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Environmental initiatives in organizations: the effects of employees' perceptions of the costs and benefits on increased participation

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Abstract

Purpose – Employees play an essential role in the implementation and success of organizations' environmental initiatives (EIs). This study tested an expanded theory of planned behavior (TPB) model of employees' participation in their organizations' EIs, examining the effects of employees' perceptions of the costs and benefits of participation (to themselves, their organization and society) on their attitudes to participation, intentions to increase participation and reported increases in participation two months later.

Design/methodology/approach – Aligning with TPB research best practices, purpose-specific scales were developed and piloted. A sample of 206 employed US workers then completed a survey measuring the model's variables. Two months later, 110 participants completed an additional survey measuring increases in initiative participation.

Findings – Confirmatory factor analysis demonstrated a good fit between the data and the measurement model. Structural equation modeling similarly demonstrated a good fit with the theoretical model. Personal and organizational benefits predicted attitudes to participation in EIs and indirectly predicted intentions to increase participation. Personal, organizational and societal costs and societal benefits, showed limited predictive ability.

Originality/value – Employees' cost and benefit perceptions are understudied antecedents to workplace pro-environmental behaviors. Our unique model, including costs and benefits at the personal, organizational and societal level, was supported and provides a foundation for further research on costs' and benefits' effects on initiative participation. Drawing employees' attention to personal and organizational benefits of initiative participation through internal marketing, or enhancing actual benefits, may increase participation and help organizations to achieve their sustainability goals.

Keywords Environmental initiatives, Costs, Benefits, Pro-environmental behavior, Theory of planned behavior, Employees

Paper type Research article

1. Introduction

A considerable volume of historical and current greenhouse gas emissions, which contribute to climate change, are directly or indirectly caused by companies and business-related economic activity (CarbonMajors, 2024; Office of High Commissioner for Human Rights, 2020). Organizations are called to identify, prevent, mitigate and be accountable for activities that results in environmental harm or impedes communities' access to a clean, healthy and sustainable environment as a human right (Boyd, 2024; United Nations Human Rights Council, 2011). As a result, organizations are increasingly pressured and self-motivated to engage in environmental

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initiatives (EIs) that reduce their environmental impact as a part of their broader corporate social responsibility (CSR) strategy (Endrikat *et al.*, 2021; Wells *et al.*, 2018). In support of this strategy, organizations can benefit from insights into how to encourage employees to participate in EIs, reducing a barrier to sustainable action (Yuriev *et al.*, 2020a, b; Wells *et al.*, 2024).

EIs are formal or informal, and voluntary or mandatory, programs or actions in organizations (e.g. conserving energy) that benefit the natural environment and contribute to environmental sustainability (Boiral *et al.*, 2015; Ones *et al.*, 2015). Such initiatives often depend on employees' behaviors, and employees can play an important role in identifying opportunities for innovation and implementing pro-environmental changes (Boiral and Paillé, 2012). To reach their environmental goals and ensure EIs' success, organizations need to align employees' and organizations' goals and actions (Paillé and Valéau, 2022), which may be achieved through following green human resource management practices (Sathasivam *et al.*, 2021). Employees' motivation to engage in EIs is, therefore, a microfoundation of organizations' overall pro-environmental behaviors (PEBs) (Unsworth *et al.*, 2021).

Antecedents to employees' PEBs, such as attitudes to initiative participation, are an important research topic given the effects on organizations' pro-environmental efforts and the management of such initiatives (Norton *et al.*, 2015; Rasheed *et al.*, 2020). While antecedents to PEBs have been addressed in some workplace studies and in the broader CSR literature (Gond *et al.*, 2017), the present study addresses a specific gap in research on employees' attitudes to EI participation by examining employees' perceptions of EIs' costs and benefits, and the subsequent effects on their EI participation.

Workplace PEBs are often discretionary, and employees' efforts beyond simple compliance must be understood in order to increase EI participation (Boiral *et al.*, 2015; Wells *et al.*, 2024). According to Ajzen's (1991) theory of planned behavior (TPB) (Figure 1), employees form an attitude toward an action, like EI participation, by weighing its costs and

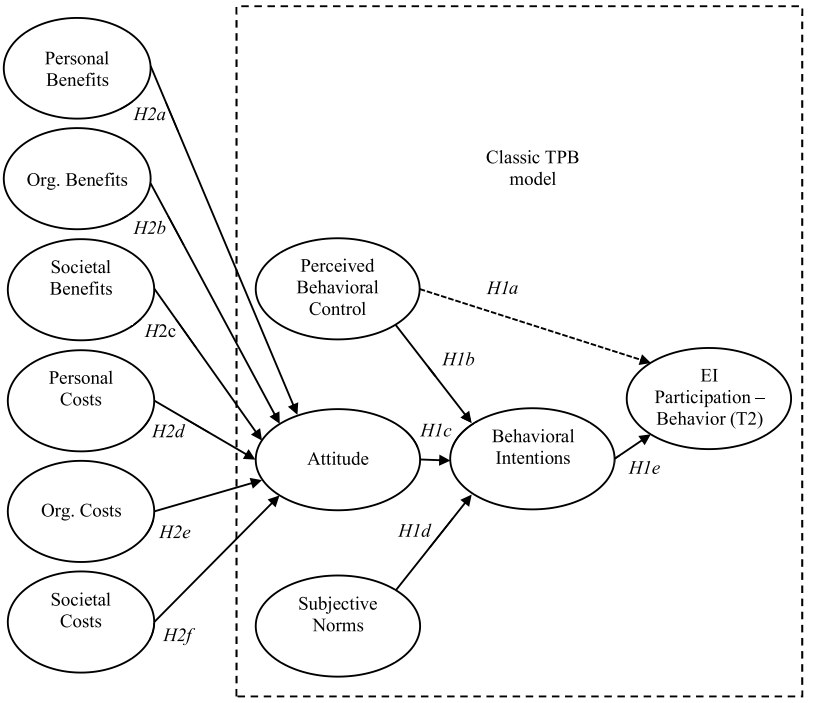

Figure 1. Costs and benefits to the environmental initiative-related pro-environmental behaviors model. Source: Authors' own work

benefits. The TPB has been applied in workplace PEB studies to explain employees' attitudes to and actual engagement in PEBs (Yuriev *et al.*, 2020a). However, the role of cost and benefit perceptions is often assumed or excluded from PEB workplace research and has not been systematically studied (Allen, 2023). Cost-benefit perceptions seem likely to influence EI participation, justifying further research. Goal framing theory suggests that employees will consider the costs and benefits of a behavior like EI participation to themselves and to others, including the groups they belong to (Lindenberg, 2001; Lindenberg and Steg, 2014), such as their organization or society. This study, therefore, directly tested an expanded version of the TPB that states that employees' perceptions of the costs and benefits of EI participation, at both the individual and group level, influence their attitudes to and participation in EIs.

