



## RESEARCH ARTICLE

# The Effect of Managerial Support on Employee Creativity: A Study on Aircraft Maintenance Personnel

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**HIGHLIGHTS**

- This is the first study to examine the effect of manager support on employee creativity in aircraft maintenance organizations.
- A positive and strong relationship was found between manager support and employee creativity.
- Both manager support and employee creativity variables do not differ significantly according to demographic characteristics.
- The results of the study have important implications for the development of managerial mechanisms to support creative thinking in the aviation industry.

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**ABSTRACT**

This study aims to examine the effect of managerial support on employee creativity in SHY-145 approved aircraft maintenance organizations operating in Turkey and authorized by the Directorate General of Civil Aviation (DGCA). A quantitative research method was adopted in the study and a relational survey model was used. Data were collected from 362 technical personnel selected by convenience sampling method. A questionnaire form consisting of three sections was used as a data collection tool, and in addition to demographic information, Manager Support Scale and Employee Creativity Scale were applied. According to the regression analysis results, managerial support has a positive and significant effect on employee creativity. Analyses conducted according to demographic variables revealed that both managerial support and employee creativity variables did not show a significant difference according to gender, marital status, age and professional experience groups. In line with the results of the study, it is recommended that creative leadership training programs should be organized for managers in aircraft maintenance organizations, formal mechanisms should be established where technical personnel can share their creative ideas, performance evaluation systems should be restructured to encourage creative thinking, and regulations should be included in DGCA regulations to encourage creative thinking. In future studies, it is suggested investigating the moderating effects of variables such as organizational culture, technological competence and job security climate and conducting comparative studies covering aircraft maintenance organizations in different countries.

**Keywords:** Managerial Support, Employee Creativity, Aircraft Maintenance Personnel.

## I. INTRODUCTION

The aviation industry is one that requires high reliability and has a minimum level of fault tolerance. Aircraft maintenance activities in the aviation industry are of vital importance for the safe and efficient maintenance of flight operations [1]. The success of maintenance activities largely depends on the performance of technical personnel working in this field. Aircraft maintenance technicians need to be able to use creative thinking and problem solving skills to produce fast and effective solutions to the technical problems they encounter [2].

The fact that approximately 12-20% of aircraft accidents are caused by maintenance errors [3] reveals the importance of the performance and creativity of aircraft maintenance personnel. Improving the creative thinking and problem solving skills of aircraft maintenance technicians is important for both increasing flight safety and optimizing maintenance costs [4]. A supportive management approach is needed for maintenance personnel to reveal their creative potential. Managerial support emerges as an important factor that helps employees to do their jobs more effectively, reduces stress in the workplace and increases employee creativity [5].

In the literature, three main dimensions of managerial support are proposed as emotional, material and informational support [6]. The presence of managerial support enables employees to unleash their creative potential and produce innovative solutions to the technical problems they face. Understanding the impact of managerial support on employee creativity is of great importance, especially in high-reliability sectors such as aviation.

A review of the literature reveals that there are no studies examining the relationship between managerial support and employee creativity in aircraft maintenance organizations. Existing studies in the aviation sector generally focus on technical issues and there are limited number of studies on organizational behaviour. In this context, the lack of research on the effect of managerial support on employee creativity in aircraft maintenance organizations emerges as an important research problem.

The main purpose of the study is to examine the effect of managerial support on employee creativity in the aircraft maintenance sector. The study was conducted on technical personnel working in SHY-145 approved aircraft maintenance organizations operating in Turkey and authorized by the Directorate General of Civil Aviation (DGCA). The results of the study are expected to fill an important gap in the literature by examining the relationship between managerial support and employee creativity, especially in aircraft maintenance organizations in Turkey. In addition, the results of the study are expected to contribute to the development of human resource management practices in aircraft maintenance organizations and to increase the effectiveness of maintenance activities.

## II. METHOD

This study was designed with the relational survey model, one of the quantitative research approaches [7, 8]. The independent variable of the study is managerial support and the dependent variable is employee creativity. In the study, the hypotheses “*H1: Managerial support perceived by aircraft maintenance personnel positively affects employee creativity*” and “*H2: Managerial support perceived by aircraft maintenance personnel and employee creativity differ significantly according to demographic characteristics*” were tested.

The population of the study consists of 4,684 technical personnel working in SHY-145 approved aircraft maintenance organizations operating in Turkey [9]. The minimum sample size was determined as 356 people, and 362 people were contacted in the study [8]. Simple random sampling method was used in sample selection [7], and the criteria were that the participants should have at least one year of current maintenance organization experience, work directly under a manager and take part in active aircraft maintenance activities.

A questionnaire technique was used as a data collection tool. In order to measure managerial support, the unidimensional “Managerial Support Scale” consisting of 7 items was used [10, 11]. The reported Cronbach's alpha reliability coefficient of the scale is 0.918. In order to measure employee creativity, the unidimensional “Employee

Creativity Scale” consisting of 11 items was used[12]. The reported Cronbach's alpha reliability coefficient of this scale is 0.930. Both scales have a 5-point Likert-type evaluation system.

