BJ O&PM Brazilian Journal of Operations & Production Management

ISSN 2237-8960 (Online)

ABEPRO ASSOCIAÇÃO BRASILEIRA DE ENGENHARIA DE PRODUÇÃO

RESEARCH PAPER

The effect of perceived green organizational support on employee green behavior: the moderating role of long-term orientation

Gökhan Kerse [1]

[1]Kafkas University, Kars, Türkiye.

How to cite: Kerse, G. (2024), "The effect of perceived green organizational support on employee green behavior: the moderating role of long-term orientation", *Brazilian Journal of Operations and Production Management*, Vol. 21, No. 1, e20241762. https://doi.org/10.14488/BJOPM.1762.2024

ABSTRACT

Purpose: The present study examines the effect of perceived green organizational support on employee green behavior in the manufacturing sector. The study also attempted to determine whether long-term orientation has a moderating role in this effect.

Design/Methodology/Approach: The study uses a quantitative research design. Data were obtained from employees working in the manufacturing sector using the convenience sampling and survey methods. Analyses such as confirmatory factor, reliability, correlation and regression (Model 1) analyses were carried out.

Results: The findings have shown that perceived green organizational support positively affects employee green behavior, and that long-term orientation plays a moderating role in this effect.

Research Limitations: Limitations include the data being obtained cross-sectionally from a single sector (manufacturing) and the only variables in consideration being perceived green organizational support, long-term orientation and employee green behavior.

Practical implications: The findings reveal that managers in the manufacturing sector should turn to green organizational support practices because green behaviors (in-role and extra-role) increase with employees' perceptions of these support practices. The findings also revealed that employees with low long-term orientation levels (compared to those with medium and high levels) exhibit more green employee behavior as their perception of green organizational support increases.

Originality / Value: The present study focuses on employee green behavior, which is important for Industry 4.0. It is also the first study to examine the relationship between perceived green organizational support and employee green behavior within the context of long-term orientation.

Keywords: Industry 4.0; Perceived Green Organizational Support (PGOS); Long-Term Orientation; Employee Green Behavior.

INTRODUCTION

Industry 4.0 or the Fourth Industrial Revolution is a new and recent industrial model referred to as advanced production (Benitez et al., 2019; Cordeiro et al., 2019) and characterized by excellent productivity as well as procedural and environmental performance (Carvalho et al., 2020). This model is briefly defined as the use of information and communication technologies in industry (Youssef Abdelmajied, 2022). The integration of people, work, machines/equipment and technologies is prominent in the model. Optimizing physical resources, using natural resources more consciously, caring for the environment, reducing waste, making processes leaner, and using machinery and equipment for longer periods of time are also essential for the model (Carvalho et al., 2020).

Financial support: None.
Conflict of interest: The authors have no conflict of interest to declare.
Corresponding author: gokhankerse@hotmail.com
Received: 31 January 2023.
Accepted: 06 December 2023.
Editor: Julio Vieira Neto.

Industry 4.0 is a model that attempts to prioritize and achieve sustainability (Bonilla et al., 2018). Sustainability is described as being able to achieve social and environmental improvement without creating obstacles for future generations (Alhaddi, 2015; Maruyama et al., 2019). As in social life, sustainability in organizational life consists of three main components: economic, social, and environmental sustainability (Alhaddi, 2015). All three components of sustainability are very important for human and environmental well-being (Torrent-Sellens et al., 2023), but environmental sustainability is of particular importance. Because today, there is a high consumption of non-replaceable resources, raw materials and energy (Olah et al., 2020). Today, practices such as burning or dumping waste into the environment and disposing of toxic substances in nature are more widespread than in the past (Weerakkody et al., 2022). All of this leads to high carbon emissions, greenhouse gases, changes in climate, natural disasters, and diseases caused by air and environmental pollution (Fawehinmi et al., 2022). Therefore, it is important to focus on environmental sustainability.

It is important to focus on employees, who are members of society (Weerakkody et al., 2022), and to ensure that they exhibit pro-environmental (green) behaviors in the organizational environment in order to ensure environmental sustainability. Because employee green behavior leads to an increase in green performance by spreading pro-environmental attitudes and behaviors in the organizational environment (Huo et al., 2022; Edosomwan et al., 2023). For this reason, it is important to determine the variables that enable employees to exhibit environmentally friendly behaviors both within and beyond the scope of their job descriptions. This study examined this phenomenon and attempted to find out how to increase employee green behavior with the perception of green organizational support (PGOS) as a variable. Additionally, the study examined whether this relationship would change based on employee long-term orientation levels. Since employees with high long-term orientation are more future-oriented in their activities and consider the future effects of their behaviors more compared to those with low long-term orientation (Hofstede et al., 2008), the study also attempted to find out whether long-term orientation is a moderator in the relationship between PGOS and employee green behavior.

The study predicted that there would be a positive relationship between the level of perception of green organizational support and green behaviors exhibited by the employees. The study also assumes that this relationship will be stronger in employees with low long-term orientation compared to those with high long-term orientation. The study is expected to contribute to the relevant literature as follows: Firstly, the study discusses the concept of employee green behavior, which is important for Industry 4.0 (Wu et al., 2021), and attempts to determine the relationship between PGOS and employee green behavior. Although there are a limited number of studies addressing this relationship in the literature (Aboramadan et al., 2022b), there have been no studies on a Turkish sample. On the other hand, perceptual variables play a particularly important role in affecting employee green behaviors (Gu and Liu, 2022; Huang et al., 2023). Therefore, the study attempted to determine a perceptual variable's (PGOS) effect on employee green behavior. Moreover, this study is the first to take into account long-term orientation as a variable for employee green behavior. Therefore, the study is the first to determine whether the level of long-term orientation changes the relationship between the perceptual variable and green behavior.

