

# Mediating Role of Sustainable Development Goals in the Effect of Green Transformational Leadership on Employee Performance in the Aviation Industry

Arda Tunç<sup>1</sup> , Ethem Topçuoğlu<sup>2\*</sup> 

<sup>1</sup> Istanbul Arel University, Department of Aviation Management, Istanbul, Türkiye. (ardatuncben@hotmail.com)

<sup>2\*</sup> Giresun University, Academy of Civil Aviation, Giresun, Türkiye. (ethem.topcuoglu@giresun.edu.tr)

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Corresponding Author: *Ethem Topçuoğlu*

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## Abstract

The aviation industry is one of the significant sectors that create environmental pollution with the emission of carbon dioxide and nitrogen oxides. Bearing this in mind, the main goal of the present study is to determine the mediating role of Sustainable Development Goals (SDGs) in the effect of green transformational leadership on performance in the aviation sector and to make contribution to the literature. The study was conducted with 322 employees working in the aviation industry and the data obtained were analysed through the Smart-PLS program. The findings indicated that green transformational leadership had an effect of 0.146 on SDGs; SDGs had an effect of 0.190 on performance, and green transformational leadership had an effect of 0.108 on performance. Furthermore, it is found that sustainable development goals have a partial mediating role in the effect of green transformational leadership on performance and the result obtained by VAF calculation is realized to be significant. The study revealed that SDG1, SDG6, SDG10 and SDG14 items of the sustainable development goals were not fully understood by the participants. When the findings are considered, it can be stated that the study is important in terms of proving that green transformational leadership has an effect on performance and that a part of this effect can be explained by sustainable development goals. Even though this effect was explained more theoretically in previous studies, this issue has also been proven in practice. In addition, utilizing the Resource-Based View within the scope of the study also helped strengthen the theoretical infrastructure.

## 1. Introduction

One of the biggest concerns in today's world is global warming and the problems that arise as a result. The aviation sector is exposed to criticisms because it alone accounts for 3% of carbon dioxide emissions, which is an important variable causing climate change (Adisasmita & Hadipramana, 2011). The International Air Transport Association (IATA) is trying to introduce carbon neutral practices in order to achieve a 50% reduction in carbon emissions by 2050. Along with increasing carbon dioxide emissions, other important concerns of the sector point to many problems, including especially noise pollution, waste management and energy saving (Kumar et al., 2020). Other global environmental policies such as "Sustainable Development Goals" (SDGs) appear to create a pressure point for ensuring green performance both in terms of carbon dioxide emissions and airport buildings (Ramakrishnan et al., 2023). It seems that governments are being put under pressure to reduce carbon dioxide emissions as an international movement within the scope of the Paris Climate Agreement. Although this pressure is a disadvantage, it also brings about a process that creates an advantage. In the last few years, there has been a growing trend for organizations to market their products or services as being green or environmentally

friendly as part of their corporate social responsibility. It is realized that the focus on the environment has a significant impact on customers' preferences of aviation (Hagmann et al., 2015).

The aviation industry is claimed to be the most inappropriate mode of transport in that it is responsible for 24% of the world's nitrogen oxide emissions apart from carbon dioxide. In general, one kg of aviation fuel is estimated to produce approximately 3.16 kg of carbon dioxide, 0.011 kg of nitrogen oxides and 1.25 kg of water vapour. Because air traffic is estimated to grow by 5% annually, pollution is expected to rise at an alarming rate if measures are not taken (Khoo & Teoh, 2014). In this respect, it is thought that large-scale airline companies should have more social responsibility. This way of thinking forces the adoption of strategies that will reduce carbon emissions and increase green development (Liu et al., 2021). For example, steps have been taken to reduce carbon emissions by using 2% biofuel in Turkish Airlines flight TK1823 between Istanbul and Paris. It is known that the biofuel in question produces 87% less carbon emissions than kerosene (Jet-A1), which is an aviation fuel (Irtak, 2022).

Increasing awareness towards environmental management and sustainable development of resources has resulted in the need for a new leadership approach (Akan & Atalik, 2024).

