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Sustainability-focused leadership and pro-environmental behavior in SMEs: through the lens of conservation of resources theory

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Abstract

Purpose – Based on the conservation of resources theory (COR), we examined how sustainability-focused leadership (SFL) influences pro-environmental innovative behaviors (PEIBs) by exploring employee well-being (EWB) as a mediating mechanism. Thus, the study fills the existing gap in research devoted to the impact of leadership styles on PEIBs.

Design/methodology/approach – We used the survey method and collected data from 250 manufacturing SMEs in Poland. We based statistical analyses on PLS-SEM.

Findings – This study revealed that SFL significantly influences PEIBs among SMEs' employees. Moreover, current empirical evidence also confirms the partial mediating impact of EWB on the relationship of SFL with PEIBs.

Originality/value – Considering the substantial significance of innovative behaviors, this study enriches literature in the domain of sustainability-focused leadership and green innovation. We also discuss implications for theory and practice in SMEs operating within the manufacturing sector.

Keywords Innovation, Sustainable leadership, Environmental sustainability, Sustainable development, SMEs

Paper type Research paper

Introduction

Although the first publications addressing the concept of environmental sustainability appeared as early as in the XVIII century (Hallinger, 2020) and the World Commission on Environment and Development (1987) defined the notion of sustainable development in the XX century, academicians and practitioners are still discussing the issues of climate change and scarce resources (Caffaro, Roccato, Micheletti Cremasco, & Cavallo, 2019). To address the environmental challenges, several companies implement practices aimed at minimizing their negative impact on the environment (Piwowar-Sulej, 2022). Moreover, nowadays, we associate competitiveness with the adoption of innovation management that includes sustainability (Kneipp, Gomes, Bichueti, Frizzo, & Perlin, 2019). Eco-innovation means the creation of something new to improve environmental performance. Such improvements may take the form of changes in products, operational practices, processes, business models, thinking, and business systems (Adams, Jeanrenaud, Bessant, Denyer, & Overy, 2016).

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Ethical statement: The research project was approved by the Rector's Commission of the Research Ethics functioning at the Wroclaw University of Economics in Poland (Decision no: 13/2021).

As eco-innovation is a challenging process, understating its barriers and drivers is crucial for its further promotion (Szilagyi, Mocan, Verniquet, Churican, & Rochat, 2018).

Since the author of innovation is always human, companies should enhance the employees' pro-environmental (green) innovative behaviors (PEIBs). Moreover, scholars associate PEIBs with designing and implementing new and useful eco-friendly ideas (Chen & Chang, 2013). They often describe them as extra-role behaviors, which are voluntary activities (not included in the job description and not formally rewarded) (Aboramadan, Kundi, & Farao, 2021; Piwowar-Sulej, Austen, & Iqbal, 2023). As Piwowar-Sulej, Iqbal, Dagar, and Singh (2024) state, several studies exist on the problem of shaping and measuring employees' broadly defined green behaviors. However, the research on the issue of PEIBs remains scarce. We aimed to fill this research gap.

Research has empirically proven that leadership style significantly impacts employees' innovative behaviors (Iqbal, Latif, & Ahmad, 2020a, Iqbal, Ahmad, & Halim, 2020b; Wu, Zhang, Imran, Xu, & Yu, 2021). Although the academic literature distinguishes many leadership types, it is justified to explore the emerging type called sustainability-focused (sustainable) leadership (SFL). Sustainable development requires balancing ecological, social, and economic dimensions (Rosca, Reedy, & Bendul, 2018), and SFL not only reflects true concern about the impact of humans on society and the natural environment but also balances organizational achievements in society, environment, and economy (Iqbal & Piwowar-Sulej, 2023). Moreover, SFL uses a far-reaching vision when decisions are made "to encourage systemic inventions with the intention of increasing customer value" as well as "build a competent, dedicated and very participative staff and provide high-level products, services and resolutions" (Haroon, Sami, Rehman, Fahad, & Irfan, 2019) (p. 2). Previous studies linked various leadership styles, such as ethical (Liu & Zhao, 2019) and environmentally specific servant (Aboramadan *et al*., 2021), with PEIBs. However, while Iqbal, Ahmad, and Li (2021a) found that SFL positively influences environmental innovation, this leadership style was rarely associated with PEIBs before. Piwowar-Sulej *et al*. (2024) have not examined the direct relationship between SFL and PEIBs. However, drawing inspiration from social exchange theory, they demonstrated the impact of SFL on PEIBs through environmental awareness. They also called for more research on how SFL contributes to PEIBs. This constitutes the second promising research gap to be filled in this study.