Secondly, the study examined the concept of employee green behavior in the context of the manufacturing sector, which is especially important for environmental sustainability. Examining the relevant literature reveals that there are few studies on green practices in the manufacturing sector (Huo et al., 2022; Islam et al., 2021). However, as in other countries (Zhou et al., 2013; Griffin et al., 2016; Office for National Statistics, 2022), the manufacturing sector is one of the leading sectors in energy consumption and CO2 emissions in Turkey (Sel and Göktolga, 2020). For this reason, it is particularly important to carry out environmental studies and determine the variables that can increase employee green behavior in the manufacturing sector.

Perceived Green Organizational Support (PGOS)

Perceived organizational support (POS) is an employee's perception of whether their organization supports them and is interested in them (Eisenberger et al., 1986). This means that the employee feels that the organization values their contributions to the organization, cares about their well-being (Rhoades et al., 2001) and includes their general beliefs in the organization. Researchers (i.e., Lamm et al., 2015) have suggested that this generalized belief does not include support for sustainability, making it incomplete. Since environmental sustainability activities are important for today's organizations to survive (Jennings & Zandbergen, 1995), the concept of perceived environmental (green) organizational support should be examined (Lamm et al., 2015).

PGOS expresses employees' beliefs in the extent to which employee contribution to sustainability is valued in the organization (Lamm et al., 2015). PGOS means that organizations

value, care about and appreciate employee contributions to the environment, and that employees in turn perceive this phenomenon (Aboramadan et al., 2022a). Therefore, it should be noted that PGOS is a "perception-based" phenomenon. This means that employees can perceive the actions and activities in the organization differently and that similar actions can be interpreted differently by different employees (Kerse and Karabey, 2017). In other words, instead of actually caring about and supporting activities and actions related to the environment in the organization, making the employee feel this support is sufficient for the formation of PGOS.

PGOS can be considered as a "socio-emotional resource" (Cobb, 1976), associated with the support given by the organization to its employees for environmental activities and initiatives when performing organizational activities (Lamm et al., 2015). The perception of this resource (i.e., perception of support) leads to positive outcomes at the individual, team, and organizational levels. These outputs may be related to environmental sustainability or include outputs other than sustainability. As a matter of fact, Lamm et al. (2015) determined that PGOS positively affects psychological empowerment, job satisfaction and organizational identification while negatively affecting turnover intention. Aboramadan and Karatepe (2022) found that PGOS is positively related with job performance and organizational citizenship behavior towards the organization. Hameed et al. (2022) suggested that there are positive relationships between PGOS and green employee creativity, while Zhang et al. (2022) suggested that there are positive relationships between team green innovative behavior and team environmental knowledge learning.

PGOS and Employee Green Behavior

Employee green behavior, defined as the green performance of the employee (Ones and Dilchert, 2012), includes employee behaviors related to environmental sustainability in the organizational environment (Kerse et al., 2021; Edosomwan et al., 2023). Ones and Dilchert (2012) suggest that this definition does not only include behaviors aimed at supporting environmental sustainability, but also behaviors that prevent or harm it. Therefore, they define employee green behavior as measurable actions and activities related to environmental sustainability and exhibited by the employees of the organization that contribute to or move away from environmental sustainability (Ones and Dilchert, 2012).

Employee green behavior is a positive workplace behavior that addresses environmental and sustainable development issues, such as reducing waste, completing tasks in an environmentally friendly way, and promoting environmentally friendly behaviors among colleagues (Edosomwan et al., 2023). While this behavior can be addressed in four dimensions, which are green learning, individual practices, influencing others, and organizational voices (Zhang et al., 2021), it can also be addressed as in-role and extra-role green behavior. *Employee in-role green behavior* is the behavior that occurs as a result of employees' expectations to do their jobs in environmentally friendly ways (Bissing-Olson et al., 2013). These behaviors include employees shifting towards sustainable activities in line with organizational policies and exhibiting environmentally friendly behaviors as part of their job descriptions (Norton et al., 2015; Kerse et al., 2021). Therefore, using water and energy sensibly, protecting organizational resources, and reducing or preventing toxic waste due to organizational expectations when fulfilling tasks are examples of in-role green behavior (Kerse et al., 2021).

Employee extra-role green behavior is an environmentally friendly behavior voluntarily exhibited by an employee, also known as organizational citizenship behavior towards the environment (Katz et al., 2022). These include employee behaviors based on personal initiatives aimed at contributing to environmental sustainability beyond organizational expectations (El-Tony and Choo, 2021). Prioritizing the environment, making pro-environmental recommendations to improve existing processes or products, initiating green policies and programs, turning off lights and computers when they are not in use, and incentivizing other employees to be green are some extra-role green behaviors (Kerse et al., 2021; Islam et al., 2021). Therefore, while *in-role or task-related green behavior* takes place in the context of the necessary basic tasks of employees, *extra-role or proactive green behavior* involves a more active and change-oriented approach to the environment and environmental problems in the organizational environment (Bissing -Olson et al., 2013). Employee green behavior gains significance in the organizational environment when these two behaviors are exhibited and supported together (Dumont et al., 2017; Gu and Liu, 2022), providing positive financial/non-financial outcomes such as competitive advantage, cost savings, leader effectiveness, and employee internal satisfaction (Norton et al., 2015). For this reason, it is important to determine the perceptual and behavioral organizational variables that can ensure green employee behaviors being adopted. One of these perceptual organizational variables is PGOS.

