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Influence of organizational culture on sustainable mobility behaviours in higher education

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Abstract

Purpose – In the face of climate change, higher education institutions can play a role in fostering a sustainable future. This study aims to examine how their green organizational culture, including values, social norms and practices, affects students' mobility choices. Specifically, the authors examine the direct impact of green organizational culture on polluting commuting behaviours, the mediating role of organizational trust and the interplay between social and personal norms on students' transportation choices.

Design/methodology/approach – A quantitative survey was conducted among master's students. In total, 294 valid responses were collected and analyzed using partial least squares structural equation modelling.

Findings – Results confirm that green organizational culture reduces polluting commuting behaviours. Personal norms emerged as the strongest driver of sustainable mobility, and social norms significantly influenced personal norms, demonstrating how normative expectations within higher education institutions can encourage pro-environmental behaviours. Unexpectedly, trust exhibited a positive association with polluting behaviours, suggesting a potential delegation of environmental responsibility to the institution.

Research limitations/implications – The findings emphasize the role of organizational culture and norms in shaping mobility behaviours, providing actionable insights for enhancing sustainability through visible, value-driven practices. Future research should incorporate objective mobility data and explore variations across different institutional contexts, considering socioeconomic and geographical factors.

Originality/value – This study extends existing research by positioning commuting behaviours as an integral part of institutional sustainability efforts. Unlike previous work that primarily examines internal environmental policies (e.g. waste management, energy conservation), this study highlights how higher education institutions shape external behaviours through organizational culture and social norms. By integrating normative influences and trust dynamics, this research provides theoretical and practical insights into how institutions can effectively promote long-term sustainable mobility practices among students.

Keywords Green organizational culture, Sustainable mobility, Transportation, Social norms, Personal norms, Organizational trust, Higher education institutions, Commuting behaviour

Paper type Research paper

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1. Introduction

Mobility accounts for 45.3% of universities' CO_2 emissions, with commuting contributing 27.7% (Helmers *et al.*, 2021). Despite growing research on mobility, achieving behavioural change remains challenging. Most studies focus on individual factors and infrastructure availability, while social mechanisms driving behaviour change, such as organizational influence or peer effects, are often overlooked (Molina *et al.*, 2020; Stein *et al.*, 2022). This is particularly true for commuting behaviours, which, although typically perceived as external to organizations, are frequently influenced by them (Stein *et al.*, 2022). Car dependency is not merely a personal choice but also a result of organizational policies and practices (Molina *et al.*, 2020; Stein *et al.*, 2022).

With their constant student turnover and role in shaping future workers, higher education institutions have significant potential to influence commuting behaviours (Adjei *et al.*, 2021; Murray, 2018; Wright and Horst, 2013; Vallée, 2024). They aim to foster employability and responsible citizenship (Álvarez-Vanegas and Volante, 2024). To achieve this, they must cultivate a "green organisational culture" (Lee and Power, 2021; Vallée, 2024), embedding environmental values at all levels, from academic curricula to operational practices (Filho *et al.*, 2024; Molina *et al.*, 2020; Lee and Power, 2021).

Our research aims to determine the extent to which higher education institutions' culture can facilitate or hinder the adoption of sustainable mobility behaviours among students (Christou *et al.*, 2024). Specifically, we investigate the direct effect of green organizational culture on mobility behaviours and the mediating effect of organizational trust. In addition, we explore the effect of personal norms, which is a key individual variable. Our method uses partial least squares structural equation modelling (PLS-SEM), which is particularly well-suited for exploring complex relationships between latent variables (Hair *et al.*, 2022).

This study contributes to the literature by adopting a comprehensive approach to green organizational culture, including values, norms and practices. While previous research typically emphasizes the impact of organizational practices on employees' pro-environmental behaviours (Norton *et al.*, 2015), it often focuses on internal practices, such as waste management (Coelho de Freitas *et al.*, 2023) and energy conservation (Carrico and Riemer, 2010). By contrast, our research examines commuting behaviours, which are ultimately individual choices. In other words, we wonder whether the values promoted in the workplace spill over to personal behaviour. For example, do railway employees use public transport in their private life? Or do they avoid it out of a symbolic distance from their professional time? To our knowledge, no study has looked into the following question: does working in an organization that values the environment influence employees' daily mobility practices, even outside work? This study aims to fill this gap by examining the effect of a green organizational culture on polluting mobility behaviour. It makes an original contribution by extending the field of analysis of organizational influence to the private sphere.

Hereafter, we provide a literature review on green organizational culture, then outline our methodology, present our findings and discuss them in light of existing research. We conclude by highlighting their theoretical and practical implications, offering insights for both future research and real-world applications.

2. Literature background and hypotheses

In higher education institutions, as in other organizations, individual behaviours are shaped by shared norms and expectations that operate under the influence of organizational culture (Baird *et al.*, 2018; Tadesse Bogale and Debela, 2024). Organizational culture is a collective framework through which members perceive, interpret and respond to internal and external

challenges (Alvesson, 2002; Schein and Schein, 2016). Schein (2001) frames organizational culture as a multi-layered construct resulting from collective learning. It starts from fundamental assumptions established by founders and guiding organizational life, evolves towards values and beliefs that articulate what is essential and culminates in social norms and practices that operationalize these values. Within this framework, norms define appropriate behaviours, values reflect what is necessary and practices operationalize them into daily activities (Baird *et al.*, 2018; Cameron and Quinn, 1999). These elements collectively form the organization's shared mental programming (Hofstede *et al.*, 2010).

