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Sustainability from the Top:
How Leadership and Responsibility predict Corporate Sustainability

M. Keil[1]*, V. Michaux[2], M. Ziefle[2], K. Arning[1]

1: Junior Professorship for Risk Perception and Communication
RWTH Aachen University
Campus Boulevard 57, 52074 Aachen
e-mail: keil@risk.rwth-aachen.de, ORCID: 0009-0009-9810-9488
e-mail: arning@risk.rwth-aachen.de ORCID: 0000-0001-8234-1164

2: Chair of Communication Science
RWTH Aachen University
Campus Boulevard 57, 52074 Aachen

e-mail: michaux@comm.rwth-aachen.de, ORCID: 0009-0001-0835-1038
e-mail: ziefle@comm.rwth-aachen.de, ORCID: 0000-0002-6105-4729

Abstract *Addressing climate change requires both individual behavioural change and cor-porate transformation, as organizations play a crucial role in a sustainable society. How sustainability in organizations is perceived and implemented, depends on diverse factors such as management practices, communication, individual attitudes, and behaviours of leaders and employees. However, current research only investigates factors that affect the implementation of sustainable development and practices separately. Hence, holistic ap-proaches are required to provide insight into how they affect a company's sustainability efforts. A quantitative online survey with n = 87 employees was conducted in Germany in 2023. The Corporate Sustainability Index (CSI) was developed to indicate the extent to which organizations implement sustainability into their policies and concrete practices. To investigate which factors predict corporate sustainability, we analysed employee-, manage-ment-, and organization-related factors using multiple linear regression analysis. Trans-parent accountability for sustainability was the strongest predictor of the CSI, along with a top-down approach to implement corporate sustainability. In contrast, employees' envi-ronmental awareness and their organizational citizenship behaviour towards the environ-ment were not related with CSI. Our results stress the importance of leaders with an envi-ronmental focus as role models who can drive the transformation toward effective sustain-ability management in companies. This study offers important insights into the prerequisites for leaders to foster an environmentally responsible culture in their organizations.*

1.   INTRODUCTION

The challenges of climate change mitigation have urged both governments and organizations to adopt effective sustainability measures (Fawehinmi et al., 2020) . Ensuring sustainability is not merely an option but a necessity for companies to remain competitive, as demanded by all stakeholders (Yue et al., 2023) . While many companies have recognized its importance, the implementation of sustainable practices is often hindered by several factors such as financial constraints, legal requirements, and internal organizational factors (Gawusu et al., 2022) . These obstacles underscore the importance of refining a company's internal strategies (Biswas et al., 2022) . The existing body of literature has primarily centered on personal characteristics and corporate culture as the most important drivers of sustainability attitudes and behaviours (Kiesnere & Baumgartner, 2019) . However, to provide a comprehensive understanding of the factors shaping corporate sustainability, this study analyses individual, behavioural as well as organizational factors in one frame of reference.

2.   IMPACT FACTORS ON ORGANIZATIONAL SUSTAINABILITY

In this chapter, the main factors influencing corporate sustainability and the respective empirical state of the art are outlined.

2.1 Individual factors influencing sustainability

Environmental sustainability in organizations largely depends on the pro-environmental behaviour of its members, both employees and executives (Biswas et al., 2022) . The sustainable behaviour of employees is mostly conceptualized as Organizational Citizenship Behaviour for the Environment (OCBE) . The concept of OCBE comprises individual voluntary initiatives that are not rewarded by the organization (Boiral & Paillé, 2012) . Yue et al. (2023) highlight the positive association between OCBE and a company's sustainability performance. They suggest that OCBE acts as a mediator between the presence of an environmental management system and a company's sustainability performance. The impact of OCBE makes it relevant to consider management practices and other factors that promote OCBE for achieving sustainability goals. Several studies have highlighted the importance of leadership behaviour in promoting sustainable behaviour, which in turn has a positive impact on the company's overall sustainability performance (Foo et al., 2021) . Specifically, Environmental Transformational Leadership (ETL) has been identified as a catalyst of sustainable employee behaviour (Li et al., 2020) . Wang et al. (2018) posit that when leaders demonstrate sustainable behaviour, employees are more motivated to accept and adapt it. However, while leadership can foster sustainable behaviour, its direct association with a company's sustainability performance remains open (Foo et al., 2021) .