The relationship between PGOS and employee green behavior can be explained on a theoretical

basis with Social Exchange Theory (Blau, 1964). This theory suggests that employee perceptions that the organization or managers consider their well-being and meet both their material and social needs at the level they expect will lead to attitudes and behaviors that bring about organizational benefit (Kerse and Karabey, 2019). Therefore, when an employee feels that their contributions and well-being are valued in the organization, they exhibit positive attitudes and behaviors that provide organizational benefit. The same can also be said for PGOS. When employees feel that their organizations value their contributions to the environment, they will turn to positive attitudes and behaviors towards their work and organization. As a matter of fact, studies (Lamm et al., 2015; Aboramadan and Karatepe, 2022) have determined that PGOS has positive relationships with job satisfaction, organizational identification, psychological empowerment, job performance and organizational citizenship behavior. On the other hand, employee perception of pro-environmental organizational support is also reflected in pro-environmental attitudes and behaviors towards work and the organization. As a matter of fact, Zhang et al. (2022) determined that PGOS positively affects green innovative behavior and environmental knowledge learning at the team level. Aboramadan et al. (2022a) found a positive relationship between PGOS and green voice behavior, green knowledge sharing behavior, and green helping behavior. In another study, Pham et al. (2020) and Ababneh (2021) found that environmental support (such as green education and green employee involvement) is reflected on in-role and extra-role green behaviors, leading to an increase in these behaviors. Taking all these theoretical justifications and empirical findings into consideration, PGOS was expected to increase employee green behaviors and the following hypothesis was developed:

- H_1: PGOS positively affects employee green behavior.

The Moderating Role of Long-Term Orientation

Long-term/short-term orientation, related to how individuals view time, is one of the dimensions in Hofstede's (2011) classification of national culture. Long-term/short-term orientation is a society's views on how it evaluates and cares about the past, present and future (Hofstede et al., 2008; Mosakowski and Earley 2000). Long-term oriented societies consider the impact of current conditions and behaviors on future generations and value their continuity (Koçer et al., 2019). In these societies, individuals direct their values (such as perseverance and frugality) towards the future (Hofstede et al., 2008). These are societies that try to integrate their traditions into a more modern structure, accept all kinds of developments and changes in order to prepare for the future, and attempt to utilize change (Koçer et al., 2019; Bedur Doğruöz and Erbaş, 2021). Therefore, it fundamentally involves being more future-oriented and thinking about future generations rather than living in the moment.

On the other hand, short-term orientation (low long-term orientation) represents societies that adhere to existing traditions and values and direct values to the past or present (Hofstede et al., 2008). These societies have reservations about social change and move forward with their traditions (Bedur Doğruöz and Erbaş, 2021). These two extreme temporal orientations in societies affect individuals' daily lives (Hofstede & Minkov, 2010; Graafand 2020), as well as their work lives (Lumpkin et al., 2010). Additionally, they affect the attitudes and behaviors of employees in the organizational environment (Ertaş, 2018; Siwen, 2019) and can even moderate the relationship between these attitudes and behaviors. For example, Khan et al. (2021) determined that long-term orientation has a moderating role in the relationship between heuristic biases and investment decisions. Sims et al. (2016) found that long-term orientation is a moderator in the relationships between job pressure, job satisfaction and turnover intention. Taking these explanations and empirical findings on long-term orientation into consideration, the present study expected that it moderates the relationship between PGOS and employee green behavior. The study assumed that individuals with high long-term orientation levels gravitate more towards green behaviors because they are future-oriented rather than past or present-oriented (Hofstede et al., 2008). These individuals (employees) try to exhibit more environmentally friendly behaviors since they consider future generations and want a cleaner environment. On the other hand, these future-oriented individuals will continue to protect the environment even if they do not perceive green support. Therefore, perception of green organizational support by employees with low long-term orientation levels will affect employee green behaviors more compared to employees with high long-term orientation levels. Therefore, the following hypothesis was developed:

H_2: Long-term orientation has a moderating role in the relationship between PGOS and employee green behavior; such that the positive relationship between PGOS and employee green behavior is stronger in employees with low long-term orientation.

In line with these explanations and hypotheses, the following research model was created.

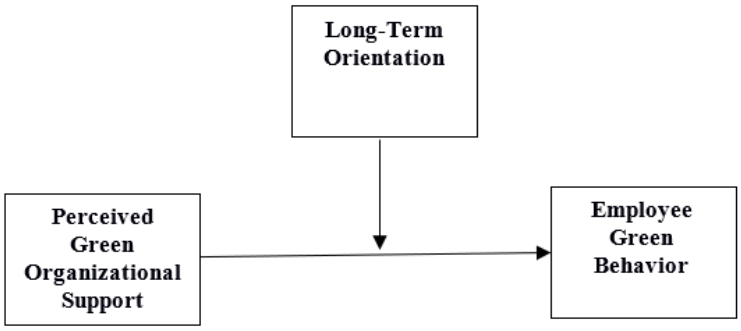

Figure 1 - The Research Model

METHODS

Participants and procedures

Data were obtained from two businesses operating in the manufacturing sector in a province in Turkey. The data were obtained from the manufacturing sector since it tends to have high energy consumption and carbon emissions (Zhou et al., 2013; Griffin et al., 2016; Sel and Göktolga, 2020), making employee green behaviors more important. The necessary permissions were obtained from the business managers before delivering online and face-to-face surveys to the employees. The data were collected using the convenience sampling method. The surveys were returned after approximately three weeks. 153 surveys were deemed suitable for analysis after eliminating those with missing data. Although there are different opinions in the literature, the general acceptance is that the survey data (sample size) should be at least 100 in order to obtain healthy and reliable results in the analyses (Memon et al., 2020). Therefore, the number of data in this study met the general acceptance in the literature. Examining the demographic data of the surveys revealed that the majority of the participants were male (71.9%). Furthermore, the data revealed that a high proportion of the participants were married (56.9%), between the ages of 26-35 (62.7%), had an associate degree (38.6%) and had been working for less than 4 years (48.4%).