The more employees are positive about their work, the more likely they are to engage in activities beneficial for the organization and the more likely their creativity is at work (Pot, 2017). According to Wang, Yang, and Xue (2017), recently, an important psychological factor of employees' innovative behaviors, i.e. employee well-being (EWB), has gained researchers' attention. However, its impact on individual innovative behavior has not been fully investigated. This gap especially refers to PEIBs. Meanwhile, EWB describes people's fulfillment, job satisfaction, happiness, abilities, and task accomplishments (Kundi, Aboramadan, Elhamalawi, & Shahid, 2021). Although there are many factors that influence EWB (Biggio & Cortese, 2013), scholars found leadership to be its crucial antecedent (e.g. Gyu Park, Sik Kim, Yoon, & Joo, 2017; Berger, Czakert, Leuteritz, & Leiva, 2019).

We may explain how a leader can impact PEIBs directly and indirectly – by stimulating EWB – with the use of the conservation of resources theory (COR). The COR focuses on phenomena related to individual resources, which cover personal resources (e.g. competencies and personal traits), object resources (e.g. working tools), condition resources (e.g. seniority), and energy resources (e.g. money) (Hobfoll, Halbesleben, Neveu, & Westman, 2018). This theory states that an increase in individual resources (e.g. energy, objects, competencies) leads to proactive employee behaviors – in this case, PEIBs – which are performed to gain more resources. This is in line with the COR principle called "resource gain spiral"/"resource investments" (Hobfoll *et al*., 2018). In turn, considering the COR principle called "primacy of resource loss" (Hobfoll, 1989), resource loss is more prominent than resource gain. Resource loss leads to stress and decreases EWB. However, sustainability-focused leaders focused on

social needs may prevent resource depletion. Consequently, sustainability-focused leaders support employees in gathering resources, which will positively impact the levels of both EWB and PEIBs.

The study had two objectives revolving around a better understanding of the PEIB mechanism. First, we aimed to explore – based on the COR – the relationship between SFL and PEIBs. Second, we investigated the mediating effect of EWB on the relationship between SFL and PEIBs. For such defined objectives, we used literature studies and empirical research. The latter based on a survey conducted in 2022 among SMEs operating in the manufacturing sector in Poland. Why in Poland and why in SMEs? First, there is a need to conduct sustainability-oriented research in the Visegrad Group (V4) countries (Piwowar-Sulej, 2024). Although Poland, as a member not only of the V4 but also the European Union (EU), adopted the EU Circular Economy Strategy, which includes such priorities as bioeconomy, sustainable consumption, sustainable production, and new business models, the carbon intensity of the Polish economy remains high. Moreover, Poland ranks second to last place among the EU countries as far as eco-innovativeness is concerned (European Commission, 2021). Second, although SMEs are the largest contributors to economic activity in most economies (Iqbal, Piwowar-Sulej, & Kallmuenzer, 2024), the theory of innovation lacks a deeper insight into the specifics of SMEs (Kohnová & Papula, 2019). In Poland, SMEs constitute 99.8% of all enterprises (PARP, 2022). They are the dominant force of the Polish economy (providing 49.1% of GDP and steadily increasing their contribution to GDP) and the source of innovation, employment, social inclusion, and growth (Kamba-Kibatshi, 2013). However, SMEs do not receive support from national programs to promote energy efficiency efforts, and, similar to other countries, they have huge financial and informational barriers resulting from weak management quality (OECD, 2020). In turn, traditionally, scholars see companies operating in the manufacturing sector as mostly threatening the natural environment. However, the companies often implement many sustainability-oriented activities (Sartal, Bellas, Mejías, & García-Collado, 2020). Therefore, there is a need to explore the mechanism of PEIBs under the above-presented conditions.

The remainder of this study is organized as follows. The second section will present the theoretical background that led us to the hypotheses development. Next, we will describe the data collection method, items used in the research instrument, and statistical method used in analyses. Then, we will present the results of analyses and hypotheses testing. The fifth section will provide a discussion of the results as well as a number of theoretical and practical implications. The article will end with conclusions, which will include research limitations.