Green transformational leadership is needed in order to create an environmentally sensitive management strategy, to adopt a green behavior culture in the organization and to disseminate sustainable ecological business processes. The green transformational leadership approach responds to increasing air pollution and other environmental needs (Singh et al., 2020). In the present study, it is tried to explain the mediation of SDGs in the effect of green transformational leadership on performance in the aviation sector. In this regard, the green transformational leader is expected to affect employees by means of his visionary perspective and inspire and motivate them. In addition, in this study which is inspired by the Resource-Based View (RBV) theory (Barney, 2001), it is thought that the organization will gain more competitive and inimitable capabilities.

## 2. Literature Review

Although many studies have been conducted on environmental management and sustainability, little attention is realized to be paid to the role of the manager in solving the problems experienced. Firms' performance depends on their ability to exploit resources that are critical, rare and expensive for competitors to imitate (Topcuoglu et al., 2023). In this regard, RBV suggests that firms' ability to leverage strategic resources paves the way for accomplishing similar approaches in different ways, ensuring sustainable performance and increasing competitive advantage (Riva et al., 2021). Leadership support is greatly needed so as to increase and stimulate the interest in green among employees. For a sustainable organizational structure, there must be leader support in the green orientation (Pham & Pham, 2023). Green transformational leaders' pro-environmental behavior in the workplace can subtly shape employees' cognitions to understand and learn the environmental protection values conveyed by leaders gradually. Thanks to the environmental awareness of leaders, green transformational leadership manifests itself in aviation enterprises (Ding et al., 2023).

Despite the fact that the United Nations has taken many steps towards practicing the "Sustainable Development Goals", it seems that other solutions are still being looked for the rising climate crisis. For this reason, efforts are being made for a sustainable world that will prevent environmental pollution and resource depletion with the preparation of the Paris Climate Agreement and the zero carbon approach. In this respect, targets are being set for many sectors, especially aviation, to reduce carbon emission (Pham & Pham, 2023). Solutions for sustainability, clean energy and environmentally friendly fuels in aviation are searched for by the International Civil Aviation Organization (ICAO) by means of international Green Airport Seminars (ICAO, 2024a).

Within the framework of the "Sustainable Development Goals" announced by the United Nations in 2015, there has been an effective pressure on organizations. There are seventeen goals that organizations should implement in accordance with the targets planned to be achieved by 2030 by international and national authorities (Rizvi & Garg, 2020). In order to achieve goals and avoid sanctions, environmental problems in the aviation industry are necessary to be strategically addressed, planned and practiced. In this respect, the Green Transformational Leadership approach comes to the fore, which refers to the leadership that motivates followers to achieve environmental goals and inspires followers to perform beyond expected levels (Kerse et al., 2021). This leadership approach encourages managers and employees to think about environmental problems and discover new perspectives and solutions to convert traditional products into sustainable

products and technologies (Begum et al., 2022). Bearing these in mind, H<sub>1</sub> hypothesis was formed.

H<sub>1</sub>: "Green Transformational Leadership has a significant effect on the Sustainable Development Goals."

When the effect of the "Sustainable Development Goals" on performance is paid attention throughout the literature, it is observed that it remains symbolic. Previous studies suggest that there was no relationship between SDG and performance in 78% of 132 studies (Ramos et al., 2022). It is considered that the excessive generality of the SDG may prevent the clear implementation of the organization's performance policies (Bellostas et al., 2023). In spite of the negative opinions in the two sources mentioned, it is realized that there is a low level of relationship in the results of both studies. Based on this, the H<sub>2</sub> hypothesis was formed.

H<sub>2</sub>: "Sustainable Development Goals have a significant effect on Employee Performance."

The positive or negative effect of human resources on organizational performance is a concept with deep roots in the field of management. According to the resource-based view theory, the organization is likely to gain a competitive advantage and increase its performance if the resources of the organization are rare and difficult to imitate by its competitors (Singh et al., 2020). Green transformational leaders create a positive effect on employees by inspiring, motivating and providing intellectual stimulation for the success of environmental initiatives. Transformational leaders encourage their followers to make breakthroughs by developing new ideas, an example of which is making team members think about challenges from various perspectives by demonstrating green behaviors over a period of time (Ding et al., 2023). Employees' sense of self-efficacy paves the way for the creative process. Green transformational leaders improve employees' self-efficacy so that subordinates exhibit extraordinary performance (Begum et al., 2022). As a result of the dissemination of environmental initiatives by leaders, reducing waste and raw material consumption becomes a part of the daily roles of employees, which in turn increases performance (Rizvi & Garg, 2020). Based on this, H<sub>3</sub> hypothesis was formed.