Data Collection Tools

Employee' PGOS levels were measured using the 5-item, one-dimensional "Perceived Organizational Support towards the Environment" scale developed by Lamm et al. (2015). The scale includes items such as "I feel that I am able to behave as sustainably as I want to at the organization where I currently work". Employee green behavior levels were measured using the 6-item "Pro-Environmental Behavior" scale developed by Bissing-Olson et al. (2013). The scale includes two dimensions: in-role (3 items) and extra-role (3 items). The scale includes items such as "I complete the given tasks adequately with environmentally friendly methods" and "I take initiative to act in an environmentally friendly way at work". Finally, employee' long-term orientation levels were measured using the 6-item scale used by Yoo et al. (2011). The scale includes items such as "Long-term planning is important". Each scale item was evaluated with a 5-point Likert Type (1: Strongly Disagree – 5: Strongly Agree).

FINDINGS

Findings on Scale Reliability and Validity

The scales underwent reliability and validity (including discriminant validity) tests before the hypothesis tests. The validity test was performed using Amos 18.0 before performing the confirmatory factor analysis. Items with a factor load below 0.40 were removed from the analysis (Hair et al., 2017). One item on the PGOS scale was accordingly removed from the analysis because it did not meet the reference factor load. The confirmatory factor analysis examined the CMIN/DF, RMR, GFI, NFI, CFI and RMSEA values for model fit. The fit index values were improved by making modifications on the items, taking into account the reference criteria (Table 2). The Cronbach Alpha coefficients indicating internal consistency reliability were examined for the reliability of the scales. Furthermore, the CR (Composite Reliability) and AVE (Average Variance Extracted) values were calculated for reliability and validity. All findings are presented in Table 1.

Table 1 - The Reliability and Validity Analysis Findings

	Factor Loadings	Cronbach's Alpha	CR	AVE
Perceived Green Organizational Support (PGOS)				
PGOS1	0,778	0,816	0,812	0,526
PGOS3	0,860			
PGOS4	0,538			
PGOS5	0,686			
Employee Green Behavior (EGB)				
GEB_IR1	0,865	0,921	0,912	0,638
GEB_IR2	0,879			
GEB_IR3	0,938			
GEB_ER4	0,730			
GEB_ER5	0,675			
GEB_ER6	0,664			
Long-Term Orientation (LTO)				
LTO1	0,926	0,888	0,886	0,572
LTO2	0,834			
LTO3	0,662			
LTO4	0,830			
LTO5	0,580			
LTO6	0,645			

The findings in Table 1 reveal that the scale item factor loads met the reference criterion of 0.40. Reliability and validity were ensured since the scale Cronbach alpha (PGOS = 0,816; EGB = 0,921; LTO= 0,888) and CR values (PGOS = 0,812; EGB=0,912; LTO= 0,886) were greater than 0.70, and the AVE values (PGOS = 0,526; EGB = 0,638; LTO= 0,572) were greater than 0.50, respectively (Hair et al., 2017). Furthermore, the confirmatory factor analysis compliance values for the scales met the reference criteria (see Table 2).

Table 2 - Scale Fit Index Values

Models	CMIN/DF	RMR	GFI	NFI	CFI	RMSEA
	0< χ2/sd ≤ 5	≤,10	≥,85	≥,90	≥,90	≤,08
PGOS	,269	,007	,999	,999	1,000	,000
LTO	,759	,011	,993	,995	1,000	,000
GEB	1,002	,013	,989	,993	1,000	,004
Three-factor model	1,839	,063	,878	,903	,952	,074

Finally, another analysis necessary for validity was conducted. For this purpose, a three-factor research model (PGOS, LTO and GEB separately) was created and compared with other models (two-factor model in which PGOS and LTO were combined and GEB was left separate; two-factor model in which PGOS and GEB were combined and LTO was left separate, etc.). When the fit index values obtained were examined, it was seen that the other models did not meet the referenced index values, while the three-factor research model did (see Table 2). Therefore, the results obtained at this stage also showed that validity was found.

Hypothesis Testing Findings

The study primarily attempted to examine the relationship between the PGOS, employee green behavior and long-term orientation variables. The findings of the correlation analysis can be seen in Table 3.

Table 3 - Correlation Analysis Findings

Variables	1	2	3	Mean	S. D.
1. PGOS	1			2,997	,661
2.Long-Term Orientation	,142	1		3,811	,745
3. Employee Green Behavior	,497**	,434**	1	3,482	,788

**= 0,01

Findings from the correlation analysis (Table 3) reveal that employee green behavior is positively related to PGOS and long-term orientation. It was therefore deduced that the regression analysis could be performed for the hypothesis tests. The hypotheses were tested using the Process Macro software and Model 1 developed by Hayes (2013). PGOS was selected as the independent variable, employee green behavior was selected as the dependent variable, and long-term orientation was selected as the moderator variable. Findings obtained on Model 1 can be seen in Table 4.