Apart from leadership, individual attitudes influence sustainable behaviour, and the effectiveness of sustainability measures in companies (Latif et al., 2022) . Sustainability attitude, subjective sustainability norms, perceived control of environmental behaviour, and the perception of corporate sustainability were found to positively affect employee sustainability behaviour (Alzaidi & Iyanna, 2021) . In contrast, the study by Foster et al. (2022) shows that the influence of environmental commitment, environmental consciousness, and green self-

efficacy on OCBE was insignificant.

2.2 Organizational factors shaping sustainability

Another aspect of implementing sustainability is the organizational culture. An eco-friendly company culture promotes the integration of sustainable practices into everyday working life, while a slow-changing organizational culture and lack of strong leadership can hinder its integration (Kiesnere & Baumgartner, 2019) . Moreover, Psychological Green Climate (PGC) has a positive impact on employees' sustainability behaviours (Biswas et al., 2022) . PGC reflects employees' collective perception of the company's policies and procedures promoting environmental sustainability and green values. Additionally, it has been identified as a mediator between leadership styles like ETL and OCBE (Liu & Yu, 2022) . Besides leadership styles, strong support from top management is crucial even if the main initiative for the implementation comes from employees (Gotsch et al., 2023; Kiesnere & Baumgartner, 2019) . Further, the company's size impacts corporate sustainability. Larger companies tend to focus more intensively on ecological change and are better equipped to implement internal sustainability strategies (Risius et al., 2023) .

2.3 Research aims and hypotheses

Despite the current insights, an understanding of the determinants of corporate sustainability necessitates an integrated perspective, encompassing both individual and organizational factors. Therefore, the present work aims to a) adopt a multifactorial approach to simultaneously investigate factors influencing corporate sustainability and b) develop a novel instrument for measuring corporate sustainability, which reflects its multifaceted nature and considers both, specific measures as well as the integration into corporate policies. Adequately, the following research questions were derived:

RQ1: Which attitudinal and behavioural factors influence corporate sustainability?

RQ2: Which organizational factors influence corporate sustainability?

RQ3: Which attitudinal, behavioural and organizational factors can be used to predict corporate sustainability?

3.   METHODOLOGY

In the following chapter, we describe the operationalization of relevant factors, the acquired sample as well as the different steps and procedures of the statistical data analysis.

3.1 Survey structure and variables

To investigate our research questions, we conducted a quantitative online survey using Qualtrics software (Version March 2023; © 2023 Qualtrics, Provo, UT) . Since only a part of the collected data is relevant here and further data is processed in other publications, only the relevant variables for this paper will be presented. Employee-, management, and organization-related factors were either measured with validated scales or derived and qualified from a qualitative pre-study in which semi-structured interviews were conducted with employees

and corporate sustainability experts. All multi-item constructs were measured on six-point Likert-scales (1 = strongly disagree, 6 = totally agree). The questionnaire consisted of the following parts:

a) Sociodemographics: Gender, age, education, job position (leadership, yes or no);

b) Individual attitudinal factors: *Eco-consciousness* (eight items by Geiger & Holzhauer, 2020), *general openness to change* (four items of the scale developed by Szebel, 2015);

c) Individual behavioural factors: To measure employees' sustainable behaviour we adapted the *Organizational Citizenship Behaviour for the Environment* (*OCBE*) scale by Boiral and Paillé (2012) and translated twelve of the originally 13 items into German. *Environmental Transformational Leadership* (*ETL*) was assessed with six items from Robertson and Barling (2000);

d) Organizational factors – Corporate demographics: Company size (up to 9, 49, 249 and more than 249 employees), company age (in years);

e) Organizational factors – Corporate sustainability: Here, participants were asked if sustainability in their organizations is approached in a *top-down* or *bottom-up* way (four items, e.g., "Regarding sustainability, our employees are pushing the issue more than management"), if there is transparent *accountability* for sustainability (four items, e.g., "Our company employs a sustainability expert") and if the company's *image* is perceived as sustainable (five items, e.g., "Sustainability is a guiding principle of our company"). Corporate actions regarding sustainability were measured with 13 items describing different possible areas of sustainable measures (e.g., energy management or mobility) as well as an adaptation of the *Corporate Environmental Policies* (CEP) scale (Ramus & Steger, 2000) extended to 15 items (e.g., "My Company has specific sustainability targets"). For all items of these constructs, the 6-point scales were expanded to include an "I don't know" option. Finally, we assessed the perceived *relevance* of sustainability once across the *overall* company, at the *management* level, and at the *employee* level each on a scale from 0 (irrelevant) to 100 (extremely relevant).