Theoretical background and hypotheses

The relationship between sustainability-focused leadership (SFL) and employees' pro-environmental innovative behaviors (PEIBs)

As presented in the Introduction, scholars acknowledge leadership style as one of the most crucial factors influencing innovations. Some define SFL as a leadership style that has "the aim of producing constant and better results and reducing turnover and absenteeism of employees and last but not the least hastening the inventions and new creations" (Haroon *et al.*, 2019) (p. 1). It accomplishes a balance between the social, environmental, and economic performance of its company. Furthermore, SFL ensures that a company has qualified staff who enable it to survive in crises (Avery, 2005). The analyzed leadership style shares transformational leadership's focus on inspiring and motivating followers and prioritizes involving team members in decision-making, like participative leadership. It builds strong, trust-based relationships with followers like relational leadership, ensures just and fair decisions like ethical leadership, focuses on addressing the needs of multiple stakeholders like responsible leadership, reflects the authenticity of leaders who act consistently with their values and principles like authentic leadership (Iqbal & Piwowar-Sulej, 2022). It integrates aspects of other styles but frames them within a broader commitment to sustainability,

ensuring that decisions and actions contribute positively to future generations while balancing economic, environmental, and social dimensions. Therefore, to explain the hypothesized impact of SPL on PEIBs, one may draw inspiration from research on the above-mentioned leadership styles.

Bahzar (2019) found that green transformational leaders stimulate environmental innovation. Liao and Zhang (2020) provided evidence that responsible leaders encourage green innovation. Avery and Bergsteiner (2011) stated that sustainability-focused leaders require a fostering of systematic innovation, whereas Iqbal, Ahmad, Li, and Li (2022) found that SFL positively impacts environmental innovation. There are also many studies that examined the linkage between different leadership styles and general employees' innovative behaviors (e.g. transformational leadership (Afsar & Umrani, 2019), servant leadership (Cai, Lysova, Khapova, & Bossink, 2018; Khan *et al.*, 2021; Opoku, Choi, & Kang, 2019; Zeng & Xu, 2020), authentic leadership (Yamak & Eyupoglu, 2021). However, less research exists on the impact of a leadership style on PEIBs, which are crucial for environmental innovation (Aboramadan *et al.*, 2021). For example, Ramus and Steger (2000) found that by giving support to their employees, responsible leaders help them find innovative, sustainability-focused solutions. Liu and Zhao (2019) found that ethical leadership stimulates PEIBs, whereas Aboramadan *et al.* (2021) proved that environmentally-specific servant leadership influences PEIBs.

Considering the assumptions of the COR presented in the Introduction, we may state that sustainability-focused leaders create a supportive work environment by promoting values like environmental stewardship, ethical practices, and employee engagement. This leadership style provides employees with psychological resources, such as purpose, meaning, and a sense of organizational support, as well as practical resources like training and tools for sustainability-related innovation. They develop employees' competencies, build a culture of trust, cooperation, and support, care about knowledge sharing, empower people, and create exploratory opportunities (Zhang & Bartol, 2010; Gerard, McMillan, & D'Annunzio-Green, 2017). The support and other resources (such as, e.g. knowledge) given by a leader make employees invest more resources into green outcomes such as PEIBs, which reflects the "resource gaining spirals" (Hakanen, Perhoniemi, & Toppinen-Tanner, 2008). Resources availability encourages people to invest in collecting additional resources (similar to those given by a leader or different – such as, e.g. promotion). Therefore, we developed the following hypotheses:

H1. Sustainability-focused leadership positively relates to employees' pro-environmental innovative behaviors.

The mediating role of employee well-being (EWB) between sustainability-focused leadership (SFL) and pro-environmental innovative behaviors (PEIBs)

The literature associates EWB with health and productivity. As Adams (2019) noticed, many research projects showed that employees who are in good health (physical, mental, and emotional) achieve better results than employees who are not. The EWB level is an important predictor of employees' innovativeness (Pot, 2017), thus, it should also influence PEIBs. In turn, as the COR states, various stressors related to resource loss have a strong negative impact on EWB. Therefore, people need social support. They must have somebody they can rely on, someone who may offer them resources or help collect them (Hobfoll *et al.*, 2018). A leader can act as the main supportive person. They may prevent resource depletion and guide employees in collecting resources, which will positively stimulate EWB (Hobfoll *et al.*, 2018).

Previous research found that transformational leaders motivate subordinates to use resources effectively, reduce job demands, strengthen employees' personal resources, and provide job resources (Diebig, Bormann, & Rowold, 2017; Harms, Credé, Tynan, Leon, & Jeung, 2017), which meet the assumptions of the COR. Ethical, positive, and responsible leadership styles also positively impact EWB (Haque, 2021). Noteworthy, some