Organizational culture is a broad concept. This study goes beyond static, value-based models (Hofstede *et al.*, 2010; Marchand *et al.*, 2013) to adopt an intersubjective and dynamic perspective. Thereby, it aligns with the conceptualization of green organizational culture, defined as a dynamic system of shared values, norms and practices that shape organizational identity and guide daily behaviours toward sustainability. This definition highlights the cultural framework through which members interpret environmental challenges and align their practices with sustainable objectives (Baird *et al.*, 2018; Cameron and Quinn, 1999; Schein and Schein, 2016).

Organizations with strong environmental values implicitly discourage polluting transportation modes. Educational institutions provide unique organizational contexts to shape student behaviour. For instance, institutions that integrate sustainability into their identity (through green certifications or curricula) foster a culture where sustainable practices become the norm. This can directly or indirectly influence students' behaviours (Cotton *et al.*, 2007; Duque *et al.*, 2014). Based on this background, we hypothesize:

H1. The culture of higher education institutions influences students' pro-environmental behaviours.

While culture provides a foundational framework for influencing behaviours, its impact is often mediated by intermediate factors. In particular, organizational trust is a psychological state characterized by individuals' willingness to take risks based on positive expectations of others' intentions and behaviours (Rousseau *et al.*, 1998; Tadesse Bogale and Debela, 2024). Acting as a mediator, organizational trust increases receptivity to organizational culture's influence on behaviours. With high levels of trust, members are more likely to adopt practices aligned with organizational values, such as sustainable transportation modes (Singh and Srivastava, 2016). Cultural initiatives like sustainability campaigns resonate more effectively when organizational trust is strong. Assuming that organizational trust plays a central role in translating cultural values into tangible behaviours, we hypothesize:

H2. The effect of higher education institutions' culture on pro-environmental behaviour is mediated by organizational trust.

Social norms are shared expectations regarding appropriate behaviours (Schwartz, 1992). They are a critical component of organizational culture, providing a bridge between values and individual decision-making. By promoting green practices, organizations can support internalization of social norms and lead individuals to align their behaviours with these expectations (Roos *et al.*, 2015; Schultz *et al.*, 2007). In this process, personal norms, described as individual moral obligations to act in specific ways (Schwartz, 1992), are strongly influenced by social norms. Personal norms, in turn, are potent predictors of pro-environmental behaviours (Gifford and Nilsson, 2014; Stern, 2000; Javaid *et al.*, 2020). Recent theoretical and empirical developments confirm that the influence of social norms is often indirect, mediated or moderated by personal norms (Göckeritz *et al.*, 2009; Thøgersen, 2009; Schultz *et al.*,

2014). Social norms alone do not uniformly predict behavioural outcomes, as their impact is contingent upon the strength of individual moral commitments. Consequently, personal norms can change the influence of social norms (Hornsey *et al.*, 2007; Kim *et al.*, 2016). Therefore, in contrast with earlier models that postulated a direct causal path from social norms to behaviour (Cialdini *et al.*, 1991), our approach aligns with more nuanced models of norm activation and value-based decision-making. Accordingly, we hypothesize:

H3. Personal norms influence students' pro-environmental behaviours.

H4. Social norms influence personal norms.

This study focuses on transportation behaviours, which contribute massively to CO_2 emissions, with a share ranging from 15% to 91% (Versteijlen *et al.*, 2017). Given its substantial impact and the urgency to mitigate emissions, understanding cultural and normative influences becomes essential.

While previous research identified solutions that could achieve significant CO_2 reductions, individual preferences often outweigh environmental considerations. For instance, a meta-analysis revealed that 70% of people prefer using personal vehicles, even when sustainable alternatives are available. This illustrates the limitations of relying solely on economic incentives or external constraints to drive behavioural change. Despite extensive research into psychological and contextual drivers of behaviour (e.g. Michie *et al.*, 2011; Sheeran, 2002; Ajzen, 1991), the role of organizations remains underexplored. Yet, institutional culture has significant potential to act as a catalyst for behavioural change. To address this gap, we aim to examine the relationship between organizational culture and mobility behaviours.

Previous research highlighted the role of organizational culture on members' behaviour within the organization itself (Schein, 2001; Schneider *et al.*, 2012), for example in terms of cooperation, commitment and compliance with internal norms (O'Reilly *et al.*, 1991). More recently, studies have focused on green organizational culture, showing that it can reinforce pro-environmental behaviours at work, such as saving energy or reducing waste (Robertson and Barling, 2012; Norton *et al.*, 2015). However, a gap persists in the literature concerning the influence of organizational culture on extra-organizational behaviours (adopted in private life), which we intend to fill. Thereby, we expect to extend the field of analysis of organizational influence to the private sphere.