Meaningful models and measures of employees' EI-related attitudes and behavior enable greater understanding of workplace PEBs, ultimately aiding organizational leaders when designing and managing EIs as part of their broader CSR programs (Gond *et al.*, 2017). Yuriev *et al.* (2020a) reviewed TPB research but identified only 18 workplace PEB studies, noting the "lack of TPB-based studies on pro-environmental behaviors in the organizational context" (p. 9). They noted that many prior studies had substantial methodological flaws, especially incomplete statistical reporting and called for further research. They also criticized studies for failing to develop behavior and context-specific scales, as mandated by the TPB's authors Fishbein and Ajzen (2011). Khalid *et al.* (2022) add that time-lagged workplace TPB studies are rare and bolster study validity. The present study, therefore, responds to this need by systematically developing measures of the components of a cost-benefit model and testing that model. Zulkepeli *et al.* (2024) also encouraged TPB research integrating multiple theories, which we achieve by including the TPB and goal-framing theories. Building on Allen's (2023) qualitative study, which identified EIs' costs and benefits, our study contributes: (1) a unique expanded TPB model, which directly examines personal, organizational and societal costs and benefits as antecedents of attitudes to EI participation, behavioral intentions to increase participation in an EI and increased participation (Figure 1), (2) a unique approach, using behavior and context-specific scales that we developed for the study; and (3) a longitudinal approach by measuring employees' EI participation after two months, demonstrating costs' and benefits' impact over time.

This study, therefore, asked: How do employees' perceptions of the personal, societal and organizational costs and benefits of EI participation predict employees' attitudes to EI participation, intentions to increase participation in EIs and actual self-reported increases in EI participation (measured two months later)? In practice, knowledge of the role of costs and benefits in initiative participation may aid employee-targeted influence campaigns and efforts to increase employees' EI participation.

2. Literature review and hypotheses development

2.1 Pro-environmental behaviors

Workplace PEBs form part of a broader stream of research on PEBs. There is less research on PEBs in organizations compared to home, community, or private contexts (Gond *et al.*, 2017; Ruepert *et al.*, 2015; Wells *et al.*, 2024; Yuriev *et al.*, 2020a). Boiral *et al.* (2015) emphasize the importance of studying employees' PEBs by stating that many corporate EIs "rely almost entirely on employees' goodwill and individual behaviors" (p. 12). They define employees' PEBs as "all types of voluntary or prescribed behavior undertaken by individuals at work that aim to protect the natural environment or improve organizational practices in this area" (p. 21). Complementing this definition, Ones and Dilchert's (2012) definition includes behaviors that "contribute to or detract from environmental sustainability" (p. 87). The potential for employees to sabotage or weaken sustainability efforts through remaining passive or disengaged points to the risk of tepid or negative attitudes to EI participation (Rasheed *et al.*, 2020; Wells *et al.*, 2018), resulting from higher perceived costs or low benefits from such actions. For this reason, employee voice in the management of and reporting on sustainability initiatives is important

and even required in some countries (A&L Goodbody LLP, 2024; Crifo and Rebérioux, 2024; Rees and Brione, 2024).

2.2 Theory of planned behavior

According to Ajzen's (1991) TPB (see Figure 1), the likelihood of individuals developing behavioral intentions to or actually engaging in certain behaviors depends on the interaction of: (1) positive or negative attitudes (behavioral beliefs) formed toward outcomes based on the perceived costs and benefits of engaging in a behavior; (2) the social pressure to engage in the behavior (subjective norm), or normative beliefs; and (3) perceptions of the ability to perform the behavior, including factors like task knowledge, skills, self-efficacy, resources and opportunities (perceived behavioral control), or control beliefs. Perceived behavioral control not only predicts behavioral intentions but may also directly predict actual behavior (as a proxy for actual control), as even if an intention exists, an opportunity may not arise, unanticipated circumstances may prevent a behavior, or other appealing behaviors might compete for an individual's energy (dotted arrow in Figure 1). While a behavioral intention does not guarantee engagement in a behavior, reflecting an attitude-behavior gap (Sabbir and Taufique, 2022), previous PEB studies show intentions are strongly correlated with actual behaviors (Klöckner, 2013; Yuriev, 2020a). Although multiple alternative models have been applied in explaining PEBs, such as the norm activation model and values-belief-norm theory (Ruepert *et al.*, 2015; Yuriev *et al.*, 2020a; Zulkepeli *et al.*, 2024), our interest in employees' cost-benefit perceptions as PEB antecedents relates most closely to the behavioral beliefs concept in the TPB. The classic TPB model (Ajzen, 1991) has received positive support, as described above; however, aligning to TPB best practices (Fishbein and Ajzen, 2011), we still tested and confirmed Ajzen's classic model through initial hypotheses (dotted box in Figure 1), as behaviors and contexts are unique and new scales were used in this study:

H1a. Perceived behavioral control has a positive effect on reported increased participation.

H1b. Perceived behavioral control has a positive effect on behavioral intentions.

H1c. Attitude has a positive effect on behavioral intentions.

H1d. Subjective norms have a positive effect on behavioral intentions.

H1e. Behavioral intentions have a positive effect on reported increased participation.

Attitudes or behavioral beliefs "reflect the extent to which performing a behaviour is evaluated positively or negatively" (Ruepert *et al.*, 2015, p. 37), resulting in beliefs about a positive outcome (e.g. reward, fulfillment of needs) expected from an action and the costs (e.g. ease or difficulty) associated with that action (Ateş, 2020). Weighing costs and benefits as consequences of an action is not an entirely conscious process and engages multiple inputs (e.g. past and present experiences). An action's appeal is typically measured through semantic differential items representing the action's net favorability, such as good-bad and harmful-beneficial (Ajzen, 1991).

Klöckner's (2013) meta-analytic study provides a comprehensive estimation of the various effects of the three components (attitudes, subjective norms, perceived behavioral control) of the theory in non-workplace studies, suggesting that they jointly account for 36% of the variance in PEBs across multiple studies. Yuriev *et al.*'s (2020b) workplace study reported that attitudes predicted between 27.4 and 69.1% of the variance in behavioral intentions for two behaviors (making eco-suggestions, taking alternative transport). Zulkepeli *et al.*'s (2024) review reports a range of 46%–61%. Yuriev *et al.*'s (2020a) review of multiple workplace PEB studies found a 27.3% reduction in the variance in actual behavior explained by TPB models when compared to the percentage of variance in behavioral intentions explained by those models. This attitude-behavior gap is not surprising given circumstantial restrictions that

might limit behavior relative to intentions (Fishbein and Ajzen, 2011), as previously explained.

