
- Large (more than 1000)	6	12	18
Years of experience			
- From 1 to 5 years	0	8	8
- More than 5 years	12	13	25

Note. * These numbers refer to the number of participants, and not to the number of public organizations.

To ensure the alignment between interview questions and organizational sustainability efforts, the scope of sustainability objectives set out by participating organizations and their achievement was assessed prior to interviews. This information was extracted from 25 publicly available annual reports and 13 sustainability plans. Also, to have a better understanding of respondents' duties and the realities of the public sector, the main researcher worked for five months in a sustainability-related department of a large Quebec-based public company. The researcher was involved in the assessment of the organizational sustainability performance, the comparison of sustainability efforts among public organizations, and the development of practical tools for sustainability reporting. Not only did this experience lead to multiple observations related to the handling of employee-driven innovations, but it also allowed the researcher to get a better understanding about the peculiarities of Quebec public sector. Furthermore, the practical knowledge obtained during this work allowed a more in-depth analysis and interpretation of data.

2.3. Data Analysis

Data analysis was performed using QDA Miner software version 4.1.21. The core of the analysis was the inductive coding of the data, which allows scholars to identify recurring micro-themes in a large volume of data (Hsieh and Shannon 2005). Qualitative studies are frequently based on this approach (e.g., Oldenhof, Postma, and Putters 2014; Boiral and Heras-Saizarbitoria 2015), the main

goal of which is to group information around similar concepts. More specifically, two coders grouped and compared information from three sources: interviews, documents, and observations. The transcribed interviews were the principal data source, representing 573 single-spaced pages (12 Times New Roman, 1-inch margins).

Initially, two researchers identified the factors that affected the emergence of contributory or proactive pro-environmental innovations. Based on Unsworth's model (2001) and Table 1, extracts were considered related to contributory innovations when participants expressed opinions about their own eco-friendly innovative efforts, while passages related to the efforts of employees from other departments were attributed to proactive innovations. Considering that employee-driven pro-environmental innovations fall within the scope of OCBs, the development of the initial coding grid was based on the factors to OCBs. In line with the literature (Norton et al. 2015; Yuriev et al. 2018), two large categories of factors were covered in the grid: individual and organizational. Although the first draft of the grid contained nine codes for individual factors and eight codes for organizational factors, the coders did not find pertinent extracts for all codes in the transcribed interviews, and so some were deleted. After coding all the interviews, multiple extracts remained unclassified. The remaining extracts were then compared with the interview guide and the study objective and classified under a new theme: public sector-specific factors. In total, 26 codes were used or emerged during the coding process. The coded transcripts contained 1,824 extracts that were distributed between these micro-themes.

Next, the organizations were divided into two groups based on whether environmental concerns were integrated symbolically or substantially. This classification was based on other themes covered during the interviews (e.g., the development of sustainability indicators, follow-up procedures, compliance with the legal framework, and sustainability efforts of organizations), information from the field (main researcher's practical experience), and public documents.

Five measures were undertaken to ensure rigour and decrease bias in the interpretation of themes. First, two researchers were involved in both the data collection and in the coding processes. Including coders in data collection increases the consistency of the results, as researchers who participated in data collection tend to have the same understanding of the interviews (e.g., Martin et al. 2018; Thomas 2006). Second, the coding grid contained detailed descriptions of every code as Huberman and Miles recommend (2002). This ensured both coders had a similar understanding of

each category. Third, following the steps proposed by Corbin and Strauss (1990), the interview analysis began before all the participants were recruited. To verify the comprehensiveness of the coding grid, the two researchers met after the first five interviews and in the middle of the data collection to discuss the results. Fourth, six randomly chosen interviews were blindly analysed by both coders to confirm inter-coder agreement. According to Wimmer and Dominick (2003), between 10% and 25% of the collected data should be tested independently by coders in order to ensure inter-coder reliability. Of the 286 passages coded by the first researcher, the second researcher agreed with 247, giving 86.3% agreement, which is considered acceptable (Neuendorf 2002). Fifth, the disagreements identified in the double-coding process were used to adjust the categorization of the remaining interviews. This additional verification resulted in only a few minor changes, all due to the fact that a given passage could be attributed to several codes (for instance, phrases on ‘public sector motivation’ and ‘personal values’ may be very similar). Coded passages were then further analysed and interpreted. The following section provides the main results of the study.

3. Results

In line with our coding grid, the results are divided into three sub-sections based on the types of factors affecting proactive and contributory employee-driven pro-environmental innovations: individual, organizational, and public sector specific. Representative quotes from the transcripts for each type of factors can be found in Tables 3, 4, and 5. These tables also indicate the extent of such factors relative to whether the organization integrates environmental concerns symbolically or substantially. Due to the impossibility of establishing a clear connection between some factors and proactive versus contributory innovations, some rows in Tables 3, 4, and 5 have been merged. This was necessary as multiple respondents mentioned such factors without sufficient contextual detail to determine the nature of the innovation. Conversely, some factors were found to influence only one type of innovation, and therefore some cells have been left blank, meaning that these factors were not mentioned by participants for a given type of innovation.

3.1. Individual Factors

The analysis of the respondents’ opinions led to the identification of five individual factors that affect employee-driven pro-environmental innovations: awareness, personal values, social norms, public sector motivation, and time (see Table 3). Employees working in sustainability-related departments (who make contributory innovations) and employees working in other departments

(who make proactive innovations) were affected by the same set of individual factors. However, the prevalence of three factors (awareness, personal values, and social norms) seemed to depend on whether environmental concerns were integrated substantially or symbolically in the organization. For instance, respondents from various sustainability-conscious ministries and organizations claimed that the majority of employees were well aware of environmental issues and regularly attempted to address them. The reverse seems also to be true: a lack of awareness and consciousness in certain organizations seemed to shape internal social norms. For example, one respondent from a large organization said, ‘Every second desk is thrown out when changed! It’s crazy, but it’s the norm here...’

As for the other two factors (public sector motivation and time), they seemed to be present regardless of how deeply environmental concerns are integrated into the organization. For example, a director in a large ministry said, ‘Public sector employees... are traditional people. They think about their careers and money above all, not about social problems.’ In relation to time, a participant from a medium-size organization stated, ‘We often hear about how overloaded employees are. They barely have enough time to fulfil their own tasks, let alone be creative!’