The present study draws on Bamberg *et al.*'s (2020) insights into shared expectations about acceptable mobility practices as direct and indirect predictors of mobility behaviours, interacting with personal norms (Bamberg, 2003). While organizational culture establishes expectations and norms at the group level, personal norms, as internalized moral values, directly shape individual decisions. For instance, students with firm ethical commitments to sustainable mobility are likely to choose environmentally friendly transport options, even when organizational norms are less prominent (Bamberg, 2003). However, their explanatory power is limited when examined in isolation, underscoring the need to analyze their interplay. By integrating these findings, we aim to deepen our understanding of the respective roles of organizational culture and personal norms to foster sustainable mobility.

In sum, this study builds on organizational culture theory (Schein, 2001; Tadesse Bogale and Debela, 2024), social and personal norms theory (Schwartz, 1992; Schwartz, 1977) and trust literature (Rousseau *et al.*, 1998) to propose a multi-level framework for understanding sustainable mobility behaviours. Thereby, we aim to identify how higher education institutions can foster pro-environmental behaviours among students. For practical reasons, we investigated transportation behaviour through an environmentally harmful variable,

namely, the polluting commuting behaviour, expecting that a green organizational culture would decrease this behaviour.

Our operational hypotheses are the following:

- *H1*: Green organizational culture of higher education institutions, defined by green social norms, values and green practices, significantly decreases students' polluting commuting behaviour.
- *H2*: The effect of organizational culture on students' commuting behaviour is mediated by organizational trust.
- *H3*: Green personal norms significantly decrease students' polluting commuting behaviour.
- *H4*: Green social norms positively influence students' green personal norms.

These hypotheses are gathered into a structural model presented in Figure 1. Green organizational culture is a second-order construct built on three components: organizational values based on the competing values framework (Cameron and Quinn, 1999), including four types of organizational cultures (hierarchy, clan, adhocracy and market, which are treated hereafter as latent variables), green social norms and green organizational practices, which are latent variables by themselves. Green personal norms are also a latent variable, and organizational trust is a second-order construct based on five latent variables (competences, openness, identification, concern and reliability; Shockley-Zalabak *et al.*, 2000).

3. Material and method

3.1 Study design and procedure

Participants completed an online questionnaire using Lime Survey (version 6.4.6). They were invited to respond to items related to study variables, behavioural measures and socio-demographic questions. The questionnaire also included two verification items. Items within a construct were presented in a randomized order. Respondents could skip any questions they did not wish to answer.

3.2 Participants and sampling

This study involved post-master's students from CESI School of Engineering in France. With 60 years of experience, CESI counts more than 110,000 graduates in the fields of industrial engineering, civil engineering, construction and computer science. CESI provides engineering programmes, including two years of undergraduate studies, three years of graduate studies and 13 one-year executive post-master degrees. About 26,000 students enrol

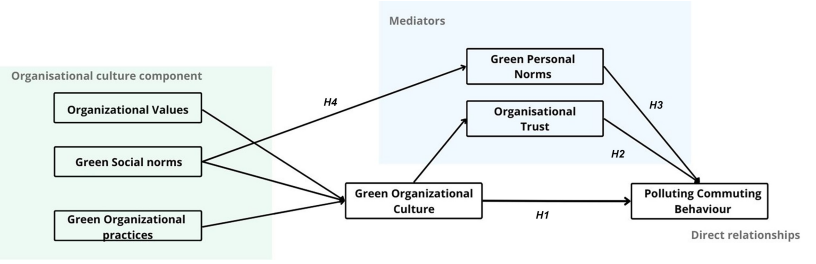

Figure 1. The model and its assumptions
Source: Created by the authors

each year in one of the 26 CESI campuses across France. The main cultural markers of CESI are social promotion (due to the inclusiveness of students' recruitment), territorial anchoring (due to its geographical distribution) and industrial proximity (due to the predominance of work-linked training).

The sample used for this study belongs to the post-master's students' population, in the fields of industrial and civil engineering. A power analysis at a 5%–95% confidence interval determined a minimum sample size of 268 participants. They were recruited through emails circulated by their instructors, and data was collected from February to May 2024. All participants were over 18 years old and provided informed consent before participating. Data were analyzed using SMART-PLS software (version 4.1.0.6) and RStudio.

We collected responses from 684 students, representing 76.95% of the parent population ($n = 889$). After excluding participants who did not provide consent, failed verification items or did not answer behavioural items, the final sample included 294 participants. This sample size is suitable for structural equation modelling through partial least squares path modelling (PLS-SEM). Mean age was 28.5 years (SD = 7.03), with 51.68% identifying as female.

3.3 Study instruments

This study uses a model with nine latent variables. All the survey material is available in Appendix. Green organizational culture, conceptualized as a second-order latent variable, incorporates six: the four types of organizational values (clan, adhocracy, hierarchy and market), green social norms and green organizational practices. Organizational values items were adapted from Marchand *et al.* (2013), referring to Cameron and Quinn (1999) model. Green social norms items were derived from Bertoldo and Castro (2016) and Cestac (2014). Green organizational practices items were based on (El Akremi *et al.*, 2018), which measured the perception of CSR practices. Organizational trust was measured across five dimensions (competencies, openness, identification, concern and reliability; from Shockley-Zalabak *et al.*, 2000). Green personal norms items were adapted from Mahpour *et al.* (2023) and Steg *et al.* (2011). Participants rated each item on a seven-point Likert scale.