Attitudes relate to specific contextualized behaviors (e.g. recycling at home), rather than global intentions, sets of actions (e.g. desire to help the environment), or values. Antecedents to attitudes (costs and benefits or behavioral beliefs) are not consistently included in many workplace TPB studies (Li *et al.*, 2018; Yuriev *et al.*, 2020b). Few studies include employees' perceptions of benefits. For example, Fatoki (2022) examined personal, organizational and societal benefits in a quantitative TPB study on employees' energy-saving behavior, but did not include costs and only examined one initiative type. Chi *et al.* (2023) and Meng *et al.* (2022) hybrid TPB models included benefits (reasons for) and barriers (reasons against) to participating, examining workers' intentions to engage in sustainable behaviors. In a qualitative study, Allen (2023) generated a taxonomy of the costs and benefits of EIs that employees perceived to come from EI participation personally and for their groups (organization and society). The above studies demonstrate that specific costs and benefits can impact attitudes, perceived behavioral control and subjective norms, however, often only the overall attitude to an action is measured in studies. Information about specific costs and benefits underlying attitudes may assist EI leaders in selecting, designing and communicating about EIs through interventions that maximize participation, per Fishbein and Ajzen's (2011) guidance on encouraging a behavior.

Fishbein and Ajzen (2011) outline a detailed process for developing scales for TPB studies, aligning with the logic that behaviors, their antecedents and their context are unique. Therefore, using existing TPB scales is not recommended without substantial similarity in the studied behavior and context. Yuriev *et al.* (2020a) critiqued past studies for not engaging in scale development. Among other flaws identified by Yuriev *et al.* (e.g. poor statistical analysis and reporting), only 36% of reviewed studies engaged in study-specific scale development. In order to ensure that attitudes, subjective norms, perceived behavioral control, behavioral intentions and behaviors are correctly measured, qualitative surveys must first be conducted to identify antecedent behavioral (attitudes), normative (subjective norms) and control (perceived behavioral control) beliefs for the specific behavior and context (Ajzen, 1991), which are then used in creating items. For this reason and because we could not identify existing scales measuring the TPB constructs suited to this study's context and purpose, it was necessary to develop new scales as described in the methodology.

2.3 Goal frames

Lindenberg and Steg (2014) discuss the situation-specific nature of goals and the influence of group goals on PEBs. Human evolution is used to explain three overarching human goals: hedonic, group and gain goals (Lindenberg and Steg, 2014; Steg *et al.*, 2014). Hedonic goals focus on immediate, self-centered pleasures and avoidance of discomfort. Lindenberg and Steg point to the social nature of human beings, where humans evolved to form groups (e.g. hunting parties) to gain collective goods. This suggests individuals not only consider what is immediately good for them but also for their group (Paillé and Valéau, 2022). Lindenberg and Steg (2007) add a third level of consideration to goal framing, created by the human ability to put themselves in the shoes of others, including their future selves. Gain goals relate to long-term goals which may require sacrifices in hedonic goals to gain future or collective benefits.

Individuals may move between these frames, as temporary mental states, when considering their goals. Goal frames have been experimentally manipulated, showing that individuals change their approach to a game based on particular frames (e.g. cooperation) being emphasized as the goal (Lindenberg, 2008). Individuals with higher levels of commitment to their organization and who identify with its mission might be as concerned about organizational outcomes as personal outcomes, or see them as gain goals, side bets, or ways to maintain group membership resulting in personal benefits (Meyer and Allen, 1991). Another important social group is an employee's broader community or collective, including

family, friends, neighborhood, or nation, adding a further influence over determinations of whether a behavior is beneficial or costly. Group goals are overlooked in the existing workplace PEB research using TPB models, with Allen (2023), Fatoki (2022) and Meng *et al.* (2022) being the only studies identified that directly or indirectly included group frames. Therefore, we included goal frames in our study, where frames refer to the outcomes employees anticipate when focusing on an EI's impact on themselves, their organization, or society.

2.4 Model and hypotheses

Figure 1 displays the structural equation model (SEM) to be tested. This study includes testing the new scales for reliability, validity and other psychometric properties, including using confirmatory factor analysis (CFA). Aligned with TPB best practices (Fishbein and Ajzen, 2011; Khalid *et al.*, 2022), the study collects data at two time points to identify if behavioral intentions predict increased participation after two months, an approach missing from many studies.

Following the reasoning, and after validating the proposed measure and model, this study tested the following novel hypotheses regarding costs and benefits in the personal, organizational and societal frames:

H2a. Personal benefits have a positive effect on attitudes.

H2b. Organizational benefits have a positive effect on attitudes.

H2c. Societal benefits have a positive effect on attitudes.

H2d. Personal costs have a negative effect on attitudes.

H2e. Organizational costs have a negative effect on attitudes.

H2f. Societal costs have a negative effect on attitudes.

These hypotheses add detail to the TPB model. Insight on the relative role of costs and benefits in the three frames, and on the overall factorial validity of the model, advances theorizing about employees' EI participation and TPB models. It may also aid effective EI design and implementation in practice.

3. Methodology

3.1 Scale development

Scales were developed for this study to measure: (1) personal, organizational and societal costs and benefits of EI participation, (2) subjective norms, perceived behavioral control and attitudes related to EI participation, (3) behavioral intentions to increase participation in the EIs and (4) increased reported EI participation (at two months). Ethical clearance was received before the studies began. An initial pilot survey with open-ended questions was used to develop items, aligning with Fishbein and Ajzen's (2011) scale-development guidance. Allen's (2023) qualitative study with 120 US employees also provided a list of costs and benefits to compare our pilot survey's findings against. Successive pilot surveys included 60, 60, 60 and 50 anonymous and voluntary US participants, exceeding Fishbein and Ajzen's (2011) recommendation of 30 per pilot. The study's main sample is separately described in Section 3.3. All pilot participants were recruited through Amazon Mechanical Turks (MTurks) and compensated for participating at approximately double the US federal minimum wage. MTurks is a crowdsourcing website for recruiting and hiring workers for specific tasks, which has grown in popularity for sourcing research participants (Aguinis *et al.*, 2021). This site allows participation criteria to be set when recruiting participants, including employment status and location. Respondents were required to be recently employed at an organization where they participated in an EI. Participants in pilots were excluded from the main study.

Aligning with Aguinis *et al.*'s best practices for using MTurk samples, participants were screened using mechanisms such as filters for US workers, reCaptchas (bot prevention), manual researcher reviews of data for automated and irrelevant responses and thorough reviews of open-ended written responses to ensure data quality and English literacy. Participants wrote an initiative description paragraph, which allowed us to identify irrelevant, inattentive, inconsistent and inauthentic responses.