3.2. Sample

Data were collected in March 2023 in Germany. To ensure data quality, we discarded incomplete surveys, speeders (response time below 50% of the median, $Md = 29$ min.), and non-differentiated data sets. As our focus lies on the employee perspective, we omitted 14 data sets from respondents in an executive position. The final sample ($n = 87$) comprised 72% female ($n = 24$) and 28% male ($n = 24$) participants. The mean age of participants was 28 years ($SD = 9.21$), with an age range spanning from 18 to 56 years. With 61% the majority of participants exhibited high educational attainment ($n = 53$), while 38% held medium levels ($n = 33$) and only one percent fell within the lower range of educational attainment ($n = 1$). The determination of educational levels was based on the International Standard Classification of Education (ISCED). Regarding employment relationships, most participants worked full-time (40.23%, $n = 35$), as student assistants or mini-jobbers (37.93%, $n = 33$). Other employment forms were part-time (18.39%, $n = 16$) and short-term employment or internships (3.35%, $n = 3$).

3.3 Statistical analysis

All analyses were computed using R Studio Version 2022.12.0+353. First, we performed descriptive analyses that included calculating measures of central tendencies and dispersions and checked the internal reliability constructs with Cronbach's Alpha. Increased or decreased construct means were statistically validated with one sample t-tests. When evaluating the sustainability measures and policies (s. 4.1), missing values ("I don't know") were not included. On average, there were eleven missing values for each measure and 20 for each policy. As shown in table 1, the sample exhibited an elevated environmental consciousness ($M = 4.76$, $SD = 0.68$) and openness to change ($M = 4.35$, $SD = 0.7$). Except for top-down, which was slightly decreased ($M = 3.14$, $SD = 1.17$), the mean values of all other factors were closely clustered around the scale means of 3.5 and 50 for the relevance factors.

Table 1: Descriptive analysis of attitudinal factors, behavioural factors, and corporate sustainability ($n = 87$)

		M	*SD*	Cronbach's α	Scale
Individual factors	Eco-consciousness	4.76	0.68	0.83	1-6
	Openness to change	4.35	0.7	0.7	1-6
	OCBE	3.38	0.92	0.9	1-6
	Leadership (ETL)	3.3	1.11	0.93	1-6
Organizational factors	Top-down	3.14	1.17	0.71	1-6
	Bottom-up	3.67	1.06	0.8	1-6
	Accountability	3.83	1.47	0.9	1-6
	Image	3.73	1.33	0.95	1-6
	Relevance Overall	55.37	26.53	-	1-100
	Relevance for employees	53.06	24.11	-	1-100
	Relevance for managers	48.82	29.02	-	1-100

Secondly, possible relations between variables were investigated by calculating bivariate correlations (Spearman's rank correlation) . Before performing the regression analysis, we tested the necessary assumptions. Bivariate correlation analysis indicated linearity, while the Breusch-Pagan test confirmed homoscedasticity and low variance inflation factors (VIFs in the range of 1.3-2.1) ruled out multicollinearity. The normal distribution of residuals was confirmed by both visual inspection and the Shapiro-Wilk test.

4. RESULTS

In this chapter, we first provide a descriptive overview of sustainability in the companies surveyed. We then introduce the newly devised Corporate Sustainability Index and present factors that are related to it and predict it. Furthermore, companies are considered separately according to different corporate factors, and preliminary insights into the influence of leadership on sustainability are displayed.

4.1 Descriptive analysis of corporate sustainability practices

In this section the descriptive results of measures that companies have already implemented to enhance their sustainability, as well as the policies employed to integrate sustainability into their corporate culture, are reported.