characteristics of the above-mentioned leadership styles – as presented in subsection 2.1 – are included in SFL, which covers a shared responsibility to preserve social, environmental, and economic resources (Hargreaves & Fink, 2006). Moreover, it may contribute to EWB – similarly to transformational leadership (Arnold, 2017) – through intellectual stimulation (providing knowledge and provoking creativity), inspirational motivation (providing energy and empowering people), making justice and individualized consideration (focusing on social needs, giving support and developing followers). The shared vision and inspirational motivation could increase task clarity, decrease uncertainty, and increase psychological safety (Avery & Bergsteiner, 2011; Iqbal & Piwowar-Sulej, 2023) by providing knowledge about expected performance, which in turn relates to lower stress levels (Turner, Barling, & Zacharatos, 2002). When employees perceive that their leaders prioritize sustainability and care about their well-being, they feel valued and supported. This leads to enhanced well-being, which can manifest as reduced stress, increased job satisfaction, and a stronger sense of purpose. According to COR theory, we may consider these positive emotional and psychological states "resource gains," which individuals are motivated to conserve and expand. Increasing employees' resources through sustainability-focused leaders is crucial for building employees' strength and, thus, EWB (Di Fabio, 2017). Therefore, we may hypothesize that:

H2a. Sustainability-focused leadership positively influences employee well-being

Well-being encompasses physical, emotional, and psychological health. It represents a state of resource abundance. Employees who feel well experience lower stress, higher energy levels, and greater emotional stability (Umrani, Bachkirov, Nawaz, Ahmed, & Pahi, 2024). According to COR, individuals with abundant resources are better equipped to invest these resources into challenging and resource-intensive tasks (Qian, Zhang, & Liu, 2024). Furthermore, PEIBs – such as developing eco-friendly solutions or optimizing processes for sustainability – require significant cognitive and emotional investment. Employees with higher well-being have more cognitive and emotional resources to devote to tasks (Bourini, Al-Boreeni, & Jamal Bani-Melhem, 2022). High well-being enhances cognitive functioning, including creativity, critical thinking, and problem-solving abilities. Employees with strong well-being are also more open to new ideas, less risk-averse, and more willing to experiment, all of which are critical for innovation (Kim, 2024). They are also less likely to experience resource-draining stress and more likely to channel their energy into proactive, sustainability-driven initiatives. Thus, we hypothesized:

H2b. Employee well-being positively influences pro-environmental innovative behaviors.

SFL spurs EWB by fostering a supportive work environment that aligns with principles of long-term value creation, inclusivity, and ethical practices (Iqbal & Piwowar-Sulej, 2023). As a state of resource abundance, well-being stimulates innovative behavior. Employees with high well-being can "invest" their emotional and cognitive resources into innovation because they are not preoccupied with addressing stressors or conserving limited reserves (Islam, Zulfiqar, Aftab, Alkharabsheh, & Shahid, 2024). Furthermore, COR theory suggests that resource-rich individuals are more likely to engage in behaviors that further enhance their resources (Hakanen *et al.*, 2008). The increase in the resources possessed by an employee may further lead to the "resource gaining spirals" in which the resources availability encourages people to invest in collecting additional resources (Hakanen *et al.*, 2008) through PEIBs. The above led us to the following hypothesis:

H2c. Employee well-being positively mediates the relationship between sustainability-focused leadership and employees' pro-environmental innovative behaviors.

Figure 1 illustrates the research model. We predicted that SFL influences PEIBs directly and indirectly, while EWB is a mediator in the relationship between SFL and PEIBs.

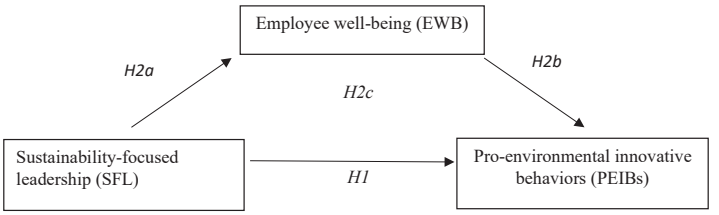

Figure 1. Research model. Source: Authors' own elaboration

Material and methods

Data collection

We used a survey based on the computer-assisted telephone interviewing (CATI) method, which enables accurate data collection and efficient data administration (Lavrakas, 2008). The Biostat research agency (one of the largest research agencies in Poland) collected the data in 2022. According to Statistics Poland (Główny Urząd Statystyczny w Polsce, 2020), the total study population amounted to 338,267 as of December 2019 (companies assigned to section C of International Standard for Industrial Classification of All Economic Activities (United Nations, 2008). The minimum sample size addressed a significant level of 0.05, the power of 0.98, and 5%, as the margin of error was 246 (Naukowiec.org, 2022). This research sample covered 250 randomly selected SMEs operating in the manufacturing sector in Poland, which means that the appropriate sample size was reached. The respondents were line employees engaged in manufacturing processes (one respondent from each company). They participated in this research voluntarily. Due to the specific language in this study, which is related to the issue of sustainability, we directed the questionnaire toward people with secondary and higher education levels. We explained the main notions used in this research to the respondents. In total, 52% of respondents were women. Most of the respondents (46%) had job seniority longer than 10 years and a higher educational degree (84%). The companies were regionally diversified and represented different types of industries (according to the International Standard for Industrial Classification of All Economic Activities).