Table 3. Individual factors to employee-driven pro-environmental innovations

Obstacles	Extracts													
	Contributory innovations	Proactive innovations												
Awareness	<p>‘I always attempt to translate sustainability to employees by asking “What would you like to improve in your work?” I get a lot of ideas that way.’ (specialist, medium-size ministry)</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td colspan="2" style="text-align: center;">The factor is widespread when sustainability is integrated:</td> </tr> <tr> <td style="text-align: center;">Symbolically</td> <td style="text-align: center;">Substantially</td> </tr> <tr> <td style="text-align: center;">✓</td> <td></td> </tr> </table>	The factor is widespread when sustainability is integrated:		Symbolically	Substantially	✓		<p>‘Employees can’t suggest ideas when they aren’t aware of sustainability issues.’ (specialist, small organization)</p> <p>‘I think employees are interested in sustainability... but not at the workplace!’ (director, medium-size ministry)</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td colspan="2" style="text-align: center;">The factor is widespread when sustainability is integrated:</td> </tr> <tr> <td style="text-align: center;">Symbolically</td> <td style="text-align: center;">Substantially</td> </tr> <tr> <td style="text-align: center;">✓</td> <td></td> </tr> </table>	The factor is widespread when sustainability is integrated:		Symbolically	Substantially	✓	
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<p>Personal values</p>	<p>‘The sustainability expert’s personal values are extremely important for the success of innovations.’ (specialist, small ministry)</p> <p>‘When we attempt to change the way people work, they see us as a team of disruptive environmentalists!’ (director, large ministry)</p> <table border="1" data-bbox="427 527 906 667"> <tr> <th colspan="2">The factor is widespread when sustainability is integrated:</th> </tr> <tr> <td>Symbolically</td> <td>Substantially</td> </tr> <tr> <td>✓</td> <td></td> </tr> </table>	The factor is widespread when sustainability is integrated:		Symbolically	Substantially	✓		<p>‘Initiatives proposed without enthusiasm just can’t thrive. After a couple critiques, employees abandon them.’ (specialist, large organization)</p> <p>‘We don’t receive many ideas from employees because they believe sustainability is just sorting waste... they just don’t get it...’ (specialist, medium-size ministry)</p> <table border="1" data-bbox="974 527 1479 667"> <tr> <th colspan="2">The factor is widespread when sustainability is integrated:</th> </tr> <tr> <td>Symbolically</td> <td>Substantially</td> </tr> <tr> <td>✓</td> <td></td> </tr> </table>	The factor is widespread when sustainability is integrated:		Symbolically	Substantially	✓	
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<p>Social norms</p>	<p>‘We want to talk about sustainability, but it’s a sensitive subject nowadays. Before, you weren’t allowed to talk about politics and religion. Now, you also have to be careful encouraging pro-environmental measures!’ (specialist, large organization)</p> <table border="1" data-bbox="427 936 906 1077"> <tr> <th colspan="2">The factor is widespread when sustainability is integrated:</th> </tr> <tr> <td>Symbolically</td> <td>Substantially</td> </tr> <tr> <td>✓</td> <td></td> </tr> </table>	The factor is widespread when sustainability is integrated:		Symbolically	Substantially	✓		<p>‘When I tell employees that I bike to work, I feel like I’m the only one.’ (director, medium-size ministry)</p> <table border="1" data-bbox="974 936 1479 1077"> <tr> <th colspan="2">The factor is widespread when sustainability is integrated:</th> </tr> <tr> <td>Symbolically</td> <td>Substantially</td> </tr> <tr> <td>✓</td> <td></td> </tr> </table>	The factor is widespread when sustainability is integrated:		Symbolically	Substantially	✓	
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<p>Public sector motivation</p>	<p>‘Civil servant—that does not really apply to Quebec public sector.’ (director, medium-size organization)</p> <p>‘The personnel of a public organization is a sample of the general population. At least in Quebec, just because a person is a manger in the public sector doesn’t mean they’re more involved in sustainability.’ (specialist, large organization)</p> <table border="1" data-bbox="724 1346 1214 1486"> <tr> <th colspan="2">The factor is widespread when sustainability is integrated:</th> </tr> <tr> <td>Symbolically</td> <td>Substantially</td> </tr> <tr> <td>✓</td> <td>✓</td> </tr> </table>		The factor is widespread when sustainability is integrated:		Symbolically	Substantially	✓	✓						
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<p>Time</p>	<p>‘Employees do send me their ideas, but I don’t have time to process them! So, I ask my deputy, and then he often asks his deputy because he also doesn’t have time... And then it gets lost!’ (director, medium-size ministry)</p> <p>‘Look, 60% of the time I just follow-up on performance indicators! It’s hard to find a spare minute for something else.’ (specialist, large ministry)</p>	<p>‘Time... Employees really lack time for any other projects.’ (specialist, medium-size ministry)</p> <p>‘We try to motivate employees to innovate by offering them training. But what do we hear back? “Why would I waste one hour on this?”’ (director, medium-size organization)</p>												

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3.2. Organization Factors

Six organizational factors were identified (see Table 4). Three of these factors were regarded by multiple respondents as key elements for the success of such innovations: leadership, managerial support, and resources. A specialist from a large ministry expressed his opinion about the importance of leadership as follows: ‘Bottom-up ideas can only make it to the top with appropriate leadership. In addition to being in the right place, employees need to be driven and to not be afraid of starting over.’ Pro-environmental innovations also cannot thrive without managerial support. For instance, multiple respondents indicated their departments were facing high turnover due in part to low managerial engagement with sustainability experts’ ideas. In other departments, the situation was similar: respondents expressed their doubts about their managers’ interest in pro-environmental innovations. In terms of the third factor (resources), the collected data pointed at a major lack of financial and human resources for environment-related activities in PA. Importantly, the situation does not seem to change over time, as one participant commented, ‘When I went to present our environmental management plan with new initiatives to the board of directors, they told me, “We don’t have the budget.” And that wasn’t the first time!’ (specialist from a large organization).

Three other factors (communication, support from colleagues, and internal culture) were significantly more widespread in organizations where environmental concerns were integrated only symbolically. For instance, some employees working in sustainability departments in organizations with low environmental consciousness faced major communication challenges in promoting their projects. A specialist from a large organization explained their struggles as follows: ‘We recently received a list of 10 subjects to avoid in internal communications. Now, we’re supposed to be careful with initiatives related to public transportation and food and diet.’ As for colleague support, innovations launched in organizations that had internalized environmental concerns seemed to be perceived in a positive light. Analogously, workplace culture was usually greener in organizations where environmental concerns were integrated in daily practices. A sustainability specialist from one such organization stated, ‘Our sustainability plan is very elaborate, it affects all departments. Sustainability is integrated in our culture, and employees are more likely to get involved.’

Table 4. Organizational factors to employee-driven pro-environmental innovations

Obstacle	Extracts													
	Contributory innovations	Proactive innovations												
Leadership	<p>‘Innovations depend on leadership. If employees are not proactive and articulate, their initiatives are doomed to fail.’ (specialist, large organization)</p> <p>‘By chance, I found myself on a team where everyone has the guts to try new things, to challenge routines. That’s what it takes to change things: courage.’ (specialist, large ministry)</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <th colspan="2">The factor is widespread when sustainability is integrated:</th> </tr> <tr> <td>Symbolically</td> <td>Substantially</td> </tr> <tr> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> </tr> </table>		The factor is widespread when sustainability is integrated:		Symbolically	Substantially	✓	✓						
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Communication	<p>‘We no longer talk about sustainability. To make our ideas acceptable, we now refer to other concepts like efficiency, responsibility, or productivity.’ (specialist, large ministry)</p> <p>‘When we promote new sustainability projects, they have to be seen as important. Otherwise, they won’t be successful.’ (specialist, large organization)</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <th colspan="2">The factor is widespread when sustainability is integrated:</th> </tr> <tr> <td>Symbolically</td> <td>Substantially</td> </tr> <tr> <td style="text-align: center;">✓</td> <td></td> </tr> </table>	The factor is widespread when sustainability is integrated:		Symbolically	Substantially	✓		<p>‘Employees think these innovations are complicated and not easily transferable.’ (specialist, large organization)</p> <p>‘The success of bottom-up initiatives depends on their objective. Some are communicated well and received well, others are not.’ (director, large organization)</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <th colspan="2">The factor is widespread when sustainability is integrated:</th> </tr> <tr> <td>Symbolically</td> <td>Substantially</td> </tr> <tr> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> </tr> </table>	The factor is widespread when sustainability is integrated:		Symbolically	Substantially	✓	✓
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Managerial support	<p>‘When I started my job, I had a lot of ideas and made a lot of suggestions. Then, my manager confronted me, “Look, it’s good you have these ideas, but calm down. We won’t be able to implement them.”’ (specialist, large organization)</p> <p>‘Without managerial support, employees in the sustainability department quickly burn out. They have new ideas, but they have no power.’ (director, large ministry)</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <th colspan="2">The factor is widespread when sustainability is integrated:</th> </tr> <tr> <td>Symbolically</td> <td>Substantially</td> </tr> <tr> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> </tr> </table>	The factor is widespread when sustainability is integrated:		Symbolically	Substantially	✓	✓	<p>‘Employees can’t really do anything unless their managers give them permission. That’s why we prefer a top-down approach – it saves time!’ (specialist, large organization)</p> <p>‘Many employees think their efforts won’t be recognized at a higher level. Their managers don’t pay much attention to their ideas.’ (specialist, large ministry)</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <th colspan="2">The factor is widespread when sustainability is integrated:</th> </tr> <tr> <td>Symbolically</td> <td>Substantially</td> </tr> <tr> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> </tr> </table>	The factor is widespread when sustainability is integrated:		Symbolically	Substantially	✓	✓
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Colleague support	<p>‘We often work with other departments to implement projects. But very often, the</p>	<p>‘The problem with bottom-up ideas is that they’re only around for a short period of</p>												