H<sub>3</sub>: "Green Transformational Leadership has a significant effect on Employee Performance."

Green transformational leadership refers to the leadership that motivates followers to achieve environmental goals and inspires followers to perform beyond expected levels (Kerse et al., 2021). Modern aircraft are 70% more fuel efficient than it was forty years ago. The aircraft in question have 20% better fuel consumption than it was ten years ago. Moreover, many studies reveal that the choice of aircraft type, size, age and aircraft technology are among the key factors in terms of addressing the environmental issues (Khoo & Teoh, 2014). Though a mediating role is not expected for all SDGs in the light of the developments, it is thought that there will be a mediation (D'Adamo & Gastaldi, 2023; Saha et al., 2024) especially for "SDG7 (Accessibility and Clean Energy), SDG9 (Industry, Innovation and Infrastructure), SDG11 (Sustainable Cities and Communities), SDG12 (Responsible Production and Consumption) and SDG13 (Climate Action)" Based on this, H<sub>4</sub> hypothesis was formed.

H<sub>4</sub>: "Sustainable Development Goals have a mediating role in the effect of Green Transformational Leadership on Employee Performance."

The model designed for the hypotheses is displayed in Figure 1.

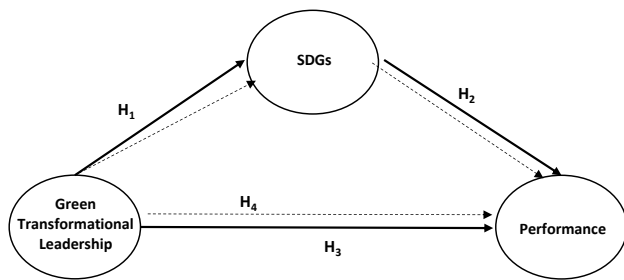


Figure 1. Model Recommendation.

### 3. Materials and Methods

The present study aims to measure the effect of green transformational leadership on performance in the aviation industry through the SDGs. In this respect, data were collected in Istanbul between November, 1, 2023 and April, 4, 2024. Those working in the aviation industry were selected as the participants and 322 people were reached. The sampling can be claimed to be valid and reliable because the number of participants reached is more than ten times higher than the number of items in the study (Nunnally, 1978).

In the study, Green Transformational Leadership Scale developed by Chen and Chang (2013) and translated into Turkish by Kerse et al. (2021) was utilized for the Measurement of Green Transformational Leadership. On the other hand, Employee Performance Scale developed by Kirkman and Rosen (1999) and translated into Turkish by Çol (2008) was used for the measurement of Employee Performance while the scale developed by Zengin et al. (2021) was utilized for measuring the “Sustainable Development Goals”. The survey forms were applied by the researchers on-site and digitally through convenience sampling method in businesses operating in the aviation sector via the survey form and Google Forms. The data obtained through the surveys were analysed by means of the SmartPLS program.

### 4. Result and Discussion

When the demographic information regarding the participants is examined, it is realized that men (70.50%) participate at a higher rate than women; there are more single participants (53.40%) and education level is predominantly high school or below (36%). Detailed information on other demographic variables is presented in Table 1.

Table 1. Demographic Variables.

Demographic	Variable	n	%
Gender	Female	95	29.50
	Male	227	70.50
Marital Status	Married	150	46.60
	Single	172	53.40
Age	Between 18-25 Years of Age	69	21.50
	Between 26-30 Years of Age	73	22.70
	Between 31-35 Years of Age	43	13.30
	Between 36-40 Years of Age	46	14.30
	Between 41-45 Years of Age	52	16.20
	Between 46-50 Years of Age	24	7.50
	Between 51 Years of Age	15	4.50
	High School and Below	116	36.00
Level of Education	Undergraduate	61	18.90
	Graduate	97	30.20
	Postgraduate	48	14.90
Years of Experience	5 Years and Below	127	39.40
	Between 6-10 Years	70	21.70
	Between 11-15 Years	52	16.20

Income	Between 16-20 Years	31	9.60
	21 Years and Over	42	13.10
	Between 500-700 USD	19	5.90
	Between 701-900 USD	39	12.10
	Between 901-1.100 USD	38	11.80
	Between 1.101-1.300 USD	47	14.60
	Between 1.301-1.500 USD	66	20.50
	Between 1.501 USD	113	35.10

The scales used are required to meet theoretical reliability and validity criteria. According to the responses given by the participants to the scales, the factor load value of the items are expected to exceed 0.60; the Cronbach Alpha coefficient and Composite Reliability (CR and rho\_A) should be above 0.70 while the Average Variance Extracted (AVE) value should be above 0.50 (Hair et al., 2017). Factor load values, validity and reliability values of the scales are illustrated in Table 2.