The pilot studies' goals were to: (1) elicit qualitative input for initial item pools, and (2) reduce item pools using analysis of item and scale properties (e.g. normality, inter-item correlations, Cronbach's alpha and exploratory factor analysis). For example, for perceived behavioral control, participants were asked, "Please list any factors or circumstances that would make it easy for you or encourage you to participate in this environmental sustainability initiative in the next year." Items were generated from participants' responses to the open-ended questions, following Fishbein and Ajzen's (2011) and Hinkin's (1998) recommendations, by content analyzing responses to identify modal responses. These responses allowed us to generate item wording for each scale representing the construct. For example, for perceived behavioral control, a lack of time was frequently mentioned, leading to the first perceived behavioral control item (see Table 1). Items were then reviewed by five experts for face and content validity, edited and were tested in pilots as described below.

Initial pilots demonstrated invariance and skewness for some items, suggesting that participants generally (>80%) held positive attitudes toward their EIs. Rewording items corrected this problem. For example, behavioral intentions items were adjusted to focus on the intentions to increase participation in EIs or give additional personal or discretionary time to EIs, in line with extra-role behaviors (Lamm *et al.*, 2013). Similar to Allen (2023), participants identified fewer organizational and societal costs, often stating "no costs" for EIs. Some participants initially identified costs and benefits only relevant to specific contexts or initiatives. For example, a few initiatives resulted in a personal financial cost or benefit. Therefore, more broadly applicable cost and benefit items (e.g. a sense of belonging through participating) were selected to ensure item relevance. The chosen items were not intended to represent all possible costs and benefits exhaustively, but rather to serve as indicators of cost and benefit within their frame (personal, organizational, societal) for model testing. Attitudes are products of multiple influences and may not be entirely captured by what study participants consciously list as costs and benefits (Fishbein and Ajzen, 2011). In fact, Fishbein and Ajzen recommend only considering costs and benefits that come to mind first, rather than considerations that are afterthoughts or arise when prompted by the researcher. For this reason, during piloting, some costs and benefits listed by Allen (2023) were not added when they were discovered to be infrequently endorsed or unrelated to participants' attitudes. Attitudes are typically measured as an overall perception of favorability, and there are limitations to deconstructing the costs and benefits that contribute to attitudes, as some might be outside of conscious thought at the time of behavior. However, it is reasonable to assume that identified antecedent costs and benefits are likely contributors and suited to exploring the model.

3.2 Instrumentation

The final items developed for this study are included in Table 1. The cost and benefit items used a Likert scale ("1- Strongly agree" to "7 - Strongly disagree"). The remainder of the items used seven-point semantic differential scales with varied scale anchors (shown in Table 1). The time 1 (T1) survey included an introduction, a consent form, demographic and initiative-related questions and the scales. Participants selected and described a specific EI as the focus for all remaining questions, ensuring they drew upon more accurate situational memories about a specific EI rather than their general environmental dispositions. Cost and benefit items were presented last to reduce priming participants' responses to the attitude and behavioral intentions items, with the item order within each frame alternating between costs and benefits to increase careful consideration of each item (Podsakoff *et al.*, 2003). The time 2

Table 1. Item and scale descriptive statistics

Measurement items	M	SD	Item factor loading	α	AVE
Personal benefits	2.61	1.15		0.82	0.60
1. Created a sense of community and/or teamwork in the workplace for me	2.73	1.42	0.71		
2. Made me feel like I am really making a substantial difference to the environment and society	2.49	1.29	0.79		
3. Increased my pride in and commitment to my organization	2.62	1.31	0.84		
Personal Costs					
1. Resulted in inconveniences for me	5.13	1.72	1		
Organizational benefits	2.59	0.99		0.75	0.51
1. Increased employees' positive attitudes toward the organization	2.64	1.17	0.79		
2. Boosted the organization's public reputation or image	2.81	1.30	0.71		
3. Supported the organization in achieving its mission or values	2.33	1.18	0.60		
Organizational costs	5.41	1.28			
1. Slowed the organization's productivity	5.24	1.59	0.60		
2. Led to some criticism of the initiative or organization	5.59	1.45	0.70		
Societal benefits	3.02	1.17			
1. Benefited the local economy	3.31	1.38	0.64		
2. Enhanced community health, safety, well-being, or quality of life	2.73	1.27	0.86		
Societal costs					
1. Only had positive effects on the community or on society. (Reverse scored)	5.32	1.28	1		
Attitudes to participation	2.34	1.21			
1. For me, participating in this environmental sustainability initiative in the next year will be: (*Enjoyable* to *Unpleasant*)	2.17	1.14	0.80		
2. For me, participating in this environmental sustainability initiative in the next year will be: (*Interesting* to *Boring*)	2.50	1.49	0.85		
Subjective norms					
1. Other employees and managers would want me to participate in this environmental sustainability initiative in the next year. (*True* to *False*)	1.87	1.15	1		
Perceived behavioral Control	2.06	1.21			
1. I will have enough time to fully participate in this environmental sustainability initiative in the next year (*True* to *False*)	2.17	1.40	0.83		
2. I have the necessary resources and support to participate in this environmental sustainability initiative in the next year (*True* to *False*)	1.94	1.22	0.86		
Behavioral intentions	3.52	1.65			
1. In the next 12 months, if there is the opportunity, I will give up other work projects and responsibilities to participate more in this environmental sustainability initiative. (*Agree* to *Disagree*)	3.77	1.93	0.80		
2. If given the opportunity in the next year, I will volunteer some of my personal time to support this environmental sustainability initiative. (*Agree* to *Disagree*)	3.27	1.87	0.65		
Reported increased participation at two months (T2)	3.51	1.67		0.89	0.74
1. I put additional time into participating in this environmental sustainability initiative. (*Agree* to *Disagree*)	3.48	1.75	0.86		
2. I contributed extra effort to participating in this environmental sustainability initiative. (*True* to *False*)	3.44	1.90	0.99		
3. I participated in this environmental sustainability initiative more than I was required or expected to. (*Agree* to *Disagree*)	3.62	1.89	0.71		

Note(s): All scales have $N = 206$ except Reported Increased Participation (T2), which had $n = 110$. Cronbach's α and AVE are not calculated for one- and two-item scales. Factor loadings (CFA) are standardized. Semantic scale anchors are included in parentheses. All other items used a seven-point Likert scale of "1 - Strongly agree" to "7 - Strongly disagree"

Source(s): Authors' own work

(T2) instrument included three semantic differential items inquiring about respondents' actual increased participation in the EIs in the two months since T1.