	<p>people at the table aren't cooperative.' (specialist, large organization)</p> <p>'I recently met the head of another department to discuss an idea and he said, "This isn't our mission, why would you even come to me with this project?"' (director, large ministry)</p> <table border="1" data-bbox="415 491 893 632"> <tr> <th colspan="2">The factor is widespread when sustainability is integrated:</th> </tr> <tr> <td>Symbolically</td> <td>Substantially</td> </tr> <tr> <td>✓</td> <td></td> </tr> </table>	The factor is widespread when sustainability is integrated:		Symbolically	Substantially	✓		<p>time. Once the initiator is gone, their initiatives are forgotten.' (director, large ministry)</p> <p>'Initiatives tend to fail when employees' colleagues are negative: "Why would we do that?" or "How long will this last?"' (specialist, large ministry)</p> <table border="1" data-bbox="964 491 1442 632"> <tr> <th colspan="2">The factor is widespread when sustainability is integrated:</th> </tr> <tr> <td>Symbolically</td> <td>Substantially</td> </tr> <tr> <td>✓</td> <td></td> </tr> </table>	The factor is widespread when sustainability is integrated:		Symbolically	Substantially	✓	
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Internal culture	<p>'Sustainability should be embedded in organizational values. That helps a lot with new projects.' (director, large organization)</p> <p>'Organizational culture plays a very important role in creativity.' (specialist, small ministry)</p> <table border="1" data-bbox="415 1037 893 1178"> <tr> <th colspan="2">The factor is widespread when sustainability is integrated:</th> </tr> <tr> <td>Symbolically</td> <td>Substantially</td> </tr> <tr> <td>✓</td> <td></td> </tr> </table>	The factor is widespread when sustainability is integrated:		Symbolically	Substantially	✓		<p>'My organization is mature because employees have a say about sustainability. It's in our culture.' (specialist, small organization)</p> <p>'Our sustainability plan is very elaborate; it affects every department. Sustainability is integrated in our culture, and employees are more likely to get involved' (specialist, large organization)</p> <table border="1" data-bbox="964 1037 1442 1178"> <tr> <th colspan="2">The factor is widespread when sustainability is integrated:</th> </tr> <tr> <td>Symbolically</td> <td>Substantially</td> </tr> <tr> <td>✓</td> <td></td> </tr> </table>	The factor is widespread when sustainability is integrated:		Symbolically	Substantially	✓	
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Resources	<p>'Over the years, I've noticed that the main reason why I wasn't able to launch some projects was a lack of financial resources. Sustainability departments suffer greatly from budget cuts.' (director, medium-size organization)</p> <p>'Our department has an annual budget of 14,000 dollars. We sometimes disconnect our printers because there's no more toner!' (specialist, large ministry)</p> <table border="1" data-bbox="415 1612 893 1753"> <tr> <th colspan="2">The factor is widespread when sustainability is integrated:</th> </tr> <tr> <td>Symbolically</td> <td>Substantially</td> </tr> <tr> <td>✓</td> <td>✓</td> </tr> </table>	The factor is widespread when sustainability is integrated:		Symbolically	Substantially	✓	✓	<p>'We don't have an excess of money in the organization, so we are extremely selective about new projects.' (director, large organization)</p> <p>'Some ideas are promising, but they require solid investments. Not everyone supports sustainability efforts. How would we explain these expenses to citizens?' (specialist, large organization)</p> <table border="1" data-bbox="964 1612 1442 1753"> <tr> <th colspan="2">The factor is widespread when sustainability is integrated:</th> </tr> <tr> <td>Symbolically</td> <td>Substantially</td> </tr> <tr> <td>✓</td> <td>✓</td> </tr> </table>	The factor is widespread when sustainability is integrated:		Symbolically	Substantially	✓	✓
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3.3. Public Sector-Specific Factors

The analysis of the data led to the identification of five public sector-specific factors to employee-driven pro-environmental innovations: hierarchy, political context, organizational mission, legal obligations, and accountability (see Table 5). Except for ‘organizational mission’, all these factors had an effect on employee-driven pro-environmental innovations regardless of the extent to which environmental concerns were taken into account. Generally speaking, whenever the organizational mission was related to sustainability, respondents emphasized their organization’s internalization of environmental concerns, which benefited employee-launched innovations.

Table 5. Public sector-specific factors to employee-driven pro-environmental innovations

Obstacle	Extracts													
	Contributory innovations	Proactive innovations												
Hierarchy	<p>‘The people in charge say over and over that sustainability is our priority. But in practice, every time I suggest something, I can’t get authorization to go further.’ (specialist, large organization)</p> <p>‘Sustainability officers should be placed at the top of the organizational structure. Otherwise, it’s incredibly difficult to get all the necessary authorizations.’ (director, medium-size ministry)</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <th colspan="2">The factor is widespread when sustainability is integrated:</th> </tr> <tr> <td>Symbolically</td> <td>Substantially</td> </tr> <tr> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> </tr> </table>	The factor is widespread when sustainability is integrated:		Symbolically	Substantially	✓	✓	<p>‘New ideas, at least from employees, rarely make it to the top. It’s just that the organizational structure is so cumbersome, there’s so much red tape... And you go through all of this for a very insignificant result, in most cases!’ (specialist, small organization)</p> <p>‘In the public sector, it’s all about hierarchy. And it’s a huge barrier to innovation.’ (director, large organization)</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <th colspan="2">The factor is widespread when sustainability is integrated:</th> </tr> <tr> <td>Symbolically</td> <td>Substantially</td> </tr> <tr> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> </tr> </table>	The factor is widespread when sustainability is integrated:		Symbolically	Substantially	✓	✓
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The factor is widespread when sustainability is integrated:														
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Political agenda	<p>‘Even now, it’s difficult to implement our initiatives. What will happen if the ruling party changes?’ (specialist, large ministry)</p> <p>‘For real change, you need high-level political power. Our initiatives are just a drop in the ocean.’ (director, medium-size organization)</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <th colspan="2">The factor is widespread when sustainability is integrated:</th> </tr> <tr> <td>Symbolically</td> <td>Substantially</td> </tr> <tr> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> </tr> </table>	The factor is widespread when sustainability is integrated:		Symbolically	Substantially	✓	✓							
The factor is widespread when sustainability is integrated:														
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Organizational mission	<p>‘We’re different from other ministries. Employees have an understanding of sustainability. Ideas for improvement are always received with excitement!’ (director, large ministry)</p>													