Behaviour was assessed using three self-reported indicators that formed a latent variable. Participants had to select the transportation modes used for commuting to CESI. Their answers were transformed into a variable defining their choices as polluting (e.g. car, motorcycle), moderately polluting (e.g. tram, bus, subway) or non-polluting (e.g. walking, cycling). They also had to report the distance travelled weekly using different polluting transportation modes, allowing us to calculate a weekly CO2 emission rate based on ADEME coefficients. Participants rated the availability of eco-friendly transportation modes on a seven-point scale. This information was factored into the overall pollution score, enabling us to assign higher scores to those who chose a polluting mode despite having alternatives available.

3.4 Data processing and quality control

Outliers were handled by excluding responses with more than three aberrant values, removing seven participants. Missing data, which accounted for 3% of the corpus, were imputed using the K-nearest neighbours (KNN) algorithm ($k = 3$). PLS-SEM was used because it is particularly suited for predictive research models with formative or reflective constructs, limited sample sizes and non-normal data (Hair *et al.*, 2022). Prior to model estimation, we checked for indicator reliability, internal consistency and construct validity for reflective constructs (Hair *et al.*, 2022). All constructs were measured reflectively, and the one-dimensionality of measurement blocks was verified (Table 1).

Table 1. Quality measures for PLS-SEM model

Latent variable	Cronbach's alpha	Composite reliability (rho_a)	Average variance extracted (AVE)	*R*-square	Communality
Green organizational culture	*0.93*	*0.94*	*0.31*	*1.00*	*0.31*
Hierarchy values	0.78	0.84	0.43		0.43
Clan values	0.86	0.89	0.55		0.55
Adhocracy values	0.77	0.85	0.53		0.53
Market values	0.78	0.85	0.53		0.53
Green social norms	0.61	0.79	0.56		0.56
Green organizational practices	0.91	0.92	0.61		0.61
Green personal norms	*0.84*	*0.88*	*0.53*	*0.23*	*0.53*
Organizational trust	*0.96*	*0.96*	*0.51*	*1.00*	*0.51*
Competences	0.87	0.91	0.71		0.71
Openness	0.83	0.87	0.46		0.46
Concern	0.91	0.93	0.66		0.66
Reliability	0.88	0.92	0.74		0.74
Identification	0.86	0.92	0.79		0.79

Note(s): For reflective constructs, communality values are equal to the average variance extracted (AVE), representing the shared variance between indicators and their respective latent variable

Convergent validity was evaluated using item correlations and the average variance extracted (AVE), with thresholds set at 0.50 (Hair *et al.*, 2010). Discriminant validity was confirmed via the Fornell–Larcker criterion, excluding items with negative or weak correlations. This process resulted in removing four items out of 91. All remaining constructs had Cronbach's alpha (Hoyle, 1995) values above 0.60, deemed acceptable for early-stage research (Nunnally, 1978).

Hierarchy values, market values, green social norms and green organizational culture exhibited factor loadings between 0.40 and 0.50 (acceptable for exploratory research). Green organizational culture presented an AVE of 0.31, which is below the recommended threshold of 0.50 (Fornell and Larcker, 1981). However, the composite reliability remained high (CR = 0.94), and the construct showed theoretical consistency. Based on Hair *et al.* (2022), a high CR can compensate for low AVE in early-stage or exploratory research. Therefore, we retained the construct but acknowledge that some indicators may require refinement in future studies.

To address potential multicollinearity in second-order constructs, the variance inflation factor (VIF) was evaluated. None of the latent variables exceeded the recommended threshold (VIF < 5; Hair *et al.*, 2022).

4. Results

The structural model was assessed using key indicators such as path coefficients, explained variance (R^2) and the significance of effects, based on 1,000 bootstrap resamples.

H1: Green organizational culture (GOC) and polluting commuting behaviour (PCB). Organizational culture is a combination of values, norms and practices. All the variables selected as components of organizational culture play a significant role in its composition: clan ($\beta = 0.29$, $p < 0.001$), adhocracy ($\beta = 0.20$, $p < 0.001$), market ($\beta = 0.18$, $p < 0.001$) and hierarchy ($\beta = 0.24$, $p < 0.001$). This pattern is also evident in green organizational practices ($\beta = 0.33$, $p < 0.001$). While green social norms are significant, they are less central in shaping green organizational culture ($\beta = 0.06$, $p < 0.001$). As expected, green organizational

culture significantly predicts a decrease in polluting commuting behaviours (β = –0.24, p < 0.05).

H2: Mediation effect of organizational trust (OT). Mediation analysis revealed a weak but significant effect of GOC on organizational trust (β = 0.01, p = 0.05), but the indirect pathway to polluting commuting behaviours via trust was not significant (β = 0.00, p < 0.09). We removed this relation from the PLS model and focused only on the direct effect of organizational trust. Unexpectedly, organizational trust had a significant positive direct effect (β = 0.28, p < 0.001) on polluting commuting behaviours (see Table 2).

H3–H4: Green social norms (SN), green personal norms (PN) and polluting commuting behaviour (PCB). Green personal norms emerged as the strongest predictor of polluting commuting behaviours (β = –0.34, p < 0.05), before green organizational culture (see Table 3). Furthermore, green social norms significantly influenced the development of green personal norms (β = 0.48, p < 0.05).