The most frequently implemented sustainability measures in companies pertained to energy management (M = 4.53, SD = 1.3), waste separation (M = 4.45, SD = 1.4), digitalization (M = 4.35, SD = 1.48), and mobility (M = 4.32, SD = 1.58). These initiatives were widely recognized with more than three-quarters of participants indicating their implementation in their respective organizations. Less prevalent sustainability measures were raising awareness about the current status of corporate sustainability (M = 6.62, SD = 1.58) – e.g., by collecting data on resource consumption –, acquiring knowledge (M = 3.41, SD = 1.64), and adapting their business model to promote sustainability (M = 2.78, SD = 1.69). The response distributions for all sustainability measures can be seen in figure 1.
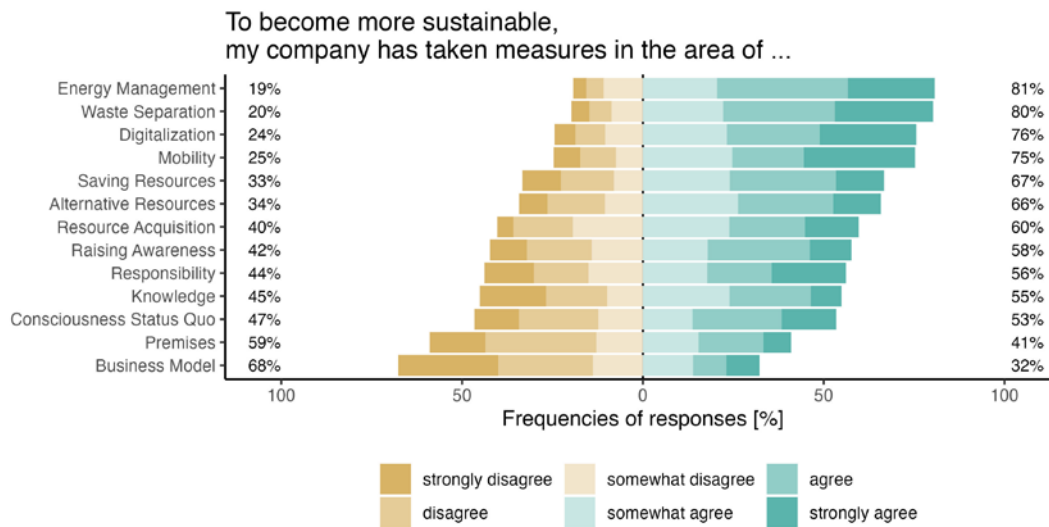

Figure 1: Response distributions for perceived sustainability measures in companies (missing values excluded)

Further, respondents were asked which environmental policies already affect their business activities. The predominant policy emphasized companies' commitment to environmental protection (M = 4.63, SD = 1.31), closely followed by dedication to becoming more eco-friendly (M = 4.47, SD = 1.27) and the pursuit of a sustainability-driven vision (M = 3.86, SD = 1.68). These three policies, in essence, describe overarching attitudes or orientations of companies towards sustainability. More tangible policies were less prevalent in respondents' ratings. Only about a third of the respondents stated that their companies offer employee trainings on sustainability (M = 2.83, SD = 1.86), enforce global environmental standards (M = 2.70, SD = 1.78), and use an environmental management system (M = 2.69, SD = 1.64). As leadership behaviour was identified as an important aspect influencing corporate sustainability, it is worth noting that 58% of respondents reported that their managers consider sustainability (M = 3.58, SD = 1.64). Again, response distributions for all policies can be seen in figure 2 below:
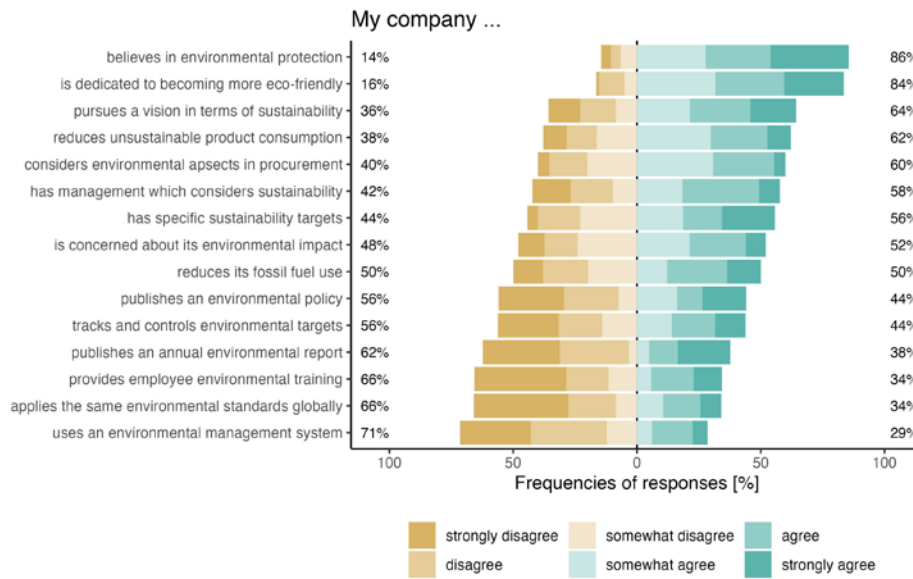
Figure 2: Response distributions for perceived corporate environmental policies (missing values excluded)