Table 2. Factor load values, validity and reliability

Items	Fact or Load Values	Mean	Standard Deviation	Kurtosis	Skewness
<b>Green Transformational Leadership Scale</b>					
Cronbach's Alpha= 0.956, rho_A=0.968, CR=0.965, AVE=0.819					
GreenLeader1	0.895	3.115	1.222	-0.987	-0.221
GreenLeader2	0.916	3.155	1.175	-0.896	-0.258
GreenLeader3	0.939	3.177	1.154	-0.841	-0.265
GreenLeader4	0.927	3.261	1.182	-0.751	-0.427
GreenLeader5	0.866	3.227	1.118	-0.738	-0.296
GreenLeader6	0.887	3.211	1.147	-0.817	-0.297
<b>Performance Scale</b>					
Cronbach's Alpha= 0.940, rho_A=0.943, CR=0.957, AVE=0.848					
Perform1	0.910	4.090	1.034	1.357	-1.315
Perform2	0.919	4.031	1.021	0.832	-1.135
Perform3	0.941	4.003	1.011	0.553	-1.039
Perform4	0.914	4.053	0.981	1.170	-1.196
<b>Sustainable Development Goals Scale</b>					
(after four questions were deleted)					
Cronbach's Alpha= 0.926, rho_A=0.973, CR=0.932, AVE=0.514					
SDG1*	0.501	3.401	1.111	-0.490	-0.431
SDG2	0.720	3.342	1.123	-0.631	-0.386
SDG3	0.807	3.606	1.044	0.355	-0.883
SDG4	0.771	3.528	1.078	-0.428	-0.543
SDG5	0.736	3.152	1.150	-0.709	-0.116
SDG6*	0.583	3.497	1.064	-0.350	-0.427
SDG7	0.754	3.671	1.008	0.035	-0.711
SDG8	0.685	3.071	1.071	-0.590	-0.082
SDG9	0.699	3.575	1.104	-0.316	-0.614
SDG10*	0.521	3.540	1.081	-0.122	-0.668
SDG11	0.725	3.447	1.120	-0.328	-0.574
SDG12	0.719	3.488	1.107	-0.353	-0.569
SDG13	0.691	3.562	1.099	-0.371	-0.574
SDG14*	0.580	3.435	1.085	-0.482	-0.462
SDG15	0.690	3.304	1.075	-0.647	-0.223
SDG16	0.649	3.174	1.169	-0.836	-0.284
SDG17	0.656	3.519	1.123	-0.239	-0.661

As presented in Table 2, four items were excluded from the analysis because their factor load values were below 0.60. The obtained values indicate that validity and reliability are achieved. On the other hand, the results obtained do not show structural discriminant validity, which suggests that the scales are separated from each other. Therefore, measuring discriminant validity requires measuring with Fornell-Larcker and Heterotrait-Monotrait (HTMT) (Hair et al., 2017). The Fornell-Larcker criterion refers to the fact that square root of

the AVE of the variables is greater than the correlation values between them and other variables. HTMT conceptually recommends a threshold of 0.90 for the scales (Henseler et al., 2015). The discriminant validity results of the model are displayed in Table 3.

Due to the fact that the scales had adequate validity and reliability for accurate measurement, a structural equation model was performed and the path diagram of the model is presented in Figure 2.