The structural equation derived from the PLS-SEM analysis highlights the significant relationships between latent variables:

$$\mathrm{PCB} = -0.24 * * * \cdot \mathrm{GOC} - 0.34 * * * \cdot \mathrm{PN} + 0.28 * * * \cdot \mathrm{OT} - 0.18 * * * \cdot \mathrm{SN} - 0.16 * * * \cdot (\mathrm{SN} \rightarrow \mathrm{PN}) - 0.02 * \cdot (\mathrm{SN} \rightarrow \mathrm{GOC})$$

The derived equation demonstrates the interplay between organizational and personal factors in shaping polluting commuting behaviours. As the strongest predictor, personal norms emphasize the importance of individual ecological commitment. Organizational culture also contributes significantly, suggesting that a green culture helps foster sustainable commuting behaviours. Interestingly, the positive coefficient for organizational trust (β = 0.28) implies that higher trust might unintentionally reduce the perceived urgency for individuals to adopt eco-friendly commuting practices. Table 4 summarizes hypotheses tests.

Table 2. Mediation hypothesis analysis

Hypothesis	Coefficient	SD	*t*-value	*p*-value
GOC → PCB	−0.24	0.08	3.06	p < 0.001
GOC → OT → PCB	0.00	0.00	1.72	p = 0.09
OT → PCB	0.28	0.08	3.37	p < 0.001

Note(s): GOC = green organizational culture; PCB = polluting mobility behaviour; OT = organizational trust

Table 3. Personal and social norms hypotheses analysis

Hypothesis	Coefficient	SD	*t*-value	*p*-value
GOC → PCB	−0.24	0.08	3.06	p < 0.001
PN → PCB	−0.34	0.05	6.81	p < 0.001
SN → PN	0.48	0.04	11.53	p < 0.001
SN → PN → PCB	−0.16	0.03	5.77	p < 0.001
SN → GOC → PCB	−0.02	0.01	2,34	p = 0.02
SN → PCB	−0.18	0.03	6.26	p < 0.001

Note(s): GOC = green organizational culture; PCB = polluting mobility behaviour; PN = green personal norms; SN = green social norms; OT = organizational trust

Table 4. Summary of the results

Hypothesis	Path	β (path coefficient)	*t*-value	*p*-value	Supported
H1	GOC → PCB	−0.24	3.06	$p < 0.001$	Yes
H2	GOC → OT → PCB	0.00	1.72	$p = 0.09$	No
H3	*PN → PCB*	−0.34	6.81	$p < 0.001$	Yes
H4	*SN → PN*	0.48	11.53	$p < 0.001$	Yes

Lastly, a goodness-of-fit (GoF; Tenenhaus *et al.*, 2005; Hair *et al.*, 2022) was used to evaluate the overall fit of the model. GoF is the geometric mean of the average communality and the average R^2. Its values range from 0 to 1, with thresholds defined as follows: small GoF = 0.10, medium GoF = 0.25 and large GoF = 0.36 (Akter *et al.*, 2011). With a 0.541 value, the GoF index of our model emphasizes a strong alignment between empirical data and the model. Additionally, the standardized root mean square residual (SRMR), which was 0.06, indicates a good global model fit (Henseler *et al.*, 2016). The model explains 16% of the variance in students' commuting behaviour ($R^2 = 0.16$) confirming the model's predictive relevance. The final model is presented in Figure 2 and the fit are presented in Table 5.

5. Discussion

Given the environmental challenges associated with mobility (Bamberg *et al.*, 2020) and the key role of higher education institutions in shaping future generations (Lozano *et al.*, 2013),

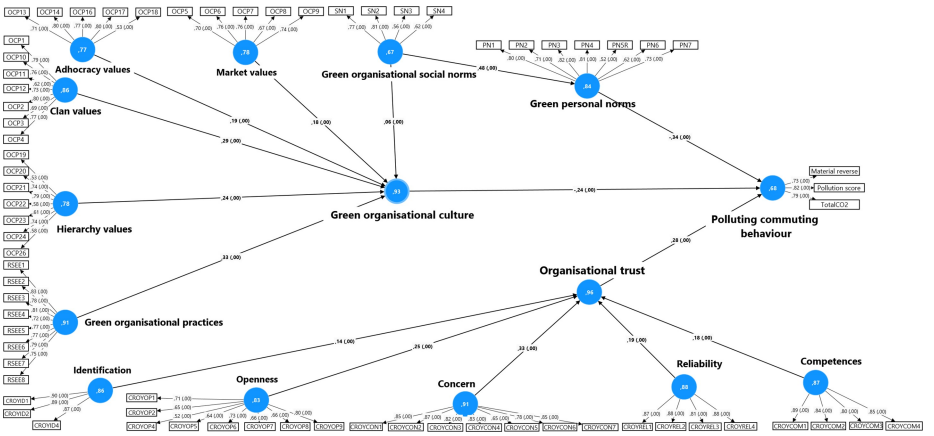

Figure 2. Path diagram of the final PLS-SEM model
Source: Created by the authors

Table 5. Fit of the model

Index	Threshold	Value	Interpretation
SRMR	< 0.08	0.06	Good model fit
R^2 (mobility pollution behaviors)		0.16	Moderate explanation

we examined the following research question: to what extent does green organizational culture influence students' mobility behaviours? To address this question, we designed a survey targeting post-master's students, focusing on several core concepts from organizational and social psychology: green organizational culture, social norms, organizational trust and personal norms. Data was analyzed using PLS-SEM, allowing us to test four main hypotheses.