	<p>‘Our organization is all about sustainability – even the product itself! It’s in our DNA.’ (director, large organization)</p> <table border="1" data-bbox="646 289 1203 430"> <tr> <th colspan="2">The factor is widespread when sustainability is integrated:</th> </tr> <tr> <td>Symbolically</td> <td>Substantially</td> </tr> <tr> <td>✓</td> <td></td> </tr> </table>	The factor is widespread when sustainability is integrated:		Symbolically	Substantially	✓		
The factor is widespread when sustainability is integrated:								
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<p>Legal obligations</p>	<p>‘Getting other departments to engage in new projects is challenging because the SDA has many counter-intuitive requirements. So, instead of being a useful tool, it’s basically a compliance checklist.’ (director, large organization)</p> <p>‘The law is very narrow. Efforts that go beyond the SDA aren’t recognized!’ (specialist, large organization)</p> <table border="1" data-bbox="402 835 894 976"> <tr> <th colspan="2">The factor is widespread when sustainability is integrated:</th> </tr> <tr> <td>Symbolically</td> <td>Substantially</td> </tr> <tr> <td>✓</td> <td>✓</td> </tr> </table>	The factor is widespread when sustainability is integrated:		Symbolically	Substantially	✓	✓	
The factor is widespread when sustainability is integrated:								
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<p>Accountability</p>	<p>‘For us, the accounting and reporting is quite burdensome. We put multiple specific actions in our sustainability plan, and there’s so many of them now that it’s difficult to report on them.’ (director, large organization)</p> <p>‘I’m the only person responsible for accountability... So, for every new project, the time I spend on these tasks grows.’ (specialist, large organization)</p> <table border="1" data-bbox="414 1375 894 1516"> <tr> <th colspan="2">The factor is widespread when sustainability is integrated:</th> </tr> <tr> <td>Symbolically</td> <td>Substantially</td> </tr> <tr> <td>✓</td> <td>✓</td> </tr> </table>	The factor is widespread when sustainability is integrated:		Symbolically	Substantially	✓	✓	
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Interestingly, unlike individual and organizational factors, public sector factors influenced contributory and proactive innovations differently. With the exception of organizational mission, the only factor that seemed to have an effect on proactive pro-environmental innovations was hierarchy. After all, it is difficult for employees to promote their ideas without the approval of their managers, who might also need to receive consent from one or several higher-placed managers.

This hierarchy seems to quash innovative ideas in their early stages. On this point, an environmental specialist from a small organization said, ‘Employees might be very enthusiastic, but if they can’t pitch their ideas to management, they won’t succeed.’

The other factors (political context, legal obligations, and accountability) influenced only contributory innovations. Regarding political context, several respondents who participated in the study prior to the Quebec general election in 2018 identified instability as an important obstacle to new pro-environmental projects. For example, an environmental specialist from a medium-size organization stated, ‘We have elections coming in the fall and we don’t know if sustainability will still be important. So, are our initiatives worth it?’ Some participants also blamed complex compliance procedures: ‘The efforts that we put into legal compliance are enormous. We would prefer to put that effort into innovation.’ Lastly, contributory pro-environmental innovations seemed to be affected by established administrative requirements within PA. The following quote best describes this situation: ‘Whenever we talk about sustainability, we discuss its administrative aspects: annual reports, accountability, statistics... All this paperwork is not “sexy”! It would be better to talk about concrete creative projects.’

4. Discussion and Conclusion

This research explored the factors affecting the emergence of employee-driven pro-environmental innovations within PA. While most studies concentrate on eco-innovations as large technological advancements or previously demanded improvements (Díaz-García, González-Moreno, and Sáez-Martínez 2015; Ghisetti and Rennings 2014; Chiarvesio, De Marchi, and Maria 2015), this article looks at voluntary green projects initiated by public sector employees. Our analysis sheds some light on two contextual elements that have been previously overlooked: the initiator of pro-environmental innovations and the type of organizations in which such innovations occur.

This study followed Unsworth’s (2001) model of creativity by distinguishing between contributory and proactive innovations and hence their initiators. This allowed us to distinguish which factors affected different types of employee-driven pro-environmental innovations. While no significant differences were found for individual and organizational factors, public sector-specific factors mostly affected contributory rather than proactive innovations. This is likely because the initiators of contributory innovations work on environmental issues and are therefore more involved in the bureaucratic tasks associated with launching and following up on new projects. This difference is

indicative of the heterogeneous nature of creative ideas within PA (Rangarajan 2008). This result primarily signifies that innovations launched by different employees do not have the same starting point and therefore should be encouraged through different means.

Organizations were classified into two categories inspired by the literature on the adoption of environmental organizational practices, based on whether environmental concerns were integrated substantially or symbolically (Castka and Prajogo 2013; Heras-Saizarbitoria and Boiral 2013; Delmas and Toffel 2008; Aravind and Christmann 2011). The analysis indicates that employee-driven pro-environmental innovations faced fewer challenges in sustainability-conscious organizations. This is particularly the case for individual factors, presumably because such organizations have a greener internal culture and their employees are consequently more aware of environmental problems. This is consistent with the literature on the symbolic integration of sustainability issues (Heras-Saizarbitoria, Arana Landín, and Molina-Azorín 2011; Castka and Prajogo 2013; Yin and Schmeidler 2009; Christmann and Taylor 2006; Boiral 2011), where low internal involvement combined with significant institutional pressures is a strong indicator of a ceremonial integration of green practices. In this context, the emergence of employee-driven pro-environmental innovations seems to depend on how environmental concerns are integrated within PA organizations. The more emphasis public organizations put on the importance of ecological protection and practices (e.g., leadership qualities of ministers and deputies, meaningfulness of organizational sustainability goals, and the transparency and consistency of follow-up procedures), the more frequently employees from various departments are likely to put forward eco-friendly suggestions.

The analysis of interviews conducted outside the participants' offices led to some unexpected observations, most likely due to the freedom of speech afforded by a non-workplace environment (Elwood and Martin 2000; Boiral 2003). Specifically, some respondents blamed the complexity of the legal framework for the lack of employee-driven innovations. Compliance with the SDA requires multiple cumbersome procedures that do not leave much room for creativity. Resources invested in follow-up procedures and paperwork could have been used to consult employees and assess their ideas. Nevertheless, this does not mean that the mandatory requirements of the SDA are useless, as participants with the longest tenure noted a positive trend towards a more profound integration of sustainability.

These conclusions contribute both to the advancement of knowledge in the domain of PA and to the improvement of organizational practices. The next two sub-sections discuss these contributions.

4.1. Contributions to the Literature

First, this research contributes to the literature on OCBs (Boiral 2009; Daily, Bishop, and Govindarajulu 2009; Yuriev et al. 2018) by adding two new elements to the discussion – namely, contextual elements and creativity. The terms previously employed in this literature, ‘eco-initiatives’ (Boiral and Paillé 2012) and ‘eco-innovations’ (Ramus 2002), are either overly inclusive (i.e., ‘eco-initiatives’ place non-creative and creative behaviours in one category) or lacking precision (i.e., ‘eco-innovations’ treat voluntary and required innovations as equal). By defining the concept of employee-driven pro-environmental innovations, this article answered the call for the ‘examination of the role of contextual, structural, and other creativity-relevant factors’ in PA put forward by Rangarajan (2008, 156). Also, PA has been relatively overlooked among scholars working on OCBs (Yuriev et al. 2018); there are only a few studies based on samples of public sector employees (Azhar and Yang 2019; Stritch and Christensen 2016). Exploring the emergence of such behaviours in the PA context is important for a more comprehensive view of these individual actions.

Second, the results of this research indicate that contributory and proactive green innovations are not influenced by the same factors in the same manner, a finding consistent with Unsworth’s (2001) model of creativity. In conjunction with the first contribution mentioned above, this means that the existing measures of such innovations are imprecise and need to be refined (for details on items currently used to assess pro-environmental workplace behaviours, see Francoeur et al. 2019). Also, the results from existing studies on eco-initiatives and eco-innovations must be interpreted with caution; more specifically, it’s necessary to examine whether the data were collected among employees more likely to launch proactive or contributory innovations.