Measurement

We developed a questionnaire to measure SFL, EWB, and PEIBs based on previous literature. Items related to SFL, EWB, and PEIBs were originally designed in English, and then we translated them into Polish following the "translation-back translation" procedure. We obligated the research agency to adjust and reword the terms to improve the comprehensive understanding of the questionnaire. We also conducted the pretest with 12 potential respondents to refine the scales' clarity.

We used a 15-item scale by McCann and Holt (2010) to measure SFL. Iqbal *et al.* (2022) positively validated this scale. We also used a 4-item scale developed by Brunetto, Farr-Wharton, and Shacklock (2011) and also positively validated in a study by Brunetto, Shacklock, Teo, and Farr-Wharton (2014) to measure EWB. Finally, we developed items related to PEIBs based on the scale designed and validated by Aboramadan *et al.* (2021). We rated all measures on a 5-point Likert scale, and response options ranged from 1 ("strongly disagree") to 5 ("strongly agree").

The extant literature provides sufficient claims about the impact of gender, educational level, and job seniority on green behaviors (Dumont, Shen, & Deng, 2017; Davis, Unsworth, Russell, & Galvan, 2020). Therefore, we took these three variables as control variables.

Methods of analyses

Analytical strategy

Since the current study has a complex framework and is prediction-oriented, partial-least squares-SEM (PLS-SEM) fulfills the objectives, and thus we applied it (Richter, Cepeda-Carrion, Roldán Salgueiro, & Ringle, 2016). The PLS-SEM analysis examines both the measurement model and the structural model. The analysis of the measurement model is a prerequisite preceding structural mode analysis. Furthermore, we also conducted the confirmatory factor analysis to verify the distinctive nature of SFL, EWB, and PEIBs. In this study, we evaluated model fit based on chi-squared, goodness of fit index, comparative fit index, and root mean square error of approximation values.

Analyses and results

Descriptive statistics

In this study, all variables were continuous in nature and we measured them based on a 5-point Likert scale. Mean values of SFL (M = 3.189), EWB (M = 3.394), and PEIBs (M = 3.569) were above 3.0. Based on the mean values criteria for a 5-point Likert scale (Sekaran & Bougie, 2016), we found all these three variables at the moderate level among surveyed SMEs. However, the position of SFL practices in Poland was a little bit above 3.0.

Confirmatory factor analysis

Before running the PLS-SEM analysis, we conducted data screening, which revealed outliers, missing values, common method bias, and normality. The CATI method ensured the absence of missing values in this study. Moreover, we found the Z-score values of all cases to be below 3.29, which indicated the absence of univariate outliers. We also ran Mahalanobis test to multivariate outliers. Based on Mahalanobis test, we deleted two cases from the dataset. We found that the present dataset displayed univariate normality as its skewness and kurtosis values of SFL, EWB, and PEIBs were in the range of ±3 (DeCarlo, 1997). Furthermore, we assessed the multivariate normality based on Mardia's skewness and kurtosis values. In this study, both the Mardia's skewness $(\beta = 0.750, \rho = 0.000 < 0.005)$ and kurtosis $(\beta = 16.751, \rho = 0.011 < 0.005)$ values were also significant. Thus, the dataset also had multivariate normality.

Moreover, we statistically ensured that the dataset was free of any common method bias on the basis of Harman's one-factor test (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003) and correlation matrix procedure (Bagozzi, Yi, & Phillips, 1991). The running of Harman's one factor exhibited that the first factor only counted for 48.12% of the total variance. However, considering the past studies, which reported the insensitive nature of Harman's one-factor test, we also adopted the correlation matrix procedure. Thus, common method bias did not appear as a problem. As per reports of the correlation matrix procedure, the highest correlation between any two items in this study was 0.793, which was less than 0.90. Therefore, both tests confirmed that the current dataset was freer than any common method bias. In the present study, the confirmatory factor analysis validated the fit of the baseline model, which comprised SFL, EWB, and PEIBs. The results were Chi square = 1284.377, CFI = 0.961 > 0.95, GFI = 0.963 > 0.95, SRMR = 0.069 < 0.080, and RMSEA = 0.085 > 0.080, as compared to one-factor, and two-factor models.