H1: Green organizational culture of higher education institutions, defined by green social norms, values and green practices, significantly decreases students' polluting commuting behaviour.

Before discussing the effect of green organizational culture, we first reflect on the consistency of this construct. Green organizational culture was conceptualized as comprising values, green social norms and green organizational practices. PLS-SEM results first confirm the role of practices in a green organizational culture (Schein, 2001). Regarding the role of values, our findings reveal an interesting pattern: Previous research on the influence of competing value framework (Cameron and Quinn, 1999) had shown that market values were not prone to support green organizational culture. In our results, this is the least impactful set of values, but they nonetheless significantly contribute to the green organizational culture. This pattern highlights that all measured values seem compatible with a green organizational culture. Values being the most profound component of culture, and thereby the most difficult to change, it is valuable to learn that it may not be necessary to transform them to develop a green culture in any higher education institution.

Besides, our results show that green social norms contribute poorly to green organizational culture. This unexpected pattern could come from introducing personal norms into the model. Green social norms may primarily affect personal norms at the expense of organizational culture. This partly questions the model of organizational culture from Schein (2001) but is strongly consistent with the literature regarding Value belief norms model (Canlas *et al.*, 2022; Stern *et al.*, 1999) and norm activation model (Oh and Ki, 2022; Schwartz, 1977), which emphasize the role of social norms in shaping personal norms.

H1 was validated. Although the impact of organizational culture on pro-environmental behaviours has been repeatedly observed in previous literature, our result is original at least in two ways. Firstly, it shows the impact of organizational culture on mobility behaviours, which are not part of organizational activities (Stein *et al.*, 2022). This suggests that work and life are not as siloed as we think, and that organizations may hold more power than we think on our private behaviour. Secondly, this effect was measured on students who are both within and outside the organization. Students cannot be considered as pure members of the higher education institution, but nonetheless experience a sense of belonging, spend considerable amount of time in the organization and partly identify thereto. This further highlights the implicit influence of organizations on private behaviour. Although significant, this influence remains challenging to implement: an organization wishing to promote environmentally friendly behaviours must incorporate them within its culture (Yuriev *et al.*, 2018), and not only disseminate rules, injunctions and policies (Yuriev *et al.*, 2018). The transformation has therefore to be profound and sincere, which can be costly in time and effort.

H2: The effect of organizational culture on students' commuting behaviour is mediated by organizational trust.

Examining the role of organizational trust led us to reject *H2* and obtain an unexpected finding. Organizational trust appeared to support polluting commuting behaviour when we expected it would reinforce the reduction effect of green organizational culture. Organizational trust is typically associated with a climate of support and engagement (Ugwu

et al., 2014), which should be associated with a stronger corporate identification. However, the results of Gneezy *et al.* (2011) also suggest that high trust in the organization can reduce the perceived social pressure to adopt proactive behaviours. Regarding pro-environmental behaviours, members may grant too high trust in the organization to develop sustainable practices. They can also attribute these practices to themselves as members and consider that they do not have to make personal efforts. This process may act as a kind of delegation of responsibility. Future attempts to support pro-environmental behaviours should account for this paradoxical influence of organizational trust and recalibrate messages about environmental commitment to avoid unintended reduction in individual responsibility.

H3: Green personal norms significantly decrease students' polluting commuting behaviour.

H4: Green social norms positively influence students' green personal norms.

Our results confirm the critical role of social and personal norms in reducing polluting mobility behaviours. This is remarkably consistent with previous literature (Bamberg and Möser, 2007; Steg and Vlek, 2009), showing that social and personal norms strengthen moral and social pressure, thereby increasing intentions to adopt pro-environmental behaviours.

Overall, the structural model demonstrates an explanatory power of 16%, which highlights that many other factors may not have been considered. This result should not discourage higher education institutions from taking action and leaves us many avenues for further research.

6. Limitations and perspectives

The primary limitation concerns the low AVE for green organizational culture, which indicates that we captured approximately 30% thereof. Although the composite reliability and the construct's theoretical relevance justified its retention, future research should refine this measurement. At a low level, psychometric properties could be improved by rewording items; at a higher level, the construct could be refined by distinguishing culture from climate, or incorporating additional dimensions of culture. For instance, the measure of social norms may include more specific topics to better capture their complexity.

The measure of values also requires refinement, as some items lacked clarity for respondents. To make values more explicit, one should consider introducing short definitions with each of them. Besides, contrary to previous results (Marchand *et al.*, 2013), the aggressiveness value did not aggregate with the market culture in our data set. This could be interpreted as a sign of evolution of values, as attested by time-series data from values surveys worldwide (Norris and Inglehart, 2019) and question the validity of the measure over time.

Additionally, the study focused exclusively on post-master's students, which limits the generalizability of the findings. Future research should involve a more extensive and diverse sample of students from different specialties and academic levels. An even larger population should be considered for investigating the role of organizational trust. Recent studies differentiate between trust in organization's members, which we measured here, and trust in the organization itself, independent from its members (Vanhala and Tzafrir, 2021). Future research could compare the effects of impersonal trust to the unexpected results we obtained.