Third, this study complements the literature on the search for social legitimacy by integrating sustainability in PA, as thus far the vast majority of articles have analysed the voluntary commitments of public organizations (e.g., Mussari and Monfardini 2010; Roman 2017). Conversely, this research was conducted in the context of Quebec’s mandatory environmental policy. Our data suggest that despite the mandatory requirements of the SDA, not all organizations are committed to resolving environmental concerns in the same manner. Therefore, whether policies

are voluntary or mandatory, there still seems to be some variation in how organizations adopt environmental agendas. This implies that some public organizations tend to incorporate sustainability concerns in ways that are more obviously compliant with regulations or guidelines, regardless of the geopolitical context. While such compliance may make their processes appear more legitimate, it does not necessarily make them more efficient.

4.2. Managerial Implications

From a practical point of view, two findings from this research might be interesting for managers. First, as initially expected, the data indicate that employee-driven pro-environmental innovations are more likely to emerge in organizations where environmental concerns are substantially integrated. Managers should move beyond the mere adoption of environmental policies and attempt to create a green culture within organizations (Bissing-Olson et al. 2013; Cayer, Raufflet, and Delannon 2011; Paillé and Mejía-Morelos 2014). According to Pek and Bertels (2015), integrating sustainability concerns into an organization's internal culture requires 'change agents' (both managers and employees), who are expected to take an active role in expanding the organization's cultural repertoire. To do so, the following non-exhaustive list of practices have proven useful: exemplary behaviour (Boiral, Talbot, and Paillé 2015), commitment to the environmental agenda (Cantor, Morrow, and Montabon 2012), recognition of new green initiatives (Ramus 2002), providing feedback on employee's pro-environmental ideas (Chou 2014), and detailed explanations of specific desired behaviours (Lo, Peters, and Kok 2012).

Second, contributory and proactive pro-environmental innovations might require different measures for each to be encouraged efficiently. For proactive initiatives, it is essential that public employees be allowed to undertake their own quality improvement projects. Specifically, such projects necessitate a temporary reduction in workload for an employee who presents data that supports their idea in order for them to pursue it further (such 'data' could include their observations, an explanation of the benefits for the department or organization, or their colleagues' approval). Healthcare employees regularly lead similar projects on various issues, such as recycling (Hagen, Al-Humaidi, and Blake 2001), noise pollution control (Liu 2010), and injury rate reduction (Tofani et al. 2012). This approach allows proactive personnel to search for solutions to problems that seem relevant to them. As for contributory innovations, sustainability experts should be regularly consulted about internal operations (e.g., choice of suppliers, logistics, and customer satisfaction analysis). Not only might this lead to a more thorough integration of environmental concerns, it

may also allow organizations to foster connections between departments, which is essential to the success of organization-wide projects.

This study might also be pertinent for policy makers. Not only should environmental policies be less cumbersome – namely by making them easier to interpret and eliminating overly time-consuming paperwork – but employee involvement must also be an integral part of such regulations and strategies. A designated office could be created to gather and evaluate new green initiatives and later disseminate them to other public organizations.

4.3. Limitations and Avenues for Future Studies

The limitations of this study provide opportunities for future research. First, this study only considered the perspectives of sustainability experts who can only provide an outsider's perspective on proactive innovations. Although the respondents were aware of organization-wide sustainability initiatives, the analysis of responses from employees in other units could have identified additional factors. Future research should adopt a case study approach by examining successful and unsuccessful employee-driven pro-environmental innovations and exploring the key factors that allowed these ideas to thrive or that impeded them. This might also shed light on how such innovations mould internal culture and change the daily routines of employees (Bertels, Howard-Grenville, and Pek 2016).

Second, it's logical to assume that contributory innovations are less discretionary than proactive innovations, which raises questions about the soundness of Unsworth's model (2001). Specifically, can an innovation be considered 'voluntary' if a problem has already been clearly formulated, as her model stipulates? In the present study, the sustainability experts interviewed were well aware of the SDA, meaning that their pro-environmental innovations could be considered as encouraged by their daily duties. The varying level of discretion involved in green workplace behaviours is consistent with the literature on OCBs (Norton et al., 2015; Yuriev et al. 2018) and requires additional exploration.

Third, the results of this qualitative study should not be generalized. The collected data reflect the positions of the respondents and not the entire public sector personnel. In this context, quantitative methods are required to answer the following crucial question: Which factors should be prioritized

by public managers willing to increase the success of employee-driven pro-environmental innovations, given the various institutional frameworks and internal engagement?

Fourth, although governmental sustainability strategies exist in many countries, the SDA is one of the few mandatory, legal policies. Because of high institutional pressures associated with the SDA, it was possible to distinguish only two types of public organizations: those with symbolic or substantial integration of environmental concerns. This might be an oversimplification. Drawing from the literature on the private sector (Boiral 2007; Lai, Melloni, and Stacchezzini 2016), the level of integration of environmental concerns seems to vary and depends on multiple factors. Future studies should explore this nuance in relation to employee-driven pro-environmental innovations. For instance, it would be pertinent to explore how such innovations can thrive in environmentally unconscious public organizations.

Despite these limitations, this research is a first step towards unveiling efficient ways of promoting employee-driven pro-environmental innovations. The literature on this subject is nascent, and more research is needed to provide a more encompassing picture of the phenomenon.

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Conclusion

This thesis has focused on understanding how employees contribute to the adoption of organizational sustainability initiatives and environmental management practices through OCBEs. Although dozens of articles on OCBEs have been published in high-ranking journals (e.g., Boiral, 2009; Ciocirlan, 2016; Daily et al., 2009; Norton et al. 2015; Temminck et al., 2015), this research field has been characterized by much theoretical confusion (e.g., interchangeable use of conceptually different terms) and methodological flaws (e.g., incomplete use of certain behavioral theories). Most importantly, scholars have failed to identify obstacles to these behaviors systematically within various organizational contexts and to suggest efficient practical recommendations for overcoming these barriers. Comprising three distinct, but tightly connected studies, this thesis aimed to overcome these literature gaps by answering the following multifaceted question: Why are some employees more inclined than others to perform green behaviors in the workplace, and what steps can organizations take to increase the likelihood of voluntary pro-environmental activities among personnel?

The three studies in this thesis addressed this question from different perspectives and within two different types of organizations: universities and governmental agencies. Article 1 provided a comprehensive mapping of extant literature on barriers to green workplace behaviors and on existing practical suggestions to promote OCBEs. This study was the foundation of the thesis, as it highlighted topics in the domain that necessitated further research. As a consequence, Articles 2 and 3 were based on the initially conducted systematic literature review's results. More specifically, Article 2 adopted a behavioral theory to evaluate the relative importance of identified OCBE obstacles among university employees. As for Article 3, it was based on a qualitative methodology and looked at the interplay between organizational greening efforts and obstacles to employee-driven pro-environmental innovations within the public sector.

Taken together, these studies answered the initially established research question, and the thesis, as a whole, contributed to understanding factors that influence employees' decisions to engage in OCBEs and the organizational efforts required to encourage such behaviors. The following subsections explain this dissertation's principal contributions in more detail, as well as its limits and other possible research avenues.

Contributions

This thesis makes several far-reaching contributions to extant literature concerning employees' pro-environmental behaviors and to the practical understanding of these individual actions. The conducted studies targeted specific literature gaps and carry implications concerning the following three aspects:

- Identification of factors that influence OCBEs
- Assessment of the relative importance of obstacles to OCBEs
- The role of organizations and internal environmental practices in the emergence of OCBEs

Identification of factors that influence OCBEs

The three studies in this thesis helped clarify the difference between OCBEs and other seemingly similar terms. According to Ones and Dilchert (2012), scholars have employed at least 14 notions to describe employees' green behaviors, not to mention specific behaviors (e.g., recycling, energy conservation, eco-innovations), frequently used to refer to such actions. This overlapping of terms is problematic because it becomes difficult to interpret results from various studies, as the principal difference between OCBEs and other types of green workplace behaviors – discretionary nature (Boiral, 2009; Daily et al., 2009) – is set aside. For instance, existing literature reviews on employees' pro-environmental behaviors (Inoue et al., 2015; Norton et al., 2015) only briefly have discussed possible differences between voluntary and non-voluntary actions. Thus, academic articles have not provided clear insights on how such behaviors' frequency can be increased because previously identified factors that impeded or incited such individual actions could have been related to both in-role and extra-role behaviors (Ramus and Killmer, 2007).