4.2 Corporate Sustainability Index (CSI)

As previously stated, various factors such as perceived corporate structures, individual attitudes, and behaviours of leaders and employees influence corporate sustainability. To investigate the interplay between those factors and corporate sustainability, its robust operationalization is a necessary initial step. Therefore, we composed an additive index that comprises sustainability measures and the corporate environmental policies (CEP scale) with 28 items in total. This Corporate Sustainability Index (CSI) reflects a holistic indicator and encompasses both tangible sustainability actions as well as the integration of sustainability into corporate strategy and culture. In the present study, CEP demonstrated a very high internal consistency ($\alpha = .96$) and was normally distributed ($M = 3.63$, $SD = 0.95$).

4.2.1 Factors correlated to CSI

Bivariate correlations were calculated to determine relations between individual attitudinal and behavioural factors and CSI. Neither the employees' eco-consciousness ($r_s = -.13$, $p = .223$, n.s.) nor their openness to change ($r_s = .07$, $p = .532$, n.s.) or their OCBE ($r_s = .21$, $p = .053$, n.s.) was related to their company's CSI. The only behavioural factor which was significantly correlated to CSI was the management behaviour measured in ETL ($r_s = .66$, $p < .001$). Hence, the more leaders act sustainably and encourage sustainable practices among their employees, the higher is a company's CSI score.
Bivariate correlations for CSI and the organizational factors were also calculated. While the approach of driving sustainability from the management in a top-down manner showed a strong positive association with CSI ($r_s = .70$, $p < .001$), it was not significantly related to a bottom-

up approach (r_s = -.07, n.s.), suggesting that higher CSI levels are not affected by such an approach. Among all evaluated factors, accountability (r_s = 0.76, p < .001) and a sustainable image (r_s = 0.76, p < .001) had the strongest associations with higher CSI levels. Thus, companies with distinct sustainability responsibility structures and a perceived sustainable image had elevated CSI levels. Regarding the perceived relevance of sustainability in the company, an increased overall relevance (r_s = 0.65, p < .001), a higher perceived relevance for employees (r_s = 0.53, p < .001) as well as for managers (r_s = 0.69, p < .001) was significantly related to higher CSI levels. Of these, the perception of how relevant sustainability appears to the management was most strongly correlated with CSI.

Summing up so far, the correlation analysis revealed significant associations between CSI and both leadership behaviour (specifically ETL) and several organizational factors, including top-down approach and accountability.

4.2.2 Predictors of corporate sustainability

In the next step, we conducted a hierarchical regression analysis to predict CSI. Image and the perceived relevancies were not included as predictors, as their relationship to CSI cannot be assumed as causal, e.g., while it is reasonable that more sustainable companies also would have a more sustainable image, this is not necessarily the reason for their sustainability.

Table 2: Results of hierarchical regression analysis on the prediction of the Corporate Sustainability Index

Variables	Model 1	Model 2	Model 3
ETL	0.65***	0.34**	0.15
Top-down		0.44***	0.35***
Accountability			0.54***
Adjusted R^2	0.41	0.51	0.74

Dependent Variable: Corporate Sustainability Index (CSI); Asterisks indicate level of significance (*p < 0.05, **p < 0.01 =, ***p < 0.001

Model 1 (with ETL as a predictor) accounted for 41% of the variability in CSI (adjusted R^2 = 0.41; $F(1, 85)$ = 61.4, p < .001). Companies in which the participants evaluated their leaders as more environmentally transformational (β = 0.65, p < .001) scored higher on the CSI. In Model 2 (adjusted R^2 = 0.51; $F(2, 84)$ = 45.6, p < .001) the predictor "top-down approach" was included, which significantly improved the explained variance from 41% to 51% ($F(1, 84)$ = 17.7, p < .001). This suggests that a pronounced top-down approach to sustainability led to elevated CSI scores (β = 0.44, p < .001). ETL remained a significant predictor in Model 2. Lastly, adding accountability as a predictor led to the significant Model 3 (adjusted R^2 = 0.74; $F(3, 83)$ = 80.8, p < .001), which increased the explained variance by 23% up to 74% ($F(1, 83)$ = 73.0, p < .001). Higher levels of accountability as a newly added variable were strongly related to higher CSI levels (β = 0.54, p < .001). Whilst top-down remained a highly significant predictor in model 3, ETL became insignificant. In summary, accountability was the strongest predictor of CSI followed by a top-down approach when integrating sustainability. Although, ETL was strongly correlated with CSI and a significant predictor in the models 1 and 2, it became insignificant in model 3. This diminished significance may be attributed to the limited sample size or potential overlap among the factors. However, multicollinearity checks confirmed it was not a major concern.