3.3 Sample and data collection

The main study's sample was also drawn from MTurk using a more elaborate screening procedure and filters to include only US participants with positive approval rates for previous MTurk tasks. MTurk was chosen to ensure a diverse sample of participants from different organizations and EI types. Potential participants were paid to complete the screening survey, which included reCaptchas (bot-prevention), a reading comprehension exercise and three open-ended questions asking participants to describe their organization, the EIs they have participated in and how they participated in the EIs. Completed screening surveys ($N = 439$) were individually reviewed to exclude poorly written, irrelevant, incomprehensible and automated (bot) responses, of which 254 were invited to complete the main survey, resulting in an 81.1% response rate (206 completed surveys). The open-ended questions were especially useful to determine the relevance of the participants' experiences with EIs and attentive contributions. A minimum sample size of 200 was chosen after reviewing Kline's (2023) guidance and using Soper's (2025) *a priori* SEM sample size calculator for an effect size of 0.3, power of 0.8 and significance of 0.05 (requiring a sample >195). This sample size allows detection of medium-to-large misfit in the overall model, but may not detect small effects in individual paths.

Following TPB research best practices where model components like attitudes and behaviors are measured at different times (Fishbein and Ajzen, 2011), as well as to limit common method bias (see Section 4.3, Podsakoff *et al.*, 2003), increases in EI participation were collected after two months, aligning with a time-lagged design (Khalid *et al.*, 2022). Completed surveys were reviewed and 198 participants were invited to complete a second paid survey at T2, excluding 8 respondents who participated in once-a-year EI events (e.g. tree planting) or whose EIs had ended. The invitation included the participants' EI description from T1 to ensure they focused on the same specific EI. At T2, participants confirmed consent and that they had reread their previous initiative description and participated in the EI in the last two months. The two-month period was selected to prevent loss of participants due to job changes, not responding to requests via MTurks, or similar events, while providing a substantial reporting period. A total of 121 completed responses were received, of which 110 were included (11 indicated no participation after T1).

3.4 Data analysis

In addition to the analyses described above, data were screened for completeness, response patterns and normality. Analysis then relied on CFA to test the factor structure of the measurement model and a full information maximum likelihood SEM in SPSS AMOS to test the overall model and hypotheses, as described below.

4. Findings

4.1 Sample

Of the 206 participants, 57.8% were employees and 42.2% were supervisors or managers. Regarding age, 4.9% were 18–24 years, 37.9% were 25–34 years, 28.6% were 35–44 years, 16.5% were 45–54 years, 9.7% were 55–64 years and 2.4% were above 64 years. Sixty-six percent were male, 31.6% were female, 0.5% were non-binary and 1.9% preferred not to indicate their gender. For tenure at their current organization, 2.4% selected less than a year, 44.7% selected one to five years, 28.6% selected six to ten years, 12.1% selected 11–15 years and 12.1% selected 16 or more years.

Twenty industries were represented with seven exceeding five percent of the sample: finance and insurance (14.1%), retail (8.7%), healthcare and social assistance (8.3%), college,

university and adult education (7.8%), information services and data processing (7.3%), computers and electronics manufacturing (5.3%) and government and public administration (5.3%). Regarding the initiatives, 68.9% said participation was voluntary and 31.1% said required. 96.1% indicated the initiative was ongoing and 3.9% said it had ended. For participation, 51.5% selected daily involvement, 30.6% indicated at least one day per week, 14.1% indicated at least one day per month, 3.4% indicated at least one day per year and 0.5% selected "other."

4.2 Confirmatory factor analysis

After an initial CFA model (all T1 items correlated), some items were removed. Due to smaller samples, pilots relied on analysis per scale (e.g. item-total correlations). Analysis within the overall model ($N = 206$) suggested a few items were cross-correlated with multiple scales or produced non-normal distributions. As TPB scales often include one to three items per construct, removing items was possible (Fishbein and Ajzen, 2011). A subsequent CFA reported a χ^2 of 176.31 (df = 110) and fit indices of CFI 0.961, RMSEA 0.054, TLI 0.939 and SRMR 0.043, suggesting a good fit to the data (Little, 2013). Table 1 includes descriptive data for the final items and scales, Cronbach alphas, AVE and standardized factor loadings (all >0.60). The Cronbach alphas for the three-item scales were above the desired level of 0.70 (Tabachnick *et al.*, 2007) and the AVE was above a 50% threshold (Fornell and Larcker, 1981).

4.3 Common method bias

Common method bias was prevented by concealing the relationships to be examined from participants, respondent anonymity, item format variations (e.g. Likert, semantic differential, reverse scored, varied scale anchors, mixed item order), careful scale development using multiple pilot surveys, temporal separation of data collection of predictor and criterion variables at two times and ordering scales to limit priming effects (Khalid *et al.*, 2022; Podsakoff *et al.*, 2003). Harman's single-factor method (principal components analysis) found 36.89% of the variance in the T1 items could be explained by a forced single factor, below the majority threshold of 50% (Podsakoff *et al.*, 2003). A CFA with an added common latent factor with equalized loadings to items (Podsakoff *et al.*, 2003) reported an unstandardized regression weight of 0.25 and standardized weights between 0.13 and 0.22, also suggesting little evidence of common method bias.

4.4 Model parsimony and factorial validity

To examine whether costs and benefits, and the three frames, were an appropriate structure for the model, various nested models were compared using a χ^2 difference test for the T1 data. This analysis addressed whether the costs and benefits in the three goal frames are multi- or unidimensional. Consideration was given as to whether a more parsimonious representation of the data was possible by: (1) applying a correlation of 1 between costs and benefits within the same frame; and (2) applying a correlation of 1 between the three benefits and between the three costs, respectively. Various combinations within these two nested models were tested. All attempted models demonstrated misfit compared to the original model ($p > 0.05$), except for nested models for the benefit factors.

Nested models with combinations of the benefits factors indicated that fixing the correlation between personal and organizational benefits or between organizational and societal benefits was as plausible as the original model. The three benefit factors were strongly correlated but also logically related, as benefits seem likely to coincide across frames. Using a single benefits factor degraded the model's fit (e.g. CFI 0.901, RMSEA 0.068). Examining patterns of inter-item correlations and AMOS's suggested modification indices pointed to some item wording (e.g. use of the word "community") or commonality in item content that may have exaggerated covariance between the scales. However, improving item wording

seems unlikely to eliminate the correlation, given the logical relationship between personal and organizational benefits. As the more parsimonious model (reducing three benefit factors to one) is as probable as the three separate benefits model, the three separate benefits model was retained, allowing for more nuanced consideration of the latent factors in the analysis. This is also more consistent with goal framing theory, where individuals simultaneously consider benefits in multiple frames (Lindenberg and Steg, 2007). The factorial validity of the initial model with separate personal, organizational and societal costs and benefits appeared to have adequate support and was used in the SEM analysis.