Table 3. Discriminant Validity Values

	Fornell-Larcker Criterion			HTMT		
	1	2	3	1	2	3
Performance	0.921					
SDGs	0.206	0.717		0.168		
Green Transformational Leadership	0.136	0.146	0.905	0.141	0.130	

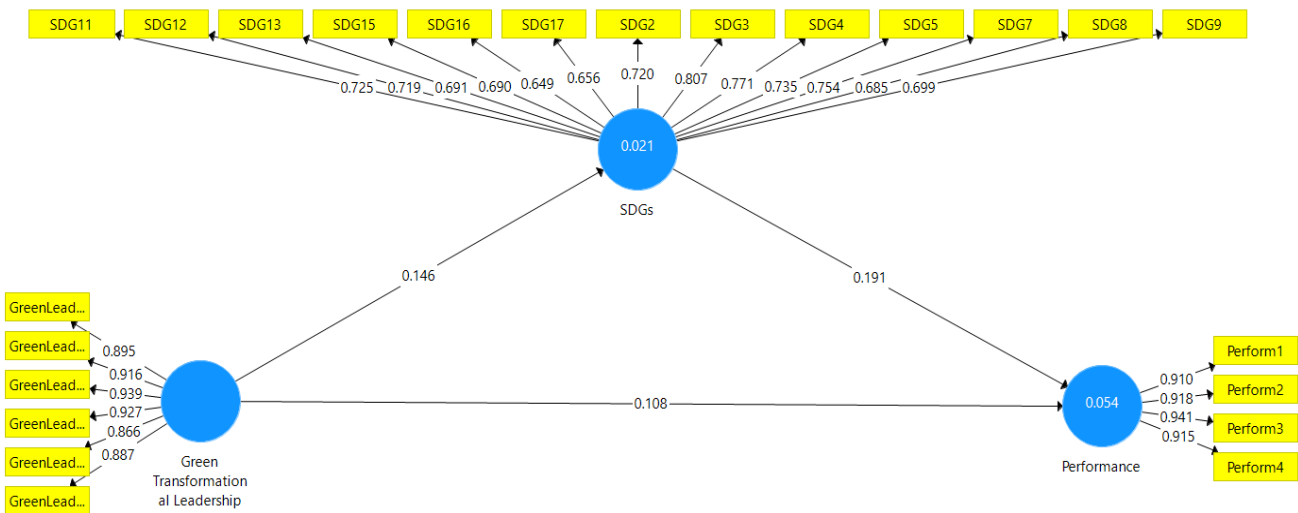


Figure 2. Path Diagram.

According to the literature, a Standardized Root Mean Square Residual (SRMR) value below 0.080 and a Normed Fit Index (NFI) value above 0.80 indicate a good fit (Byrne, 2016). Table 4 reveals in detail that the model meets the goodness-of-fit standards.

Table 4. Model Goodness of Fit Values.

	Model Fit	
	Saturated Model	Estimated Model
SRMR	0.066	0.066
d_ULS	1.189	1.189
d_G	0.479	0.479
Chi-Square	869.725	869.725
NFI	0.854	0.854

As a result of Structural Equation Modelling, the hypotheses were tested, which is illustrated in Table 5. In this regard, all hypotheses can be claimed to be accepted.

Table 5. Hypothesis Test Results

Path	B	Standard Deviation	t-Value	p	Hypothesis
Green Transformational Leadership -> SDGs	0.146	0.055	2.643	0.008	H1 Accepted
SDGs -> Performance	0.190	0.049	3.877	0.000	H2 Accepted
Green Transformational Leadership -> Performance	0.108	0.053	2.027	0.043	H3 Accepted
Green Transformational Leadership -> SDGs -> Performance	0.028	0.013	2.161	0.031	H4 Accepted

According to the hypothesis test results, the effect of green transformational leadership on the SDGs is expected and the effect of green transformational leadership on the SDGs is observed to be stated more theoretically in previous studies (Ding et al., 2023; Pham & Pham, 2023; Rizvi & Garg, 2020). Nevertheless, in the present study, this situation was proven and H1 was accepted. In spite of various criticisms, the effect of SDGs support on performance, especially on less energy use and waste production, is known (Nicolo' et al., 2024; Ramos et al., 2022), which is proven by the results obtained and H2 was accepted. In accordance with the literature, the effectiveness of green transformational leadership on performance was at a lower level than expected (Cui et al., 2023; Luan et al., 2022; Riva et al., 2021). H3 hypothesis was accepted, but the low value obtained is regarded as a result that should be evaluated particularly for the aviation sector. The present study also found the partial mediator role of “Sustainable Development Goals” in the effect of green transformational leadership on employee performance. Even though the H4 hypothesis was accepted, the significance of partial mediation was also confirmed by VAF calculation. The fact that the VAF value is 20.44% suggests that it has a partial mediator role. The significance of the mediator variable in the model was determined by VAF calculation. VAF value takes values between 0 and 100 (0-20% no mediation; 20-80% partial mediation; 80-100% full mediation). (Hair et al., 2017).