4.2.3 Organizational Factors

In a subsequent step focusing on organizational factors, we built two groups regarding company size to analyse if there is a difference between small and medium-sized enterprises (SMEs) with up to 249 employees (n = 43) and large enterprises with 250 or more employees (n = 44) regarding their corporate sustainability. The results of Welsh's two-sample t-test (t(84.6) = -3.29, p < .01) indicated that large enterprises (M = 3.95, SD = 0.94) are more progressive in terms of sustainability and thus have a significantly higher CSI than SMEs (M = 3.31, SD = 0.86).

Due to the substantial disparity in group size based on company age, we describe them descriptively to highlight some interesting results. Both companies under five years old (n = 3, M = 3.89, SD = 0.26) and companies between five and ten (n = 8, M = 4.00, SD = 0.85) years old scored similarly to the scale mean of 3.5 in terms of CSI. Due to the small sample size of five participants working in companies between ten and 20 years old (n = 5, M = 2.64, SD = 0.94), and an outlier, no reliable conclusion can be drawn about the sustainability of companies in this age range. Companies over 20 years old (n = 61, M = 3.72, SD = 0.98) had similar scores to the first two groups but had more variability.

4.3 Initial insights: Leadership's role in sustainability

While this paper mainly discusses the effects of the employee sample on corporate sustainability, this section briefly explores individuals in leadership or management roles (n = 14), as our results imply a significant role of leaders in corporate sustainability. The sample comprised eight male and six female participants in leadership positions (age: M = 37.5, SD = 14.79, 24-62 years). Notably, leaders had a higher environmental consciousness (M = 4.86, SD = 0.9) and openness towards change (M = 5.02, SD = 0.66) in comparison to employees (s. 3.2). Additionally, leaders scored higher on the OCBE scale (M = 3.95, SD = 1.14). When comparing bivariate correlations, leaders' OCBE correlated highly significantly with CSI (r = 0.78, p < 0.001) – in contrast to the employee sample (n.s., s. 4.2.1). This indicates that higher OCBE levels among leaders are linked to greater sustainability within their organizations. When comparing the two samples, the leadership sample showed a higher variability (M = 4.03, SD = 1.32) in CSI.
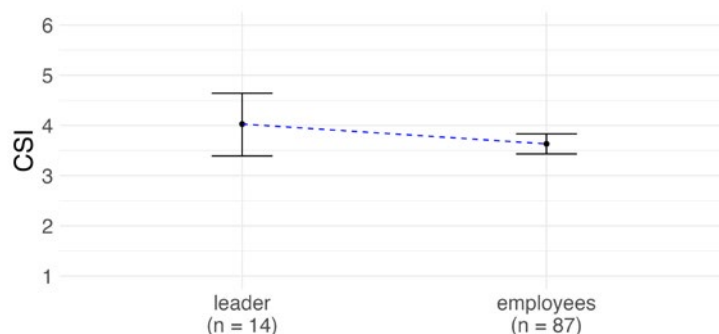

Figure 3: Mean CSI of leaders and employees (error bars indicate 95% confidence intervals based on bootstrap)

5. DISCUSSION

This study explored the factors influencing corporate sustainability, emphasizing the roles of both individual factors (attitudes and behaviours) and organizational structures. We conducted a quantitative online survey and developed the Corporate Sustainability Index (CSI). Our analysis highlighted the impact of leadership behaviour (ETL) on corporate sustainability. Organizational factors such as a top-down structure and clear accountability further acted as strong determinants of sustainability levels. Larger enterprises showed a greater inclination towards sustainable practices compared to SMEs. The exploratory observations on leaders highlighted their heightened environmental consciousness, environmental citizenship, and their potential to shape an organization's sustainability efforts. These results, methodological limitations, and future research steps are discussed according to the impact of individual factors (RQ1), organizational factors (RQ2), a nd their holistic impact on corporate sustainability (RQ3).