4.5 Structural equation model

The final analysis included the indicator and latent variables in an SEM using the full sample ($N = 206$) with reported increased participation at T2 as the criterion variable (Figure 2). The initial model generated a χ^2 of 307.820 (df = 182, $p < 0.001$) with a CFI of 0.935, a TLI of 0.944 and a RMSEA of 0.058 (90% CI[0.042—0.065]), indicating a good fit to the data. AMOS's suggested modification indices were considered. A single correlation was added between the residuals of the first perceived behavioral control item and the first reported increased participation scale item, as a lack of available time limits employees' ability to commit additional time to an EI. In addition, a tear-down approach was taken to compare a fully correlated model with a full indirect effects model, removing added regression paths after successive χ^2 difference tests ($p > 0.05$) to identify regression paths that would improve the

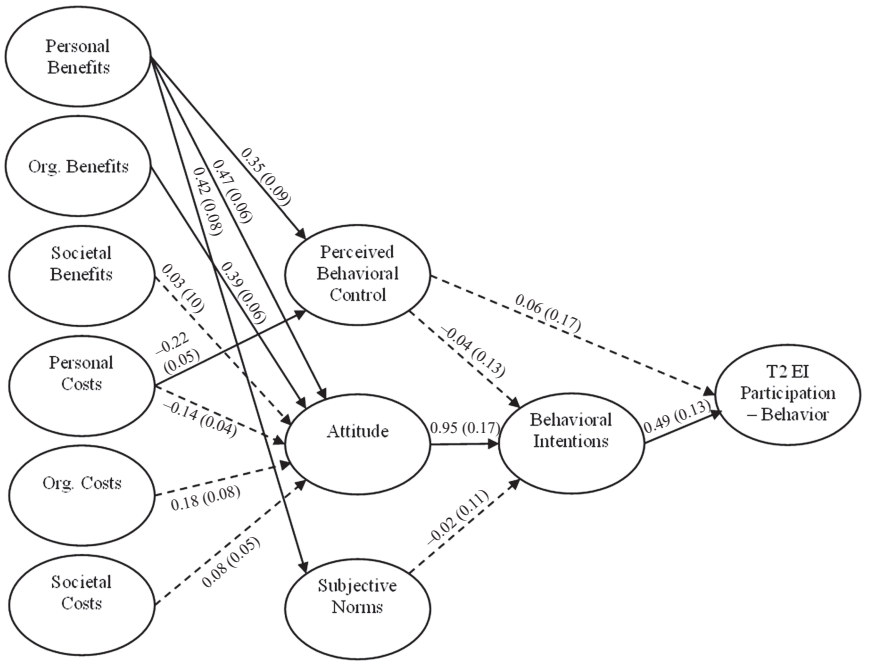

Figure 2. Final structural equation model. Note. EI is environmental initiative. Dashed lines indicate non-significant paths. $N = 206$. Path coefficients are standardized with standard errors in parentheses. Covariance paths are not shown for simplicity. Reported EI participation behavior was measured at Time 2. Significant indirect effects were personal benefits → attitude → behavioral intentions = 0.591 (95% CI: 0.064, 1.207), organizational benefits → attitude → behavioral intentions = 0.623 (95% CI: 0.064, 1.207) and attitude → behavioral intentions → behavior = 0.977 (95% CI: −0.352, 2.748). EI participation behavior was excluded from indirect effects calculations, due to a full information maximum likelihood model with imputed values being used for the overall model analysis with T2 included. Source: Authors' own work

model (Little, 2013). Only three significant paths ($p <$. 001) were retained from this analysis, adding regressions between personal benefits and perceived behavioral control, personal costs and perceived behavioral control and personal benefits and subjective norms. The adjusted model's χ^2 was 254.431 (df = 179, $p < 0.001$), with CFI 0.961, TLI 0.945 and RMSEA 0.045 (90% CI[0.032—0.058]).

Initial examination of the model raised questions about how variance was accounted for between the three benefit factors and the attitude factor, with the initial model showing a strong loading between personal benefits and attitudes (β = 0.80) and a negative, weak loading between organizational benefits and attitudes (β = −0.11). Given the strong correlation between personal and organizational benefits, these loadings were likely an artifact of the correlation between the benefit factors where the majority of the loading was applied to one path and a compensatory loading was applied to the other for the remaining variance. A solution was to equalize the covariances between personal benefits and attitude and organizational benefits and attitude to produce a more interpretable solution and positive loadings for both. This solution also maintained similar fit levels at a χ^2 of 256.771 (df = 180, $p < 0.001$), with CFI 0.960, TLI 0.944 and RMSEA 0.046 (90% CI[0.032–0.058]). A χ^2 difference test reported a nonsignificant ($p > 0.05$) difference in fit between the initial and equalized-path model. Similar models were attempted with different combinations of equalizing the variance between the three benefits and the attitude factor. Only a model with all three paths equalized produced a misfit relative to the initial model. Equalizing the paths between organizational and social benefits produced implausible loadings. Therefore, personal and organizational benefits were equalized, as a comparison of the solutions suggested that personal benefits accounted for the majority of the variance in attitudes and organizational benefits accounted for the second most, supporting H2a and H2b. Equalizing the loadings may slightly influence the regression weights' precision. However, with the strong correlation evident between the benefits, the loadings are likely to be similar across both paths and careful examination of the various equalized models suggested that the model presented in Figure 2 is a good fit to the data, as is theoretically consistent. H2c–H2f were rejected as the paths between the societal benefits and the three costs and attitudes were weak and nonsignificant. Examining the classic TPB model, only attitudes predicted behavioral intentions and behavioral intentions predicted T2 behavior. Therefore, H1c and H1e were accepted, and H1a, H1b and H1d were rejected.

Indirect effects were extracted for the SEM model for the effects of costs and benefits on behavioral intentions (N = 206). Significance of the indirect effects (95% CI, 20,000 replications) was calculated using Selig and Preacher's (2008) Monte Carlo simulation procedure. Personal benefit's indirect effect on behavioral intentions was B = 0.591(CI [0.064,1.207], β. = 422), organizational benefit's indirect effect on behavioral intentions was B = 0.623 (CI[0.064,1.207], β = 0.372) and attitudes' indirect effect on behavior was B = 0.977(CI[−0.3518,2.748], β = 0.462). All other indirect relationships were not significant or below a standardized parameter estimate of 0.20. Pearson's correlation coefficients are shown in Table 2, suggesting that personal and organizational benefits were moderately to strongly related to attitudes, behavioral intentions and behavior. In contrast, societal benefits, personal costs and societal costs showed modest to weak correlations with attitudes and behavioral intentions. Intentions to increase participation (T1) moderately and almost strongly (β = 0.49) predicted reported increases in participation (T2). Analysis of age and gender as controls did not reveal significant effects ($p < 0.05$) on the model.