7. Conclusion

This research emphasizes the systemic nature of individual choices and brings about many theoretical and practical implications. From a conceptual viewpoint, our results question Schein's seminal model of organizational culture. They suggest either that values, norms and practices do not have equivalent impact on behaviour (with practices having the strongest),

or that norms bypass the system to directly influence behaviours through their own process. Secondly, our results highlight the broad, although subtle, influence of organizational culture, transcending the borders of the organization up to affecting private behaviours and reaching populations that are not primary members, but rather beneficiaries, of the organization. Our results also question the nature of organizational trust and its potential relation with diffusion of responsibility, which is a highly stimulating topic to further investigate.

Regarding practical implications, our results highlight three major drivers of sustainable mobility: two concern higher education institutions, and one is attached to each individual. Students' commuting behaviour partly depends on organizational culture, in particular through green practices. What is interesting to understand is that all kinds of green practices can contribute to reducing polluting commuting behaviour, and not only those related to mobility. Green practices directly related to mobility include, for example, incentives for using public transportation or active modes, infrastructure improvements (e.g. bike racks, carpool programmes) and flexible work arrangements. Green practices unrelated to mobility, like reducing energy consumption or recycling, also nurture a green organizational culture, and therefore indirectly contribute to behaviour change by shaping the broader normative context.

Higher education institutions can also contribute to more sustainable student mobility through everyday social norms, including injunctive and descriptive norms. Injunctive norms refer to perceptions of what behaviours are socially approved or disapproved (Cialdini *et al.*, 1991). Their salience can be increased by official or unofficial expression of attitudes about using bikes and public transportation, policies promoting sustainable commuting, awareness campaigns or explicit endorsements by influential university figures (Schultz *et al.*, 2007). Descriptive norms refer to perceptions of what most people actually do in a given context, providing an implicit guide for expected behaviour (Cialdini *et al.*, 1991). Their impact can be enhanced through the actual behaviours of organization's members (teachers, administrative staff, etc.). Suppose students see their teachers using bikes or public transportation to commute; this may implicitly strengthen the idea that sustainable mobility is the norm and socially desirable (Goldstein *et al.*, 2008).

Lastly, personal norms showed the strongest and most direct impact on reducing polluting mobility behaviours. This underscores the importance of targeting individual-level moral values alongside fostering a supportive organizational environment to achieve meaningful increase in sustainable commuting. Educational campaigns, personalised feedback and initiatives highlighting the moral and social significance of sustainability could contribute to making personal norms greener. For example, in a school of engineering, introducing sustainability as part of the role of engineers in society and delivering knowledge, skills and tools to achieve this role may be likely to influence personal norms of students and future engineers. However, we acknowledge that personal norms are known to be stable and difficult to transform directly (Thøgersen, 2006; Bamberg and Möser, 2007). Instead, interventions targeting descriptive and injunctive social norms within the institution may be more effective in indirectly shaping personal norms over time (Schultz *et al.*, 2014). For example, promoting visible low-carbon commuting behaviours among peers and staff, or reinforcing institutional messages that frame sustainable mobility as a shared value, may gradually influence students' internalized norms.

Further research is needed to address the limitations of the present study and provide a more comprehensive understanding of the factors influencing sustainable commuting behaviours. A large-scale study is underway to refine the measurement of green organizational culture, ensuring it captures additional dimensions and more clearly

distinguishes organizational culture and climate. This study will also include a more extensive and diverse sample, incorporating students from various campuses, each of which will be analyzed independently to understand different contextual dynamics better. Additionally, contextual factors such as perceived behavioural control, facilitating conditions and environmental constraints will be integrated into the analysis. Higher education institutions can catalyze long-term behavioural shifts towards sustainable mobility by integrating personal, organizational and social normative influences. The transition to green mobility requires a balance between individual responsibility and institutional commitment. By reinforcing norms and organizational practices, this collaboration can make green mobility the default choice.

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Ethics statement

The study received approval from CESI Data Protection Officer (DPO) and fully complies with GDPR regulations, as all data were anonymized using randomly assigned participant IDs, and no sensitive information was collected. Participants provided informed consent and were free to withdraw at any time without consequences.

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Appendix

Table A1. List of all variables

Independent variable – first-order construct	Code	Item	Loading	Mean	Alpha
How well do the values listed below describe ANONYM					
Hierarchy value	OCP23	Job security	0.61	5.22	0.78
	OCP26	Predictability	0.58	4.87	
	OCP24	Stability	0.74	5.29	
	OCP19	Cautious	0.53	5.06	
	OCP20	Detail-oriented	0.74	5.20	
	OCP21	Precise	0.79	5.07	
	OCP22	Rule-oriented	0.58	5.70	
Clan values	OCP1	Just/fair	0.79	5.31	0.86
	OCP2	Respect for individual rights	0.80	5.86	
	OCP3	Tolerant	0.69	5.36	
	OCP4	Socially responsible	0.77	5.35	
	OCP10	Human-oriented	0.76	5.35	
	OCP11	Teamwork-oriented	0.62	6.28	
	OCP12	Willing to collaborate with others	0.73	5.85	
Adhocracy values	OCP13	Action-oriented	0.71	5.46	0.77
	OCP14	Willing to experiment	0.80	5.40	
	OCP16	Quick to seize opportunities	0.77	5.02	
	OCP17	Innovative	0.80	5.22	
	OCP18	Risk-taking	0.52	4.16	
Market values	OCP5	Competitive	0.70	5.11	0.78
	OCP6	Achievement-oriented	0.76	5.93	
	OCP7	Has high performance expectations	0.74	5.66	
	OCP8	Results-oriented	0.67	5.72	
	OCP9	Analysis-oriented	0.74	5.54	
Indicate your level of agreement with the following statements					
Green social norms	SN1	My promo colleagues at ANONYM expect me to use environmentally friendly means of transport	0.78	3.55	0.61
	SN2	The ANONYM teams expect me to use environmentally friendly means of transport	0.84	4.44	