Table 4 - Regression Analysis Findings (Model 1)

Variables	*b*	S.H.	t	p
PGOS	,564***	,076	7,377	,000
	[.413, .715]			
Long-term orientation	,368***	,068	5,444	,000
	[,234; ,501]			
PGOS X Long-term orientation	-,298*	,103	-2,886	,005
	[-,502; -,094]			
R= ,644	R^2= ,414			
***** p < ,001**	** p < ,01	* p < ,05		

The findings in Table 4 reveal that PGOS positively and significantly affects employee green behavior (b= 0,564; p=0,000), supporting H1. Furthermore, long-term orientation affects employee green behavior positively and significantly (b= 0,368; p=0,000); and the interaction term (PGOS X Long-term orientation) has a significant effect on employee green behavior. Therefore, increases in long-term orientation increase employee green behavior while long-term orientation has a moderating role in PGOS' effect on employee green behavior. H2 is therefore accepted. Additionally, the following graph was obtained by performing the necessary analyses to determine how the level of long-term orientation affects the moderation effect (Figure 2).

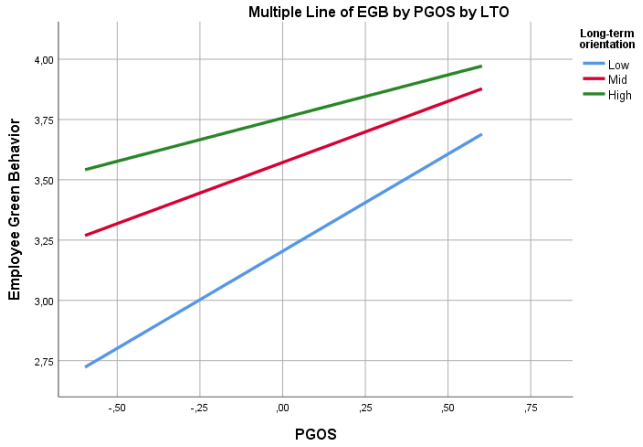

Figure 2 - Graphical Representation of the Long-Term Orientation

The findings in Figure 2 reveal that PGOS positively affects employee green behavior in low, mid and high long-term orientation levels. However, PGOS affects employee green behavior more in employees with low long-term orientation. Therefore, employees with low long-term orientation perceiving green support in the organization enables them to focus more on green behaviors.

DISCUSSION AND CONCLUSION

The actions of individuals and organizations are contributing to a rise in resource consumption and environmental pollution. As a result, there is a growing global effort to promote environmental sustainability through measures such as contracting agreements and raising awareness (Fawehinmi et al., 2022). Employees in organizations play a critical role in ensuring environmental sustainability. Employees, who are also individuals in society, affect the environment both directly and indirectly with their activities and jobs. Therefore, promoting green behaviors among employees and identifying the factors that can facilitate this shift are crucial for achieving environmental sustainability. The present study focused on the impact of PGOS on employee green behavior, with a particular focus on the moderating role of long-term orientation in this relationship. The study obtained the following findings and implications.

The study's first finding indicates that increases in the perception of support for green practices in the organization lead employees to exhibit more green behaviors. This finding is in line with findings in the literature suggesting that PGOS affects various employee green behaviors (Aboramadan and Karatepe, 2022; Zhang et al., 2022; Aboramadan et al., 2022a). Therefore, providing employees in the organization with environmental support as a perceptual variable enables them to exhibit green behaviors within and beyond the scope of their job descriptions.

Another finding obtained in the study indicates that high long-term orientation leads to an increase in employee green behaviors. In other words, since long-term oriented employees tend to be future-oriented, they have a higher tendency to exhibit green behaviors. On the other hand, the findings show that long-term orientation has a moderating role in PGOS' effect on employee green behavior. Analyzing the graph based on the levels regarding this relationship reveals that PGOS has a higher effect on employee green behavior in employees with low long-term orientation than in employees with medium and high levels of long-term orientation. Turkey is a country with a moderate score regarding these orientations (Hofstede Insights, 2023), inhabited by individuals with long-term and short-term orientations. Providing environmental support to these individuals, especially to those with low long-term orientation levels, will enable them to exhibit more green behaviors while performing their tasks. This will be reflected in their daily lives, eventually leading to green behaviors becoming widespread. Therefore, widespread employee green behavior will ensure that Industry 4.0 (Carvalho et al., 2020), which is based on activities such as using resources consciously and taking care of the environment, achieves its purpose and functionality.

The findings are also expected to make significant contributions at the sectoral level. The manufacturing sector involves some of the most environmentally harmful factors such as energy consumption and carbon emissions (Zhou et al., 2013; Griffin et al., 2016; Office for National Statistics, 2022; Sel and Göktolga, 2020). For this reason, it is important for employees in this sector to turn to green behaviors and do their jobs with this in mind. The findings reveal that employee green behavior increases with PGOS. Therefore, it is important for sector managers to support employees, especially in green practices. Perceived support is particularly important for employees with low long-term orientation, although it should be provided to all employees.

With these findings in the study, it is possible to make guiding inferences for both organizations operating in the manufacturing sector and their managers. Although the manufacturing sector contributes more to economic development than other sectors (Ullah et al., 2022), it is claimed that manufacturing industry production is one of the sectors that cause environmental pollution (Ünlüoğlu and Dağdemir, 2023). This situation shows that organizations operating in this sector should support their employees more in terms of environmentalist behaviors compared to other sectors. As seen in the research findings, it is much more important to support the environmentalist (green) behaviors of employees with low long-term orientation in this sector. Because the support perceived by these employees effects their environmental behaviors more. For this reason, managers in manufacturing sector organizations should create policies to support environmental behaviors, organize training on environmental behaviors at the organizational level and take these behaviors into consideration in performance evaluation criteria. In addition, these behaviors should not be limited only within the organization. Managers should support employees to exhibit environmentalist behaviors in private life, and these behaviors should be disseminated through practices such as "environmentalist employee of the month".