However, the issue is related not only to the interchangeable use of terms in the field, but also to the conceptualization of OCBEs' sub-categories: eco-initiatives; eco-helping; and eco-civic engagement (Boiral & Paillé, 2012). Despite being a validated categorization, these categories do not seem to take into consideration the involvement level required to execute such behaviors. For instance, this categorization suggests placing conceptually different voluntary behaviors, such as employee-driven green innovations and recycling, into the eco-initiatives category. Therefore, numerous articles based on this typography (e.g., Alt & Spitzbeck, 2016; Stritch & Christensen, 2016; Tosti-Kharas et al., 2017; Zientara & Zamojska, 2016) lack precision and should be interpreted cautiously. Aiming to overcome this issue, the two empirical studies in this thesis

(Articles 2 and 3) shed light on OCBE subcategories' non-monolithic nature and the need to develop a more nuanced categorization. For example, Article 3 suggests distinguishing two more narrowly defined sub-types of behaviors (proactive and contributory pro-environmental innovations) within the «eco-initiatives» category. This disentangled view of OCBEs might allow scholars to overcome two major domain issues. First, it would be possible to develop more precise measures for various behavioral types, as existing items are confusing and overlapping (Francoeur et al., 2019). Second, interpreting results from different studies would be more straightforward, as behaviors would be distinguished clearly between specific types. In such a way, extant literature on certain behaviors might become large enough for literature reviews on single behaviors, as is frequently done, for example, in healthcare sciences (Conner, Norman, & Bell, 2002; Cooke et al., 2016).

Assessment of the relative importance of obstacles to OCBEs

Multiple publications on OCBEs explore specific variables that seem to exert a certain effect (positive or negative) on such behaviors: corporate values (Cantor et al., 2012; Chou, 2014); leadership (Alt & Spitzack 2016); support from colleagues and supervisors (Lo et al., 2012; Paillé et al., 2016); attitude (Lamm et al., 2013; Tsai et al., 2016); and lack of knowledge (Graves et al., 2013; Scherbaum et al., 2008), among others. However, this selective approach does not allow scholars to consider the plurality of factors that influence OCBEs, and extant literature is silent on the following question: Which managerial practices should be prioritized to increase the likelihood of pro-environmental workplace behaviors?

To shed light on what obstacles should be addressed, it is necessary first to assess their relative importance by placing all factors in one theoretical model. Surprisingly, the theory of planned behavior, a framework that was applied successfully to predict multiple individual actions, rarely was employed to study OCBEs. During the period when the studies in this thesis were being conducted, only three publications had used this model to predict OCBEs: Greaves et al. (2013) implemented it to explore office workers' intentions toward switching off computers, using teleconferencing, and recycling; Cordano and Frieze (2000) applied this theory to clarify green behavioral preferences among managers of manufacturing facilities; and Lo et al. (2014) used this framework to explore workers' likelihood of using videoconferences instead of travelling. However, three studies are hardly enough from which to draw any convincing conclusions. For example, in healthcare sciences, scholars conduct dozens of studies on the same behaviors to

understand what measures should be prioritized (Conner, Norman, & Bell, 2002; Cooke, Dahdah, Norman, & French, 2016). Therefore, this thesis contributed to the development of this field through qualitative exploration and subsequent quantitative assessment of factors associated with OCBEs. Influential factors identified in the conducted study could be used for the creation, evaluation, and consecutive implementation of an intervention that aims to increase OCBEs' frequency within organizations.

The role of organizations and internal environmental practices in the emergence of OCBEs

Few studies on OCBEs were conducted outside of private companies. For instance, only three studies have been done on public sector employees' green behaviors: Tsai, Stritch, and Christensen (2016) explored public servants' motivations and attitudes toward eco-helping and eco-civic engagement among 843 city employees; Azhar and Yang (2018) explored organizational resources that might enhance the likelihood of pro-environmental behaviors; and Stritch and Christensen (2016) analyzed organizational commitment, public-service motivation, and connectedness to nature among employees in various U.S. municipalities. Similarly, very few studies were conducted in universities, nongovernmental organizations (NGOs), and other types of organizations; thus, barriers to the emergence of OCBEs in such organizations remain unknown. In an attempt to diversify available knowledge on this subject, studies in this thesis were conducted outside of private companies: in a university and in public organizations. Apart from previously overlooked organizational contexts, exploring green behaviors of individuals working in such organizations is pertinent because of these employees' role in ecological preservation and environmental education. For instance, in line with the public sector motivation argument (Kim, 2005; Esteve et al., 2016; Perry & Hondeghem, 2008), public sector employees are expected to act in accordance with society's best interests, including avoiding pollution and prioritizing more eco-friendly behaviors. Similarly, non-academic university employees' OCBEs might be perceived by students and other campus members as behavioral examples (Velazquez et al., 2016), thereby potentially provoking a more consistent and frequent emergence of green behaviors.

Furthermore, no extant studies have considered internal environmental practices' influence on the emergence of OCBEs. Therefore, the following natural question can be raised: Do pro-environmental behaviors face more barriers in organizations in which sustainability is integrated symbolically? While extant literature indicates that substantial integration of environmental concerns (e.g., through the adoption of ISO 14001) leads to better environmental performance

within organizations (Boiral, 2007; Delmas & Toffel, 2008; Yin & Schmeidler, 2009), few studies have explored the context's effect, in which employees perform voluntary pro-environmental behaviors. To overcome this gap in OCBE literature, both empirical investigations' methodologies included a qualitative dimension (interviews, documentation analysis, and observation), thereby making it possible to take into account participating organizations' environmental efforts (Articles 2 and 3). Moreover, the studies in the thesis were conducted in organizations with varying substantiality levels of internal environmental efforts (notably Article 3), thereby demonstrating that OCBEs' emergence can be facilitated in organizations in which environmental concerns are integrated substantially.

The contributions of the thesis described above are summarized in Table 1, together with specific literature gaps and principal results. The table also contains a list of practical implications, but they cannot be connected clearly with the principal contributions of the thesis (one practical implication might be related to two or more contributions or results). Therefore, instead of allocating them in cells that would correspond to specific contributions, they are divided between two categories: managers and policymakers.