Measurement model analysis

In this study, the measurement model comprised only reflective constructs SFL, EWB, and PEIBs. The measurement model analysis examined the indicator, internal reliability, and construct validity in the case of reflective constructs (Hair, Howard, & Nitzl, 2020). The factor loadings of all items in this study lay in the range from 0.496 to 0.897 (see Table 1), which was higher than 0.40 (Chin, 1998). Therefore, all items had acceptable indicator reliability. The

Table 1. Reliability and convergent validity

Construct	Items	Loadings	Cronbach's alpha	Composite reliability	Average variance extracted (AVE)
EWB	EWB1	0.853	0.827	0.886	0.667
	EWB2	0.579			
	EWB3	0.897			
	EWB4	0.895			
PEIBs	PEIB5	0.754	0.905	0.927	0.679
	PEIB6	0.822			
	PEIB1	0.864			
	PEIB2	0.864			
	PEIB3	0.848			
	PEIB4	0.787			
SFL	SFL13	0.583	0.933	0.94	0.518
	SFL14	0.481			
	SFL15	0.558			
	SFL01	0.766			
	SFL10	0.496			
	SFL11	0.600			
	SFL12	0.628			
	SFL2	0.833			
	SFL3	0.754			
	SFL4	0.807			
	SFL5	0.819			
	SFL6	0.823			
	SFL7	0.813			
	SFL8	0.840			
	SFL9	0.820			

Source(s): Authors' own elaboration

present study evaluated the internal consistency reliability of the construct based on both Cronbach's alpha and the composite reliability. They recommended its acceptability, proving that their values were greater than 0.70 (Hair *et al.*, 2020). In the current work, the Cronbach's alpha values of SFL, EWB, and PEIBs were 0.827, 0.933, and 0.905, respectively. Similarly, their composite reliability values were also above 0.70 (see Table 1). Therefore, these three constructs had acceptable internal reliability.

Construct validity takes both convergent validity and discriminant validity into account. There is sufficient acceptable convergent validity provided average variance extracted (AVE) > 0.50 and factor loadings of items >0.70. In this study, the AVE values of all reflective constructs, namely SFL, EWB, and PEIBs were 0.518, 0.667, and 0.679, respectively, which were greater than 0.50 (see Table 1). Hence, these three constructs had acceptable convergent validity. To assess the discriminant validity, we employed the Fornell-Larcker criterion. According to Henseler, Ringle, and Sarstedt (2015), a construct has acceptable discriminant validity, provided that the square root of its AVE value is greater than its corresponding correlation values with other constructs in the study. In the present study, the square root of AVE values of all constructs were greater than their inter-construct correlations. Hence, we did not encounter the issue of discriminant validity. Furthermore, the application of the Heterotrait-Monotrait (HTMT) criterion revealed that the values of HTMT ratios in this study lay in the range from 0.649 to 0.839, which was below 0.85 (Kline, 2015). Hence, SFL, EWB, and PEIBs had acceptable discriminant validity.

Hypotheses test

The analysis of the structural model confirmed that SFL significantly affects employees' PEIBs $(\beta = 0.716, \rho < 0.050)$, (see Table 2). Therefore, we found support for hypothesis H1.

We also confirmed hypotheses H2a and H2b. Moreover, it is prominent to note that for one unit change in SFL practices and EWB, there was a 69.40% variation in PEIBs.

The mediation analysis assesses how an intervening variable alters the impact of an independent variable on the outcome variable (Gunzler, Chen, Wu, & Zhang, 2013). By using Andrew Haye's methodology in SPSS, we examined the mediating impact of EWB based on total, direct, and indirect effect values. The indirect effect (product of path coefficient from SFL to EWB (0.607) and EWB to PEIBs (0.174)) of SFL on PEIBs through EWB was significant, that is, $\beta = 0.106$, $P = 0.001 < 0.05$. Therefore, we accepted hypothesis H2c. Moreover, there is complete mediation, provided that the entry of the mediator reduces the direct effect of the independent variable on the dependent variable to zero (Gunzler *et al.*, 2013). In the current study, the entry of a mediator (EWB) reduced the direct effect of SFL on PEIBs from 0.826 to 0.716. Therefore, EWB played its role as a partial mediator in the "SFL-PEIBs" relationship (see Figure 2). In this study, the total effect of SFL was 0.890, which was a sum of direct effect (0.716) and indirect effect (0.174).