5. Conclusion

Aviation takes a large share in the fossil fuel consumption of the world. Owing to international initiatives such as the “Sustainable Development Goals”, various solutions are searched for so as to reduce carbon emissions in the aviation industry. Sustainable business models have been discussed in the aviation world for years with the aim of addressing the



huge negative effect that aviation has on the environment. There is a great need in the sector for leaders who will manage green transformation in order to select and manage the right model and strategies (Çop et al., 2021). When taken into account from this perspective, the green transformational leader brings environmental goals and the vision of the organization together, ensuring that his subordinates are environmentally sensitive, internalize sustainable behavior and values and put them into practice (Begum et al., 2022). Meanwhile, green transformational leadership is expected to contribute to environmental management and performance (Sánchez-García et al., 2023). Bearing these in mind, the current study attempted to explain the mediating role of “Sustainable Development Goals” in the effect of green transformational leadership on employee performance.

With the acceptance of the first hypothesis, it can be realized that the theoretical effect expected previously has been proven by the research. Green transformational leadership is found to have a low effect on the SDGs (Ding et al., 2023; Pham & Pham, 2023; Rizvi & Garg, 2020). Taking the generalizing structure of the SDG into consideration, which covers all problems in the world, the result obtained can be stated to be natural. As a result of the study, with the RBV theory, organizations are found to need more investment in their human resources in order to adapt better to the needs of the environment. Moreover, this picture becomes even deeper especially when the salaries received by the participants are considered.

The acceptance of the second hypothesis confirmed the impact of SDG on performance. In this regard, it can be suggested that the inclusiveness of the SDG is effective in increasing performance (Nicolò et al., 2024; Ramos et al., 2022), which is achieved thanks to overarching and unifying SDGs such as SDG5 (Gender equality), SDG7 (Accessibility and Clean Energy), SDG9 (Industry, Innovation and Infrastructure), SDG11 (Sustainable Cities and Communities), SDG12 (Responsible Production and Consumption) and SDG13 (Climate Action) by contributing to the performance of the employees. For SDG1, SDG6, SDG10 and SDG14, it is observed that the items in question were removed from the study in that those questions were not fully understood by the participants and were not associated with aviation. Previous statements made by ICAO also indicate that the aviation sector cannot fully meet every SDG (ICAO, 2024b). The result obtained is found to be compatible with the prediction of industry pioneers.

With the acceptance of the third hypothesis, the effect of green transformational leadership on employee performance was determined. Some measures were taken in the aviation industry, especially after the September 11 attacks and as a result of these measures, it is observed that some communication channels among employees were restricted. Therefore, it is quite natural that the result obtained is not at the expected level. Despite the fact that the fourth hypothesis, in which all the identified issues were examined, was accepted, it is found that the mediating role was at a low level, which can be explained by the fact that the aviation industry focuses on technical issues more than social issues (Khoo & Teoh, 2014).

Environmental studies carried out in the aviation industry are conducted mainly through engine and aerodynamic technology (Bartels et al., 2017; Ekici, 2020; Gula et al., 2019; Smith, 2016; Şöhret et al., 2021; Xu et al., 2020) and through economic and numerical modelling (Abdullah et al., 2016; Gardi et al., 2014; Kaloshin et al., 2016; Ma & Zhou, 2000; Ono et al., 2015). It is expected that the study will contribute to the development of the literature by claiming that the need for green transformation necessitates an organizational

transformation and that this can be achieved by a leader. Unfortunately, transformation is not possible without the support of leaders. In this respect, the present study can be claimed to be novel in that it explains the effect of “Sustainable Development Goals” on the aviation sector through leadership. The model created to explain this specificity is supported by RBV (Barney, 2001). The fact that the study is limited to Istanbul and the collection of data with convenience sampling constitutes a major limitation. This limitation reduces the generalisability of the research. It is recommended to expand the literature with themes such as technological change, innovative behavior, organizational climate and sustainable leadership through future related studies.

### Ethical approval

Yes, Istanbul Arel University Ethics Committee Commission dated 12.05.2023 and numbered 2023/10

### Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

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