It is worth noting that the study has certain limitations alongside its contributions. First of all, the research data were obtained cross-sectionally, and the employees responded to the surveys based on their immediate feelings. Secondly, data were obtained from only two businesses in the manufacturing sector. Therefore, there are limitations regarding the generalizability of the findings to the sector. Therefore, future studies may find it beneficial to obtain the data longitudinally and involve more employees from the sector. On the other hand, the only variable in the study regarding the cultural dimensions was long-term orientation. Future studies may find it beneficial

to take other cultural variables (such as individualism/collectivism) into consideration and to examine individual factors such as personality with employee green behavior.

REFERENCES

Ababneh, O.M.A. (2021), "How do green HRM practices affect employees' green behaviors? The role of employee engagement and personality attributes", *Journal of Environmental Planning and Management,* Vol. 64, No. 7, pp. 1204-1226.

Aboramadan, M. and Karatepe, O.M. (2021), "Green human resource management, perceived green organizational support and their effects on hotel employees' behavioral outcomes", *International Journal of Contemporary Hospitality Management,* Vol. 33, No. 10, pp. 3199-3222.

Aboramadan, M., Crawford, J., Turkmenoglu, M. A. and Farao, C. (2022b), "Green inclusive leadership and employee green behaviors in the hotel industry: Does perceived green organizational support matter?", *International Journal of Hospitality Management,* Vol. 107, p. 103330.

Aboramadan, M., Kundi, Y. M. and Becker, A. (2022a), "Green human resource management in nonprofit organizations: Effects on employee green behavior and the role of perceived green organizational support", *Personnel Review,* Vol. 51, No. 7, pp. 1788-1806.

Alhaddi, H. (2015), "Triple bottom line and sustainability: A literatüre review", *Business and Management Studies,* Vol. 1, No. 2, pp. 6–10.

Bedur Doğruöz, C. and Erbaş, İ. (2021), "The comparison of culture-occupational safety relationship in the construction industry with Hofstede's cultural dimensions theory: Examples of Turkey and Japan", *Journal of Architectural Sciences and Applications,* Vol. 6, No. 2, pp. 718-736.

Benitez, G.B., Lima, M.J.D.R.F., Lerman, L.V. and Frank, A.G. (2019), "Understanding Industry 4.0: Definitions and insights from a cognitive map analysis", *Brazilian Journal of Operations & Production Management*, Vol. 16, No. 2, pp. 192-200.

Bissing-Olson, M.J., Iyer, A., Fielding, K.S. and Zacher, H. (2013), "Relationships between daily affect and proenvironmental behavior at work: The moderating role of pro-environmental attitude", *Journal of Organizational Behavior,* Vol. 34, No. 2, pp. 156-175.

Blau, P.M. (1964), *Exchange and Power in Social Life,* Wiley, New York.

Bonilla, S.H., Silva, H.R.O., da Silva, M.T., Gonçalves, R.F. and Sacomano, J.B. (2018), "Industry 4.0 and sustainability implications: A scenario-based analysis of the impacts and challenges", *Sustainability,* Vol. 10*,* p. 3740.

Carvalho, A.C.P., Carvalho, A.P.P. and Carvalho, N.G.P. (2020), "Industry 4.0 technologies: What is your potential for environmental management?", in Ortiz, J.H. (Ed.), *Industry 4.0 - Current Status and Future Trends*, doi: 10.5772/intechopen.90123.

Cobb, S. (1976), "Social support as a moderator of life stress", *Psychosomatic Medicine*, Vol. 38, No. 5, pp. 300-314.

Cordeiro, G.A., Ordóñez, R.E.C. and Ferro, R. (2019), "Theoretical proposal of steps for the implementation of the Industry 4.0 concept", *Brazilian Journal of Operations & Production Management,* Vol. 16, No. 2, pp. 166-179.

Dumont, J., Shen, J. and Deng, X. (2017), "Effects of green HRM practices on employee workplace green behavior: The role of psychological green climate and employee green values", *Human Resource Management*, Vol. 56, No. 4, pp. 613–627.

Edosomwan, H.S., Oguegbe, T.M. and Joe-Akunne, C.O. (2023), "Workplace well-being in manufacturing organizations in Nigeria: Do employee green behavior, core self-evaluations and empowering leadership matter?", *International Journal of Occupational Safety and Health,* Vol. 13, No. 1, pp. 97-107.

Eisenberger, R., Huntington, R., Hutchison, S. and Sowa, D. (1986), "Perceived organizational support", *Journal of Applied Psychology*, Vol. 71 No. 3, pp. 500-507.

Ejsmont, K., Gladysz, B. and Kluczek, A. (2020, July 30). *Industry 4.0 and Sustainability,* In Encyclopedia. https://encyclopedia.pub/entry/1478.

El-Tony, Y.F. and Choo, L.S. (2021), "Cultivating employee green behavior: The essence of individual green value", *2021 Third International Sustainability and Resilience Conference: Climate Change*, pp. 334-338.

Ertaş, Ç. (2018), "Otel çalışanlarının kültürel değerlerinin iş tatminine etkisi: Antalya'da bir araştırma", *Tourism Academic Journal*, Vol. 5, No. 1, pp. 137-153.

Fawehinmi, O., Yusliza, M.Y., Ogbeibu, S., Tanveer, M.I. Jabbour, C.J.C. (2022a), "Academic employees' green behaviour as praxis for bolstering environmental sustainable development: A linear moderated mediation evaluation", *Business Strategy and the Environment*, Vol. 31, pp. 3470–3490.