Discussion

Considering the importance of environmental innovation to meet environmental goals and create new business opportunities (Wang *et al.*, 2021), scant empirical research on PEIBs (Piwowar-Sulej *et al.*, 2024), and a need to explore the antecedents of PEIBs (Aboramadan *et al.*, 2021; Piwowar-Sulej *et al.*, 2024), we responded to a question on how sustainability-focused leaders influence employees PEIBs. Based on the COR, we proposed a research framework and tested it to assess the impact of SFL on PEIBs. According to our empirical findings, SFL significantly influences employees' PEIBs in Polish manufacturing SMEs. Beyond the direct effect of SFL on PEIBs, there was also an indirect effect through EWB. Moreover, EWB partially mediates between SFL and PEIBs. These findings advance the current knowledge in the fields of leadership, innovation, and environmental sustainability. They also provide theoretical and practical implications.

Table 2. Hypotheses results

Relationships between examined variables	β	S.D	*T*-value	*P* values	LLCI	ULCI
SFL → EIBs	0.716	0.038	18.799	0.000	0.640	0.787
SFL → EWB	0.607	0.042	14.548	0.000	0.527	0.692
EWB → PEIBs	0.174	0.052	3.381	0.001	0.070	0.272
SFL → EWB → PEIBs	0.106	0.033	3.237	0.001	0.043	0.168

Source(s): Authors' own elaboration

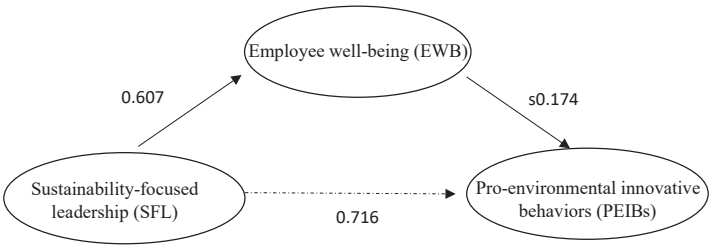

Figure 2. Results of the mediation process of EWB. Source: Authors' own elaboration

Theoretical contributions

Researchers' role is to create "a sense of coherence in the relationships among the variables and processes in the proposed model" (Sparrowe & Mayer, 2011). We created the hypothesized relationships between variables based on the COR, emphasizing the usefulness of this theory in research on PEIBs. Then, we found a positive correlation between SFL and PEIBs. This finding enriches extant literature on the importance of leadership in building environmentally friendly and innovative organizations through shaping appropriate employee behaviors.

As indicated in the theoretical part, previous research found a positive correlation between different types of leadership (e.g. transformational – Afsar & Umrani, 2019) and servant – Khan *et al.*, 2021)) and employees' general innovative behaviors. In turn, research that focused on PEIBs confirmed that responsible (Ramus & Steger, 2000), ethical (Liu & Zhao, 2019), and environmentally-specific servant leadership (Aboramadan *et al.*, 2021) had a positive impact on PEIBs. The present study revealed that higher SFL – which is a more complex leadership style than the above presented – leads to higher levels of PEIBs. Being the first of this kind, this study demonstrated a significant direct impact of SFL on PEIBs. Sustainability-focused leaders equip employees with necessary resources such as support, trust, knowledge, and other competencies and the right to participate in decision-making. On the one hand, PEIBs are the outcomes of these actions. On the other hand, they are also investments in resources because they contribute to gaining new ones (e.g. new knowledge resulting from eco-friendly projects, bonuses for successfully implemented eco-innovation). Initial resource gains will lead to resource gains in the future (Hobfoll, 1989). This emphasizes that through their behaviors related to ensuring appropriate resources to employees who work in manufacturing SMEs, sustainability-focused leaders may not only contribute to the competitive advantages of their companies but also have a real impact on a sustainable future.

This study also extends the theory on the indirect impact of SFL on PEIBs (Piwowar-Sulej *et al.*, 2024). Simultaneously, we followed the recommendation of Wang *et al.* (2017) to explore EWB as a factor for individual innovation behavior. It has provided evidence that EWB not only has a direct impact on employees' PEIBs but also positively mediates the "SFL-PEIBs" relationship. However, the mediation is partial. This finding enriches previous studies that found a positive impact of EWB on employees' innovative behaviors (Pot, 2017) by focusing on a specific type of leadership and innovative behavior. Based on COR, it explains that sustainability-focused leaders prevent employees from resource loss when the latter increases stress and reduces EWB (Hobfoll *et al.*, 2018). Through intellectual stimulation and inspirational motivation (Avery & Bergsteiner, 2011; Iqbal & Piwowar-Sulej, 2022) – which is in line with practices performed by transformational leaders (Arnold, 2017) – they increase psychological safety and reduce work-related stress (Turner *et al.*, 2002). Summarizing, they preserve resources that contribute to EWB.