Prior research stressed the role of **individual** employee **factors** for corporate sustainability (e.g., Biswas et al., 2022). In contrast, our results challenge the notion that individual attitudinal factors such as eco-consciousness, openness to change as well as pro-environmental citizenship (OCBE) directly impact a company's sustainability. This discrepancy could arise from differences in measuring corporate sustainability or our approach of directly correlating individual factors with CSI, rather than considering OCBE as a moderating factor. Future research should take a closer look at these relationships in order to understand how companies' strategies for sustainability measures can be effectively promoted. Apart from employee behaviour, leadership behaviour appeared to significantly impact corporate sustainability. As a novelty, we examined the direct influence of ETL on corporate sustainability, whereas prior research mainly focused on ETL as a mediator, e.g., for OCBE (Foo et al., 2021). The strong impact of leader behaviours on corporate sustainability, in comparison to employees without leadership tasks, may lie in the managerial capacity to implement more extensive measures due to their hierarchical position, but also the effect of strong role models that influence employees' opinions, attitudes, and behaviours. Regardless of the importance of leadership behaviour, 42% of participants still stated that their management does not consider sustainability in their actions, yet. Furthermore, managers' OCBE exceeded that of employees' and positively correlated with CSI, although these are preliminary findings due to the small sample size. The higher variances in the leadership sample may indicate the effect of differential factors. To validate these findings and contribute to the limited research on sustainability leaders' characteristics, further research should focus on sustainability leaders as a target group. Building upon the results of Knight and Paterson (2018), who identified personal expertise and influencing skills as defining behaviours of sustainability leaders, we suggest investigating these individual factors as possible CSI predictors. Overall, our results underscore the relevance of individual leadership behaviour and the importance to train and sensitise leaders, who drive sustainability transformations in their respective companies. In the context of sustainability education, Haney et al. (2020) propose to focus on leaders' emotional engagement and moral obligation with respect to sustainability.

One of our aims was to develop a methodology for measuring corporate sustainability. The operationalization of our newly introduced **sustainability index** encompasses both specific sus-

tainability measures and corporate environmental policies, demonstrating strong internal consistency. To validate the CSI, it should be incorporated in future studies. To mitigate biases arising from participants choosing the "don't know" option when answering CSI items, we recommend focussing on leaders responsible for sustainability decisions in companies. The transparency of these measures might further be reduced by insufficient sustainability communication (Genç, 2017), w hose impact on CSI is another area for future research.

Clear accountability emerged as the most influential **organizational factor** predicting sustainability, indicating that companies with greater sustainability assign and communicate responsible persons for sustainability (e.g., Ludwig & Sassen, 2022) . As accountability has not been addressed in the literature so far, this study contributes to current research on the strategic approach to sustainability. The findings implicate that companies should recognize the need for diligently steering the accountability of corporate sustainability, e.g., by installing management-centric approaches. Given that only 56% of respondents recognize designated roles being responsible for sustainability within their companies, it is crucial for companies to clearly identify and communicate responsibilities (be it an individual, team or department). We suggest that accountability should be incentivized or become mandatory for companies above a certain size or annual turnover with the corresponding resources.

Another important finding is that companies with a top-down approach, with clear responsibilities for sustainability, ETL, and a sustainable image achieve a higher CSI value. This underscores the need to make sustainability an integral part of corporate culture (Siyal et al., 2022). Conversely, bottom-up approaches did not affect CSI, suggesting that such initiatives do not enhance corporate sustainability. We assume that bottom-up approaches are comparably small measures without visible impact on sustainability. In our sample, sustainability was approached rather bottom-up than top-down, which highlights the importance of management-driven approaches. Finally, larger companies (250 or more employees) demonstrated higher CSI values, highlighting the necessity of integrating sustainability as a foundational element and assigning responsibilities, even in smaller companies with fewer human and material resources available.

6.   CONCLUSION

In this study, we investigated the factors influencing corporate sustainability. Our findings emphasize the pivotal role of leadership behaviour and transparent accountability. They underscore the need for a management-driven approach and for embedding sustainability in the corporate culture. For future research, we suggest focusing on the characteristics of "sustainability leaders" as they drive the corporate transformation supporting a more sustainable society. The complex interplay of factors highlights the challenges of promoting corporate sustainability (e.g., by leadership training) .

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