Graafland, J. (2020), "When does economic freedom promote well-being? On the moderating role of long-term orientation", *Social Indicators Research,* Vol. 149, pp. 127–153

Griffin, P.W., Hammond, G.P. and Norman, J.B. (2016), "Industrial energy use and carbon emissions reduction: a UK perspective", *WIREs Energy Environment,* Vol. 5, pp. 684–714.

Gu, F. and Liu, J. (2022), "Environmentally specific servant leadership and employee workplace green behavior: Moderated mediation model of green role modeling and employees' perceived CSR", *Sustainability,* Vol. 14, p. 11965.

Hair Jr, J.F., Hult, G.T.M., Ringle, C.M. and Sarstedt, M. (2017), *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*, Sage Publications, USA.

Hameed, Z., Naeem, R.M., Hassan, M., Naeem, M., Nazim, M. and Maqbool, A. (2022), "How GHRM is related to green creativity? A moderated mediation model of green transformational leadership and green perceived organizational support", *International Journal of Manpower*, Vol. 43, No. 3, pp. 595-613.

Hayes, A.F. (2013), *SPSS Process Models,* Model Templates for PROCESS for SPSS and SAS.

Hofstede Insights, (2023), Hofstede-insights country comparison, https://www.hofstede-insights.com/country-comparison/turkey/.

Hofstede, G. and Minkov, M. (2010), "Long- versus shortterm orientation: New perspectives", *Asia Pacific Business Review*, Vol. 16, No. 4, pp. 493-504.

Hofstede, G. (2011), "Dimensionalizing cultures: The Hofstede model in context. *Online Readings in Psychology and Culture,* Vol. 2, No. 1, pp. 1-26.

Hofstede, G.J., Jonker, C.M. and Verwaart, T. (2008), "Long-term orientation in trade", in *Complexity and Artificial Markets,* Springer, Berlin, pp. 107-119.

House, R.J., Hanges, P.J., Javidan, M., Dorfman, P.W. and Gupta, V. (2004), Culture, leadership, and organizations, in House, R.J., Hanges, P.J., Javidan, M., Dorfman, P.W., Gupta, V. (Ed.), *The Globe Study of 62 Societies,* Sage Publications, Cambridge.

Huang, L., Guo, Z., Deng, B. and Wang, B. (2023), "Unlocking the relationship between environmentally specific transformational leadership and employees' green behaviour: A cultural self-representation perspective", *Journal of Cleaner Production,* Vol. 382, p. 134857.

Huo, X., Azhar, A., Rehman, N. and Majeed, N. (2022), "The role of green human resource management practices in driving green performance in the context of manufacturing SMEs, *Sustainability,* Vol. 14, p. 16776.

Islam, T., Khan, M. M., Ahmed, I. and Mahmood, K. (2021), "Promoting in-role and extra-role green behavior through ethical leadership: Mediating role of green HRM and moderating role of individual green values", *International Journal of Manpower,* Vol. 42, No. 6, pp. 1102-1123.

Jennings, P.D. and Zandbergen, P.A. (1995), "Ecologically sustainable organizations: An institutional approach", *Academy of Management Review,* Vol. 20, No. 4, pp. 1015-1052.

Katz, I. M., Rauvola, R. S., Rudolp, C. W. and Zacher, H. (2022), "Employee green behavior: A meta-analysis", *Corporate Social Responsibility and Environmental Management,* Vol. 29, pp. 1146–1157.

Kerse, G. and Karabey, C.N. (2017), "The effects of perceived organizational support on organizational identification: The mediating role of organizational cynicism", *MANAS Journal of Social Studies,* Vol. 6, No. 4, pp. 375-398.

Kerse, G. and Karabey, C.N. (2019), "The effect of perceived organizational support on work engagement and perceived political behavior through organizational cynicism and identification", *Eskişehir Osmangazi Üniversitesi İİBF Dergisi,* Vol. 14, No. 1, pp. 83–108.

Kerse, G., Maden, Ş., Tartan Selçuk, E. (2021), "Green transformational leadership, green intrinsic motivation and employee green behavior: The scale adaptation and relationship determination", *Journal of Business Research-Turk,* Vol. 13, No. 2, pp. 1574-1591.

Khan, I., Afeef, M., Jan, S. and Ihsan, A. (2021), "The impact of heuristic biases on investors' investment decision in Pakistan stock market: moderating role of long term orientation", *Qualitative Research in Financial Markets,* Vol. 13, No. 2, pp. 252-274.

Koçer, C., Yeşil, E. and Yürüyen, H. (2019), "Relationship between national culture dimensions and

new product innovation; The case of Turkey", in *IRDITECH 2019 Uluslararası Ar-Ge, İnovasyon Ve Teknoloji Yönetimi Kongresi Bildiriler Kitabı*, pp. 189-208.

Lamm, E., Tosti-Kharas, J. and King, C.E. (2015), "Empowering employee sustainability: Perceived organizational support toward the environment", *Journal of Business Ethics*, Vol. 128, pp. 207–220.

Lumpkin, G.T., Brigham, K.H. and Moss, T.W. (2010), "Long-term orientation: Implications for the entrepreneurial orientation and performance of family businesses", *Entrepreneurship & Regional Development,* Vol. 22, No. 3-4, pp. 241-264.

Maruyama, U., Quintanilha, M.V.B., dos Santos Silva, C.M. and Sanchez, P.M. (2019), "Sustainability and green marketing challenge: Brazilian brewing industry case study", *Brazilian Journal of Operations & Production Management,* Vol. 16, No. 1, pp. 78-87.