(*continued*)

Table A1. Continued

Independent variable – first-order construct	Code	Item	Loading	Mean	Alpha
	SN4	ANONYM teams use environmentally friendly means of transport	0.60	3.96	
Green organizational practices	RSE1	Our company takes action to reduce pollution related to its activities (e.g. choice of materials, eco-design and dematerialization)	0.83	4.59	0.91
	RSE2	Our company contributes towards saving resources and energy (e.g. recycling, waste management)	0.78	4.54	
	RSE3	Our company makes investments to improve the ecological quality of its products and services	0.81	4.50	
	RSE4	Our company respects and promotes the protection of biodiversity (i.e. the variety and diversity of species)	0.72	4.37	
	RSE5	Our company measures the impact of its activities on the natural environment (e.g. carbon audit, reduction of greenhouse gas emissions, global warming)	0.77	4.53	
	RSE6	Our company invests in clean technologies and renewable energies	0.77	4.40	
	RSE7	Our company encourages its members to adopt eco-friendly behaviour (sort trash, save water and electricity) to protect the natural environment	0.79	4.76	
	RSE8	Our company encourages eco-responsible mobility behaviour	0.75	4.65	
Green personal norms	PN1	I feel personally obliged to travel in an environmentally sound way, such as by using a bicycle or public transport	0.80	5.06	0.84
	PN2	I would be a better person if I used more often other transport modes instead of the car	0.71	4.29	
	PN3	People like me should do whatever they can to minimize their car use	0.82	5.04	
	PN4	I feel obliged to take the environmental consequences of car use into account when making travel choices	0.81	4.73	
	PN5	I do not feel guilty when I use the car even though there are other feasible transport alternatives available (rs)	0.53	3.86	
	PN6	If I buy a new car, I feel morally obliged to buy an energy-efficient car	0.62	5.27	
	PN7	I feel morally obliged to use the car as little as possible, regardless of what other people do	0.73	4.11	
Organizational confidence	CROYCOM1	I am highly satisfied with the organization's overall efficiency of operation	0.89	4.72	0.87
	CROYCOM2	I am highly satisfied with the capability of the organization's employees	0.84	5.13	

(*continued*)

Table A1. Continued

Independent variable – first-order construct	Code	Item	Loading	Mean	Alpha
	CROYCOM3	I am highly satisfied with the capacity of the organization to achieve its objectives	0.80	4.77	
	CROYCOM4	I am highly satisfied with the overall quality of the products and/or services of the organization	0.85	4.93	
	CROYOP1	I receive adequate information regarding how organizational decisions are made that affect my job	0.71	3.94	0.83
	CROYOP2	I can tell my immediate supervisor when things are going wrong	0.65	5.41	
	CROYOP4	My immediate supervisor keeps confidences	0.52	5.53	
	CROYOP5	I have a say in decisions that affect my job	0.64	4.38	
	CROYOP6	I receive adequate information regarding how well I am doing in my job	0.73	4.71	
	CROYOP7	I receive adequate information regarding how I am being evaluated	0.66	4.83	
	CROYOP8	I receive adequate information regarding the long- term strategies of my organization	0.66	3.96	
	CROYOP9	I receive adequate information regarding how my job-related problems are handled	0.80	4.08	
	CROYCON1	My immediate supervisor listens to me	0.85	5.18	0.91
	CROYCON2	Top management listens to employees' concerns	0.87	4.87	
	CROYCON3	Top management is sincere in their efforts to communicate with employees	0.82	5.07	
	CROYCON4	My immediate supervisor is concerned about my personal well-being	0.83	4.57	
	CROYCON5	My immediate supervisor speaks positively about subordinates in front of others	0.65	5.29	
	CROYCON6	My immediate supervisor is sincere in his/her efforts to communicate with team members	0.78	5.08	
	CROYCON7	Top management is concerned about employees' well-being	0.85	4.84	
	CROYREL1	My immediate supervisor follows through with what he/she says	0.87	4.89	0.88
	CROYREL2	Top management keeps their commitments to employees	0.88	5.07	
	CROYREL3	My immediate supervisor behaves in a consistent manner from day to day	0.81	4.86	
	CROYREL4	My immediate supervisor keeps his/her commitments to team members	0.88	5.01	
	CROYID1	I feel connected with my organization	0.90	4.24	0.86
	CROYID2	I feel connected with my immediate supervisor	0.89	4.39	
	CROYID4	My values are like the values of my immediate supervisor	0.87	4.62	