Practical implications

Scholars expect SMEs to engage in environmental improvements because they are responsible for around 60% of all carbon dioxide emissions and 70% of global pollution (Iqbal *et al.*, 2022). Moreover, Polish SMEs have to raise their competitive advantage to expand and remain in the European Union's market, and modern competitiveness is based on innovative pro-environmental products and processes (Nowak & Szewczyk, 2016). The present empirical pieces of evidence offer numerous implications to managers to foster sustainable development of their companies through eco-friendly innovative activities of their employees.

First, considering the identified moderate levels of SFL and PEIBs and the positive impact of SFL on PEIBs, this study shows that surveyed organizations should promote SFL. It may be performed through recruitment and employment of people having sustainability-focused leaders' characteristics and/or the development of necessary leaders' competencies among currently employed managers. Regarding the characteristics of sustainability-focused leaders,

literature shows that they should be familiar with health sciences, natural sciences, engineering and social sciences (Earth Institute, 2008), and have a high level of cognitive moral development, express benevolence and positive affective states, embrace self-transcendent values, and show empathy (Stahl & Sully de Luque, 2014). As Wesselink, Blok, van Leur, Lans, and Dentoni (2015) stated, the development of interpersonal competencies to lead organizations toward sustainability is of utmost importance.

Second, sustainability-focused leaders should foster an innovative work environment. They must provide employees with resources that fulfill the higher-level needs of employees, such as support, trust, and knowledge (Gerard *et al.*, 2017; Zhang & Bartol, 2010) to enhance their PEIBs (Cho & Song, 2021). They should also build a culture of experimenting (Haroon *et al.*, 2019). By following the principle of the COR called "resource investments," they contribute to PEIBs. Employees receive resources and express PEIBs to gain further resources in the future.

Third, management should keep an eye on the resources whose loss leads to stress and thus decreases EWB because EWB positively mediates the "SFL-PEIBs" relationship. This refers to providing employees with psychological safety (Turner *et al.*, 2002). Leaders should demonstrate true concern for employees as people, promote open communication, actively solicit questions, and be precise with information and expectations (Kim, Lee, & Connerton, 2020). Fulfilling needs reported by employees can lead to providing them with further resources, such as, e.g. flexible working hours or spaces for rest, which directly impact EWB. Moreover, EWB requires regular measurement.

Noteworthy, this study revealed that SFL among Polish SMEs is at a moderate level with $M = 3.189$. However, we found a symmetry to the past studies conducted in other countries. For example, Iqbal, Ahmad, and Halim (2020) examined SFL in three Muslim countries in ASEAN region such as Malaysia, Brunei Darussalam, and Indonesia and the median of SFL was 3.022. In turn, Iqbal and Piwowar-Sulej (2022) reported 3.20 as mean value of SFL practices in higher education institutions in Pakistan and China. Despite visible differences between the above-mentioned countries in their cultural characteristics (Hofstede Insights, 2021) and economic development (The World Bank, 2022), their SFL level is similar. This finding requires special attention from policymakers such as governments and educational institutes. They play an important role in developing eco-innovation and future sustainability-focused leaders. Governments should introduce, among other elements, awareness programs (Hartley, van Santen, & Kirchherr, 2020). In turn, educational institutes should implement appropriate teaching programs such as, e.g. presented by Savage, Tapics, Evarts, Wilson, and Tirone (2015) and Arruda Filho, de, Hino, and Przybylowicz Beuter (2019). Fulfilling the above-presented postulates will impact society.

Conclusions and limitations

This study emphasizes that the field pays increasing attention to the issues of environmental protection and eco-innovation may successfully address this issue. However, there is no eco-innovation without employees PEIBs. The latter include not only ideas creation but also participation in their implementation. Therefore, based on the COR, this study helps to understand the mechanism by which organizations can achieve high PEIBs. In particular, it demonstrates that SFL significantly influences PEIBs in manufacturing SMEs in Poland. In turn, EWB partially mediates the relationship between SFL and PEIBs. This study's findings have many theoretical and practical implications.

At this point, we must acknowledge that this study has limitations. Noteworthy, they can serve as directions for future researcher's projects. First, the data came from Poland. Poland is assigned to developed countries and located in Central Europe. Since each country has its own culture and level of economic development, these factors may have influenced the current findings. Therefore, we encourage researchers to conduct studies to validate the proposed model in, e.g. developing Asian countries. Second, we collected data from a single source, which may have caused bias. Future studies should consider multiple data sources and adopt a

multi-level design. Third, every market faces a different level of technological turbulence, environmental turbulence (Iqbal, Ahmad, & Li, 2021b), Iqbal *et al.*, 2021b and resource-constraint (Iqbal *et al.*, 2022) which has direct impact on EWB. Therefore, future studies could investigate the contingent role of the above-mentioned variables in the relationship of SFL with EWB and PEIBs.

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