5. Discussion

This study examined an expanded TPB model proposing that employees' perceptions of an EI's costs and benefits directly influence their attitudes to EI participation and indirectly influence their intention to increase participation and self-reported additional participation after two months. The tested model contributes to current knowledge by enhancing

Table 2. Pearson's correlation coefficients for composite measures

Measure	1	2	3	4	5	6	7	8	9	10
1. Personal benefits	–									
2. Org. benefits	0.69**	–								
3. Societal benefits	0.50**	0.56**	–							
4. Personal costs	−0.36**	−0.32**	−0.09	–						
5. Org. cost	−0.16*	−0.18**	−0.01	0.42**	–					
6. Societal costs	−0.39**	−0.44**	−0.54**	0.18*	0.13	–				
7. Attitude	0.65**	0.56**	0.46**	−0.35**	−0.13	−0.32**	–			
8. Subjective norms	0.38**	0.29**	0.18*	−0.33**	−0.19**	−0.21**	0.31**	–		
9. Perceived behavioral control	0.36**	0.25**	0.17*	−0.41**	−0.21**	−0.23**	0.38**	0.62**	–	
10. Behavioral intention	0.63**	0.48**	0.40**	−0.30**	0.01	−0.20**	0.66**	0.24**	0.28**	–
11. Reported increased participation (T2)	0.43**	0.32**	0.27**	−0.14	−0.01	−0.10	0.34**	0.19*	0.28**	0.46**

Note(s): Correlations between all variables are for the full sample ($N = 206$), except for the behavior measure, which was for the T2 respondents only ($n = 110$) $^{*}p < 0.05$ and $^{**}p < 0.01$

Source(s): Authors' own work

understanding of reasons for employees' EI participation and ways to increase it by explicitly examining personal, organizational and societal costs and benefits as antecedents. In a novel approach, our model applies multiple goal frames aligned to goal-framing theory (Lindenberg, 2001; Lindenberg and Steg, 2014), further clarifying how different types of costs and benefits perceptions predict EI engagement (Allen, 2023). The present study is the first to empirically test such a model. Our approach adds detail to TPB models, where many TPB-inspired models only examine overall attitudes to EI participation without considering specific antecedents to attitudes, or include costs or benefits without a theoretical structure like goal-framing theory's categories.

The scales we developed appeared to be reliable and normally distributed and factorial validity was supported in the CFA, contributing instruments for future researchers to use. Nested models failed to identify a more parsimonious and theoretically viable model to explain the data. The SEM model showed a good fit to the data. Collectively, these findings suggest that the model is plausible and approach to measurement is viable. Costs and benefits appear to be useful predictors of attitudes to participation and behavioral intentions to increase participation.

Overall, our model supports the reasoning of the original TPB model, whereby attitudes predict behavioral intentions and behavioral intentions predict behavior. The present study's findings also provide support for using goal frames (Lindenberg, 2001; Lindenberg and Steg, 2014) in considering costs and benefits, as the six-frame measurement approach (costs and benefits within three frames) proposed by Allen (2023) fits the data. The costs and benefits in the three frames did not appear to be unidimensional, supporting the separate measurement of costs and benefits in multiple frames. However, only some of the benefits of participation were found to be predictive of attitudes to participation. Personal benefits predicted 22.1% and organizational benefits predicted 15.2% of the variance in attitudes to participation. Societal benefits did not significantly predict attitudes to participation in the SEM model. It appears, therefore, that benefits are a more important consideration than costs, especially personal and organizational benefits. Personal and organizational benefits also indirectly predicted behavioral intentions to increase participation. There was no evidence to support the idea that societal benefits or personal, organizational and societal costs predicted attitudes to participation or behavioral intentions to increase participation. Similar to studies such as Aboelmaged (2021) and Yuriev *et al.* (2020b), subjective norms and perceived behavioral control did not have a significant effect on behavioral intentions. Such effects can vary with contexts and behaviors.

The findings also show that personal and organizational benefits are closely related ($r = 0.69$, $p < 0.01$). An effort was made during the pilot studies to ensure items were distinct between the personal and organizational frames. Although future research might create items that further isolate the variance between personal and organizational benefits, it was evident in participants' responses to the open-ended pilot questions that many perceived benefits are both individual and organizational in nature (e.g. morale, sense of community). It seems unlikely that most initiatives, based on participants' written initiative descriptions, would benefit just the employee or just the organization. For example, commuting initiatives (e.g. using public transport) benefit the individual and organization, but for different reasons. However, some commuting initiatives (e.g. ride-sharing) were stated to be inconvenient for employees but did not appear to have a perceived cost to the organization, pointing to the complexity of cost and benefit perceptions.

It appears that participants focused on their immediate context (personal and organizational benefits), where societal benefits (often long-term or not immediately observed) were not predictive of attitudes and behavioral intentions. Previous research has emphasized the importance of more immediate personal gains (hedonic and egoistic values) versus altruistic or biospheric benefits in motivating PEBs (Steg *et al.*, 2014). Future studies might also consider whether biospheric values (Ateş, 2020; Klöckner, 2013) influence the relationship between costs and benefits and attitudes to EI participation, as societal benefits and costs may be more predictive of participation attitudes for those with strong biospheric values.

Our study, therefore, advances the literature by highlighting the important role of cost and benefit perceptions as antecedents to EI-related attitudes and behaviors, taking a more systematic and theoretically grounded approach by including different goal-frames. Our study provides support for Allen's (2023) proposed cost-benefit antecedents framework, but we uniquely identified the stronger effects of personal and organizational benefits as antecedents. These findings suggest that personal and organizational benefits are targets for leaders' attempts to increase EI participation to meet stakeholders' (e.g. employees, shareholders, public) needs and expectations and deliver on organizations' moral commitments to reduce environmental impact (Crifo and Rebérioux, 2024), which are discussed further under practical implications.

5.1 Theoretical implications

From a theoretical perspective, the present study provides initial evidence of our measures' and model's validity, suggesting both may be helpful in future studies on employees' EI participation. Per Fishbein and Ajzen's guidance (2011), our measures may need to be adjusted to match the specific type of EI and context when used in future studies. The model itself confirms the TPB's major propositions (Ajzen, 1991). Our study contributes to the literature by demonstrating the role of goal frames (Lindenberg, 2001; Lindenberg and Steg, 2014), providing supportive evidence that employees consider costs and benefits in different frames when reflecting on EIs. Categorizing antecedent costs and benefits (Allen, 2023) furthers research into the antecedent conditions leading to EI participation by illuminating the cognitive frameworks that underpin employees' attitudes, intentions and addition. Knowledge of these antecedents can also guide organizations' communication campaigns and interventions to increase EI participation (Gregory-Smith *et al.*, 2015). Our findings, therefore, contribute a more detailed and structured approach for future expanded TPB models, which should include costs and benefits categorized by goal frames.