Memon, M. A., Ting, H., Cheah, J. H., Thurasamy, R., Chuah, F. and Cham, T. H. (2020), "Sample size for survey research: Review and recommendations", *Journal of Applied Structural Equation Modeling,* Vol. 4, No. 2, pp. 1-20.

Mosakowski, E. and Earley, P.C. (2000), "A selective review of time assumptions in strategy research", *Academy of Management Review*, Vol. 25, No. 4, pp. 796-812.

Müller, E. Hopf, H. (2017), "Competence center for the digital transformation in small and medium-sized enterprises", *Procedia Manufacturing*, Vol. 11, pp. 1495–1500.

Norton, T., Parker, S., Zacher, H. and Ashkanasy, N. (2015), "Employee green behavior: A theoretical framework, multilevel review, and future research agenda", *Organization and Environment,* Vol. 28, No. 1, pp. 103-125.

Office for National Statistics, (2022), *UK Environmental Accounts: 2022*, Access 16.01.2023. https://www.ons.gov.uk/economy/environmentalaccounts/bulletins/ukenvironmentalaccounts/2022.

Oláh, J., Aburumman, N., Popp, J., Khan, M.A., Haddad, H. and Kitukutha, N. (2020), "Impact of Industry 4.0 on environmental sustainability", *Sustainability,* Vol. 12, No. 11, p. 4674.

Ones, D. S. and Dilchert, S. (2012), Employee green behaviors", in Jackson, S. E. Ones, D. S. and Dilchert S. (Eds.), *Managing Human Resources for Environmental Sustainability*, Jossey-Bass/Wiley, pp. 85–116.

Pech, M. and Vrchota, J. (2020, August 07), *Sustainability Green Industry 4.0,* in Encyclopedia. https://encyclopedia.pub/entry/1556.

Pham, N.T., Thanh, T.V., Tuckova, Z. and Thuy, V.T.N. (2020), "The role of green human resource management in driving hotel's environmental performance: Interaction and mediation analysis", *International Journal of Hospitality Management,* Vol. 88, p. 102392.

Rhoades, L., Eisenberger, R. and Armeli, S., (2001), "Affective commitment to the organization: the contribution of perceived organizational support", *Journal Appl. Psychol.,* Vol. 86, No. 5, pp. 825–836.

Sel, A. and Göktolga, Z. G. (2020), "Projection of sectoral CO2 emission values with input-output models in the framework of 11th Development Plan", *Akdeniz İİBF Journal,* Vol. 20, No. 2, pp. 158-168.

Sims, R. L., Puppel, C. P. and Zeidler, P. (2016), "Work strain, job satisfaction, and intention to quit: The moderating effect of long-term orientation", *International Journal of Stress Management*, Vol. 3, No. 1, pp. 23– 43.

Siwen, D. (2019), *Long term orientation and organizational commitment: The moderation of age in Chinese workers*, ISCTE Business School, Portugal.

Torrent-Sellens, J., Ficapal-Cusí, P. and Enache-Zegheru, M. (2023), "Boosting environmental management: The mediating role of Industry 4.0 between environmental assets and economic and social firm performance", *Business Strategy and the Environment*, Vol. 32, pp. 753-768.

Ullah, S., Khan, F. U. and Ahmad, N. (2022), "Promoting sustainability through green innovation adoption: A case of manufacturing industry", *Environmental Science and Pollution Research,* pp. 1-21.

Ünlüoğlu, M. and Dağdemir, Ö. (2023), "The relationship between manufacturing industry production and environmental pollution: The validity of the environmental Kuznets Curve Hypothesis for Turkiye", *BILTURK, The Journal of Economics and Related Studies,* Vol. 5, No. 1, pp. 19-43.

Weerakkody, W.A.S., Johnson, L.W. and Daronkola, H.K. (2022), "Role of green manufacturing practices on green knowledge and employee green behaviour in the manufacturing sector in

Sri Lanka", in *2022 Moratuwa Engineering Research Conference (MERCon),* pp. 1-6.

Wu, Q., Cherian, J., Samad, S., Comite, U., Hu, H., Gunnlaugsson, S.B., Oláh, J. and Sial, M.S. (2021), "The role of CSR and ethical leadership to shape employees' pro-environmental behavior in the era of Industry 4.0. A case of the banking sector", *Sustainability,* Vol. 13, p. 9773.

Yoo, B., Donthu, N. and Lenartowicz, T. (2011), "Measuring Hofstede's five dimensions of cultural values at the individual level: Development and validation of CVSCALE", *Journal of International Consumer Marketing,* Vol. 23, No. 3-4, pp. 193-210.

Youssef Abdelmajied, F. (2022), "Industry 4.0 and its implications: Concept, opportunities, and future directions", in *Supply Chain - Recent Advances and New Perspectives in the Industry 4.0 Era*. doi: 10.5772/intechopen.102520.

Zhang, B., Yang, L., Cheng, X. and Chen, F. (2021), "How does employee green behavior influence employee well-being? An empirical analysis", *International Journal of Environmental Research and Public Health*, Vol. 18, pp. 1-19.

Zhang, Y., Wu, J. and Fan, Y. (2022), "The effect of perceived organizational support toward the environment on team green innovative behavior: Evidence from Chinese green factories", *Emerging Markets Finance and Trade*, Vol. 58, No. 8, pp. 2326-2341.

Zhou, S., Kyle, G.P., Yu, S., Clarke, L.E., Eom, J., Luckow, P., Chaturvedi, V., Zhang, X. and Edmonds, J.A. (2013), "Energy use and CO2 emissions of China's industrial sector from a global perspective", *Energy Policy*, Vol. 58, pp. 284–294.

Author contributions: There is contribution of a single author. Gökhan KERSE contributed to all sections.