Table 1. Principal contributions of the thesis

Contributions	Literature gaps	Results	Practical implications
Identification of factors that influence OCBEs	<ul style="list-style-type: none"> - No studies focused on exploring the complete range of obstacles to workplace green behaviors; - The literature did not distinguish between obstacles to in-role and extra-role pro-environmental behaviors; - The information on factors that influence OCBEs was scattered across the literature; - Certain sub-categories of OCBEs are overly inclusive, vague, and tend to overlook the individual involvement. 	<ul style="list-style-type: none"> - The mapping of the literature led to the identification and categorization of various types of factors that influence OCBEs (Article 1); - The level of discretion involved in the execution of green behaviors varies depending on the organizational context (Articles 1 and 2); - The range of obstacles to OCBEs depends on the capacity of employees to make a change within the organization (Article 3). 	<p>For policymakers:</p> <ul style="list-style-type: none"> - Sustainability policies should take into consideration the specificities of sectors where they are introduced (e.g., objectives should vary depending on the size and mission of organizations; required administrative procedures should be commensurate with internal resources); - The increased amount of follow-up procedures decreases the involvement of employees in organizational greening efforts; - Governmental strategies for encouraging sustainability integration should not lead to a higher volume of paperwork. <p>For managers:</p> <ul style="list-style-type: none"> - Employees should be encouraged to set their own environmental goals in order to break down habits (e.g., vegetarian food once a week, reducing office garbage by ordering items with less packaging, start writing down work-related environmental
Assessment of the relative importance of obstacles to OCBEs	<ul style="list-style-type: none"> - Few studies attempted to evaluate factors depending on their likelihood to influence OCBEs; - The literature did not specify what managerial practices should be prioritized by organizations to increase the frequency of OCBEs; - Behavioral theories were rarely used to assess obstacles to OCBEs. 	<ul style="list-style-type: none"> - The spontaneous nature of OCBEs was put in doubt (Articles 2 and 3); - The theory of planned behavior could be a powerful tool for the prediction of green workplace behaviors (Article 2); - The exploration of the intention-behavior gap requires the creation of validated measures of pro-environmental behaviors of employees (Article 2); - Various types of OCBEs are influenced by individual and organizational obstacles differently (Articles 2 and 3) 	

<p>The role of organizations and internal environmental practices for the emergence of OCBEs</p>	<ul style="list-style-type: none"> - Previous studies explored OCBEs in disconnection with internal environmental practices of organizations; - The involvement of employees in organizational greening was primarily analyzed within private companies, while overlooking other contexts where OCBEs might be particularly important (universities, ministries, governmental agencies). 	<ul style="list-style-type: none"> - Some efforts to encourage OCBEs have a higher propensity to influence individual obstacles, while others are more prone to decrease organizational obstacles (Article 1); - Multiple previously suggested managerial recommendations to overcome factors that influence OCBEs are hardly applicable to a large number of organizations (Article 1) – recruitment of employees based on environmental attitude, conducting complex internal surveys, and developing interventions; - The number of factors that influence OCBEs depends on the level of substantiality in the integration of environmental concerns within organizations (Article 3); - Organizational efforts to encourage OCBEs might decrease the influence of individual factors, and, as a consequence, lead to more frequent pro-environmental behaviors outside workplace setting (Articles 1 and 2). 	<ul style="list-style-type: none"> - ideas in a notebook); - Employees working in strictly hierarchical organizations should be given more flexibility for launching their own sustainability initiatives (e.g., allocated time for the collection of data and consecutive realization of improvement projects, autonomy with improving routine processes); - Public organizations can benefit from consulting sustainability-related employees about internal operations (e.g., choice of suppliers, logistics, analysis of customer satisfaction); - Promoting green behaviors with a higher level of discretion might have negative effects on employees (e.g., reduced productivity and higher level of anxiety).
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Limits and avenues for future research

Each of the studies in this thesis contains some limits that are discussed in corresponding chapters. These limits are associated either with methodological issues (notably Articles 1 and 2) or with theoretical boundaries (Articles 2 and 3). Similarly, the thesis as a whole also contains some limitations related to either methodological considerations or conceptual flaws.

First, both empirical studies in the dissertation were conducted in public organizations, not private companies. Article 2 was based on a sample of non-academic university employees, while Article 3 relied on interviews with sustainability experts from governmental agencies. The management processes inside these two types of organizations are different compared with private companies (Boyne, 2002; Terry, 1998). Furthermore, each organization has its own culture comprising various repertoires of action strategies, and employees tend to adapt differently to implementation of new routines and practices (Bertels, Howard-Grenville, & Pek, 2016). Consequently, due to the chosen contexts' specificities, results from Articles 2 and 3 should be transferred to the private sector cautiously. In the same vein, empirical investigations of this thesis were conducted among Quebec workers, thereby limiting geographical coverage of the research. In this context, the analysis might have been skewed by cultural and geopolitical elements. For instance, employees in many African countries are known to be influenced by local management features such as power distance (Aycan, 2005; Boiral, 2008), paternalism (Etcheu, 2013; Pellegrini et al., 2010), high tolerance of uncertainty (Kamoche et al., 2012; Mutabazi, 2006), and even magico-religious practices (Boiral & MBoungou, 2004; Tayo Tene et al., 2018). The thesis cannot predict how such cultural aspects affect employees' pro-environmental behaviors, and significantly more research on the subject is needed in developing countries.

Second, the thesis focused on the factors that influence the likelihood of employees practicing behaviors without taking such actions' durability into consideration after encouragement measures. A natural question associated with this concern is: How long do employees continue to perform pro-environmental behaviors and how can this period be prolonged? In healthcare sciences, similar questions frequently are posed for individual behaviors, such as smoking cessation (e.g., Notley et al., 2015), exercising (e.g., Greaves et al., 2011), and alcohol consumption (e.g., O'Donnell et al., 2014), among others. The factors that affect behaviors at any given time vary, and it is important to have a clear picture of how such obstacles progress over time. Otherwise, there is an increased risk of facing the problem encountered in Article 2: Although answers regarding intention and actual

behaviors were collected only a few weeks apart, no significant relation between intention and behaviors was found. To sum up, explored behaviors' durability remains unknown and requires further investigation. The use of longitudinal methodologies is essential for this type of research.

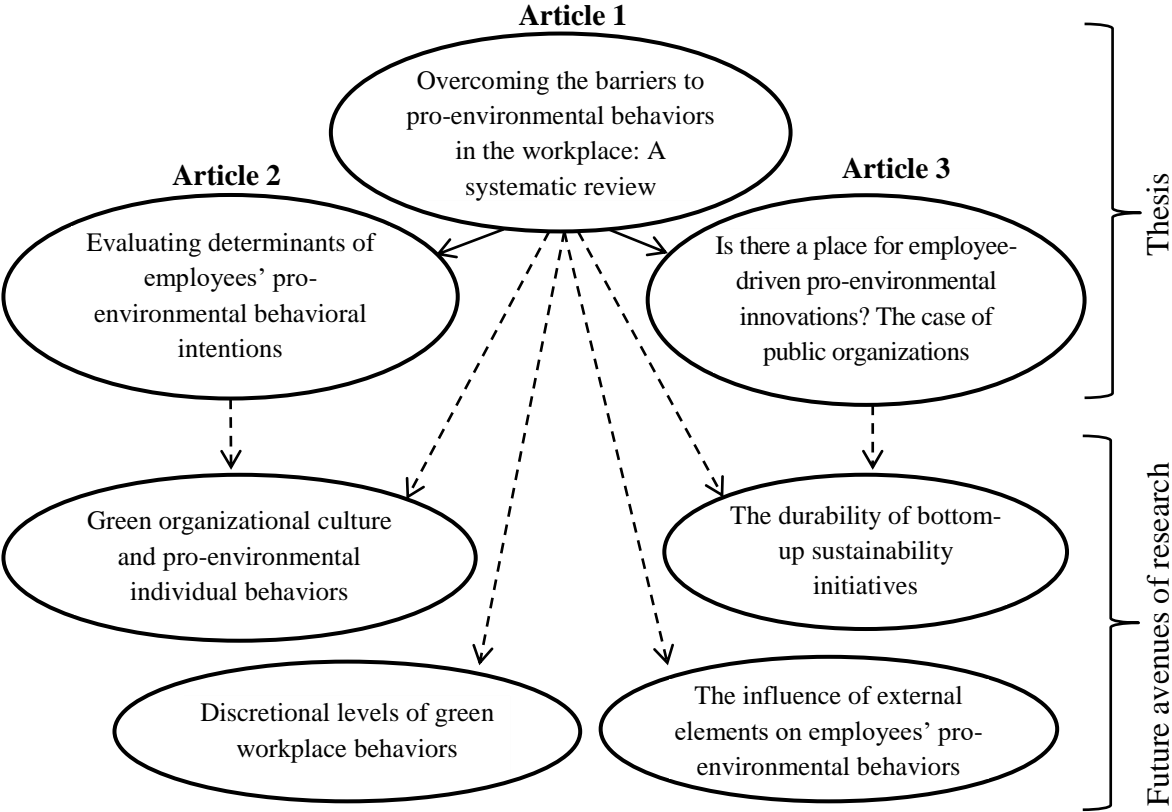
Third, analyzed behaviors were assumed to be practiced with the same level of discretion. This assumption comes from the very definition of OCBEs, according to which, such behaviors are voluntary (Boiral, 2009; Daily et al., 2009). However, some behaviors seem to be practiced with lower degrees of voluntariness than others. For instance, recycling requires more effort in offices that are not equipped with labeled waste bins, as employees must install such bins themselves. A similar observation applies to employee-driven pro-environmental innovations, which is one of the behaviors studied in the thesis (Article 3). Two sub-types of such individual innovations (proactive and contributory) were found to be influenced by slightly different obstacles. Taking into consideration this result from Article 3, it seems logical to suggest that the OCBE sub-categories (Boiral & Paillé, 2012) eco-helping and eco-civic engagement offer varying discretion levels and, thus, different factors that affect them.