Personal and organizational benefits appear to have the most predictive value of the measured costs and benefits, suggesting that personal and group gains have the greatest influence on attitudes and show the most promise as variables in future studies of workplace PEB antecedents. To date, the relative role of costs and benefits in predicting EI participation has been overlooked, with the present study being the first to demonstrate that certain benefits have a greater role, while costs appear to have minimal predictive value. While these findings need confirmation, the notion that specific benefits are more influential on EI participation can support effective TPB model building. Further study should consider whether benefits to society, or costs across the personal, organizational and societal frames, are conditionally influential, relying on the presence of other personal (e.g. values) and situational (e.g. cultural) variables or covariates.

5.2 Practical implications

In practice, these initial results suggest that focusing on personal and organizational benefits would be a useful approach when engaging in internal marketing of EI participation to employees (Gregory-Smith *et al.*, 2015; Unsworth, 2015). Initiative leaders might consider conducting focus groups, interviews, or surveys to understand perceptions of specific initiatives, using the 3×2 or six-frame approach (personal, organizational and societal costs and benefits). Our measures can be used as a template for organizations to develop surveys for gathering data from employees about EIs' costs and benefits. There is potential to survey employees about multiple EIs (e.g. using a matrix format with EIs as rows and ratings as columns), allowing comparison of costs and benefits across EIs, which may help with identifying EIs requiring specific intervention to improve perceptions and participation. Organizations might first conduct surveys with open-ended questions to identify relevant costs and benefits to be used in developing rating surveys (see Allen, 2023). Focus groups and interviews may also add rich data from interactions during employee questioning. Qualitative

and quantitative data collected from employees can then support organizations in targeting employees' perceptions of EIs' costs and benefits to improve attitudes to EIs, intentions to increase participation and actual participation.

Gathering input from employees also provides a more complete understanding of the costs and benefits in each frame, motivating employee actions. Such an approach may allow organizations to identify more powerful intrinsic motivators (e.g. implicit satisfaction or fulfillment from engaging in PEBs), rather than relying solely on extrinsic motivators such as rewards, where extrinsic motivators' effect can become exhausted (Sabbir and Tafique, 2022). Organizations can then draw attention to applicable benefits, increase certain benefits and reduce costs, if those costs are barriers to participation (Allen, 2023).

Like Gregory-Smith *et al.* (2015) and Wells *et al.* (2024), we would recommend that organizations consider various approaches to internally marketing the benefits of EIs including: sharing information on the organization's negative and positive environmental impacts and connecting them to specific EIs to highlight participation benefits; sharing other employees' accounts of benefits of EI participation in their own words through e-newsletters, posters, or internal social media to inform other employees about benefits in an authentic way; using rewards or awards to acknowledge employees for getting and staying involved in EIs (without exhausting this extrinsic motivation strategy); sharing media reports and other information about EI developments and impacts (e.g. improvements made, energy saved, paper recycled); and using promotional e-flyers or emails to inform employees about personal, organizational and societal benefits to participation. While costs were not shown to have a major influence in our data, in specific circumstance organizations may want to identify barriers to participation such as inconveniences (e.g. poor access to recycling bins, challenges experienced with commuting programs) and could share information about efforts to reduce those inconveniences to overcome resistance to participation. For example, lack of skill or confidence may be a barrier (Fishbein and Ajzen, 2011) which could be improved through training workshops. Leaders can play a role by identifying costs and benefits from their interactions with employees, which can be shared with EI leaders. Wells *et al.*'s (2024) approach to understanding the unique clusters of employees present in the workforce (based on personal demographics and characteristics like age or personality) resonates with and adds to our suggested approach by enabling tailored efforts to encourage employees to engage in EIs.

It would, therefore, seem advisable to make it both an organizational policy and practice to actively communicate with employees about their perceptions of the costs and benefits of EIs on a regular basis (e.g. biannually), giving them a voice in matters of sustainability (Crifo and Rebérioux, 2024; Rees and Brione, 2024). This can include delegating responsibility to HR, EI leaders, or managers to regularly gather data about employees' perceptions and communicate further information to employees that might improve participation, including benefits in the three frames.

5.3 Further research and limitations

Some issues worthy of further research have been outlined above in the context of the findings, but others are noted here. The present study's sample may not be large enough to allow detection of small effects in paths in SEM analysis. Samples that include heterogeneous features (e.g. multiple industries, broad age ranges) may require larger samples to compensate for numerous sources of variance (Bell *et al.*, 2022). Therefore, further study with additional larger samples, including experimental and quasi-experimental studies, are needed to confirm the present study's findings. Crowdsourced samples can have limitations such as self-selection bias and individuals misrepresenting themselves (Aguinis *et al.*, 2021). As described in the method, we included additional screening to address these concerns; however, future studies might include non-crowdsourced samples.

Studies are needed applying the scales and model in homogeneous samples or contexts (e.g. studies within single organizations or EIs), as opposed to the broader class of EIs this study

examined, to determine if unique relationships exist for different types of initiatives or organizations. Multiple case studies might allow comparison of the relationships in different organizational cultures and social contexts. Our sample was predominantly male (66%), with under 10 years (73.3%) tenure, which needs to be compared with findings for longer-serving and gender-balanced samples. As the present study's sample was purposeful, focusing on a US sample of employees already involved in EIs, the results only apply to similar contexts and organizations. Further studies are needed in other national cultures and subcultures and with employees not yet participating in EIs to determine the relevance of our study's findings.

Studies that include personal norms (Li *et al.*, 2018) may clarify whether societal benefits and costs are more strongly related to attitudes, behavioral intentions and actual behaviors for employees with strong biospheric values. The present study employed a more general societal frame (society-in-general), where future studies might focus on specific and named groups that the employee is a member of (e.g. local community around a facility), where societal costs and benefits can be measured in a less general and more context- and initiative-specific way. Triangulation of employees' self-reported participation with data from the organization (e.g. EI leaders' reports of participation) would further validate the study's predictive findings.

5.4 Conclusion

While various factors influence an organization's environmental impact, employees make an essential contribution to their organizations' environmental sustainability through their input, innovations and daily work practices (Paillé and Valéau, 2022). The present study highlights the importance of employees' perceptions of personal and organizational benefits in forming attitudes to workplace EIs. Initiative leaders should pay attention to such perceptions in order to maximize employee participation. In particular, drawing employees' attention to benefits, such as through internal communication channels where there is a lack of awareness of benefits, or through increasing specific benefits, seems likely to improve employees' attitudes to participation and actual participation (Allen, 2023; Gregory-Smith *et al.*, 2015). Without information on employees' perceptions of initiatives and personal and organizational benefits, organizations might miss opportunities to correct misinformation regarding benefits, supply information where employees are uninformed of benefits, or intervene where benefits of initiatives are not drawing employees' attention in a way that increases their support of EIs.

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