Fourth, this thesis overlooks the fact that employees operate within a micro-system (e.g., company or organization) and a macro-system (e.g., city or country) with factors outside of their control. In this context, effectuated studies unjustifiably put much emphasis on individuals (whether managers or regular employees) and not on other aspects that play significant roles in shaping environment-related practices: public policy; budget allocations; education systems; social campaigns; and technological advancement, among others. These factors, which in no way are exclusive, fall outside the scope of this thesis, but they exert a major effect on how employees' individual behaviors are shaped and how they can be transformed. In this sense, an approach that focuses exclusively on individuals' roles in the fight against climate change is myopic. By condemning non-green behaviors, it overlooks a systematic and widespread lack of social and environmental responsibility (e.g., the lack of top management engagement in environmental protection, or political parties that give ecological preservation a low priority).

In light of these limits, future research should attempt to overcome these issues. For each limit identified above, one promising research avenue is proposed: green organizational culture and pro-environmental workplace behaviors; bottom-up sustainability ideas' durability; green behaviors' discretionary levels; and external elements' influence on employees' pro-environmental behaviors.

Figure 2 schematically depicts relationships between previous studies and suggested future research. Solid arrows illustrate the connection between research that was performed in the context of this thesis, while dashed arrows represent the link between previously conducted studies and future research avenues. The sub-sections below explain each of these potential studies in more detail.

Figure 2. The link between articles of the thesis and potential avenues of research



Green organizational culture and pro-environmental workplace behaviors

As demonstrated in this thesis, the likelihood of personnel performing pro-environmental behaviors depends greatly on internal green culture. For instance, according to Pek and Bertels (2015), the successful integration of sustainability concerns in an organization’s culture requires internal change agents’ active involvement and the expansion of cultural repertoires from strategies of action. However, although multiple articles use the concept of «green organizational culture» (Harris & Crane, 2002; Jabbour, 2011), extant literature is inconsistent with the concept’s definition

and applied measures. For instance, is the concept of «profound integration of environmental concerns,» which was used extensively in this thesis (particularly in Chapter 3), equivalent to a common understanding of «green organizational culture»? In answering this question and shedding more light on these seemingly intertwined conceptual flaws, a sophisticated literature review is required. The following list of questions, which is not exhaustive, then can be addressed:

- How does organizational green culture emerge, and what are the various stages of its formation?
- At what point in the development of organizational green culture do employees' behaviors begin to change?
- What is individual employees' input at different levels in the formation of organizational green culture, and what happens when a person quits?
- How different are sustainability-conscious employees' behaviors in organizations with weak green culture compared with those of their colleagues from more engaged organizations?
- Is there a link between impression-management techniques and organizational green culture?

Durability of bottom-up sustainability initiatives

Extant literature on sustainability innovations offers few insights into why some initiatives fail, while others succeed. This thesis made the first step toward understanding this phenomenon by identifying factors that affect the initiation of such projects through regular public sector employees. Future research should go further by identifying employee-driven initiatives that became widespread in organizations and delve more deeply into the principal reasons for their success.

Moreover, such successful initiatives frequently are included in annual sustainability reports as case studies, so this research avenue also can lead to exploring the alignment between «unique» individual cases (e.g., an employee with a breakthrough idea to decrease pollution, or a department that helped avoid a major spill) and actual day-to-day practices (e.g., employees' daily work or field workers' knowledge on environmental subjects). Although the vagueness and inconsistency of corporate annual and sustainability reports have been the focus of multiple studies (Adams, 2013; Boiral et al., 2019; Boiral & Henri, 2017; Chiba et al., 2018), scholars have concentrated solely on the organizational level, not on employees' involvement. From a methodological perspective, such research should combine ethnographic methods with documentation-analysis techniques – a promising and underexplored research area that might shed more light on the interplay between corporate efforts and employee engagement.

Discretionary levels of green workplace behaviors

This avenue of research suggests exploring the difference between various discretionary levels associated with green workplace behaviors. The importance of shedding more light on discretionary levels is explained by the potential negative effects from fewer voluntary actions. For instance, compulsory or expected organizational citizenship behaviors have been proven to decrease employees' efficiency and provoke frustration and anxiety (Bolino et al., 2013; Vigoda-Gadot & Beerli, 2012; Zhao et al., 2014). Conducting empirical validations on various discretionary levels of pro-environmental workplace behaviors could help researchers tailor intervention plans to particular situations, thereby avoiding potentially negative outcomes.

External elements' influence on employees' pro-environmental behaviors

Regardless of the contexts (home or work), individuals' behaviors are being developed over their lifetimes (Ajzen, 2015; Lally et al., 2010; Wood et al., 2002). Therefore, knowledge and competence levels associated with pro-environmental behaviors vary depending on education level (Boiral et al., 2016; Stritch & Christensen, 2016; Tosti-Kharas et al., 2017), public policy efforts (Liao et al., 2018; Wan et al., 2014), generation (Kim et al., 2016; Saifulina & Carballo-Penela, 2017), and other uncontrollable (from employees' perspective) factors. In this context, it would be pertinent to explore how such external elements shape employees' decision-making processes in terms of green behaviors. For instance, are well-informed employees' pro-environmental actions any different (quality-wise or frequency-wise) compared with their less-competent colleagues' behaviors? Similarly, multiple studies provide evidence that green architectural designs significantly increase workers' productivity, motivation, and well-being (Esfandiari et al., 2017; McCunn & Gifford, 2012) due to people's intrinsic need to be close to nature (Zelenski et al., 2015). However, it remains unknown whether employees working in such green spaces are more inclined toward performing pro-environmental behaviors. Generally speaking, external elements' influence on employees' eco-friendly actions is an underexplored and promising field of study that requires various methodological (ethnographic, longitudinal, mixed methods) and theoretical perspectives.

The aforementioned future research projects might help scholars further nuance knowledge on pro-environmental workplace behaviors and develop measures that lead to profound changes within organizations. The studies in this thesis are only the first steps in this direction. Although results

from conducted research demonstrated that multiple factors simultaneously might impede or incite employees to perform green behaviors, it also became clear that the likelihood of such actions depends on organizational specificities just as much as they do on individuals' personal qualities. As the likelihood of pro-environmental behaviors is, to a large extent, a derivative of internal organizational practices, it is my hope that the subjects discussed in this thesis will appear in workplace managers' daily agendas in the near future.

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