SPSS 26.0 program was used to analyze the data. Descriptive statistics, reliability analysis, Pearson correlation analysis, simple linear regression analysis, independent sample t-test and one-way analysis of variance (ANOVA) were applied to test differences according to demographic variables. In all statistical analyses, significance level was accepted as  $p < 0.05$ .

### III. RESULTS

#### A. Demographic Characteristics of Participants

The distribution of participants according to gender, age, marital status and professional experience variables is presented in Table I.

**Table I.** Distribution of Participants According to Demographic Characteristics

Variable	Groups	N	%
Gender	Male	304	84,0
	Female	58	16,0
Age	18-25 years	83	22,9
	26-35 years	106	29,3
	36-45 years	134	37,0
	46 and overyears	39	10,8
Marital Status	Single	142	39,2
	Married	220	60,8
Professional Experience	1-5 years	93	25,7
	6-10 years	152	42,0
	11 and moreyears	117	32,3

The demographic characteristics of the aircraft maintenance personnel included in the study show that male participants (84.0%,  $n=304$ ) constitute the majority in gender distribution, while female participants are represented by 16.0% ( $n=58$ ). The age distribution of the participants showed that the highest proportion was in the 36-45 age range (37.0%,  $n=134$ ). This was followed by the 26-35 age range (29.3%,  $n=106$ ) and the 18-25 age range (22.9%,  $n=83$ ). The lowest participation rate was observed in the 46 and over age group (10.8%,  $n=39$ ). According to marital status data, 60.8% ( $n=220$ ) of the participants were married and 39.2% ( $n=142$ ) were single. In terms of professional experience, 42.0% ( $n=152$ ) of the participants had 6-10 years of experience, 32.3% ( $n=117$ ) had 11 years or more, and 25.7% ( $n=93$ ) had 1-5 years of experience.

#### B. Reliability Analysis

The reliability analysis results of the scales used in the study are presented in Table II.

**Table II.** Reliability Analysis Results of the Scales

Scale	Number of Items	Cronbach's Alpha
Managerial Support	7	0,823
Employee Creativity	11	0,918

Reliability analysis results show that the Cronbach's Alpha coefficient of the 7-item managerial support scale is 0.823 and the Cronbach's Alpha coefficient of the 11-item employee creativity scale is 0.918. It is seen that both scales are highly reliable and have sufficient internal consistency to collect data suitable for the purpose of the study [8].

#### C. Normal Distribution Analysis

Skewness and kurtosis values were examined to determine whether the variables used in the study meet the assumption of normal distribution. Normality test results are presented in Table III.

**Table III.** Normal Distribution Analysis Results

Scale	Skewness	Kurtosis
Managerial Support	-0,662	0,417
Employee Creativity	-0,842	0,738

The analysis revealed that the managerial support variable has -0.662 skewness and 0.417 kurtosis values, while the employee creativity variable has -0.842 skewness and 0.738 kurtosis values. For a normal distribution, it is ideal for these values to be close to zero [13]. In the evaluation made with reference to the  $\pm 1.5$  interval recommended in the literature [14], it was determined that the assumption of normal distribution was met and parametric tests were decided to be used.

*D. Descriptive Statistical Analysis*

Descriptive statistical analyses were conducted to determine the measures of central tendency and dispersion for the variables examined in the study. Descriptive statistics are presented in Table IV.

**Table IV.** Descriptive Statistical Analysis Results

Variable	Mean	sd	Level
Managerial Support	3,88	0,70	High
Employee Creativity	4,07	0,66	High

Considering that the scales used in the study are 5-point Likert type, the score ranges of the scales were cascaded as  $(5-1)/5=0.80$  according to the formula  $(n-1)/n$  and classified as very low, low, medium, high and very high, respectively[15]. Table IV shows that aircraft maintenance personnel's perception of managerial support is at a high level ( $\bar{x}=3.88$ ;  $ss=0.70$ ). Similarly, the level of employee creativity was also found to be at a high level ( $\bar{x}=4.07$ ;  $ss=0.66$ ). The fact that the standard deviation values of both variables are less than 1 indicates that the participant responses show a relatively homogeneous distribution around the mean. The findings indicate that aircraft maintenance personnel generally evaluate the support they receive from their managers positively and perceive their own creativity level to be quite high.

*E. Correlation Analysis*

Pearson correlation analysis was conducted to determine the direction and severity of the relationship between the independent variable of the study, managerial support, and the dependent variable, employee creativity. The correlation coefficients and significance levels between the variables are presented in Table V.

**TableV.** Correlation Analysis Results

Variable	Managerial Support	Employee Creativity
Managerial Support	1	
Employee Creativity	,736**	1

\*\* $p < 0,01$

Correlation coefficients show negligible relationship levels between 0.00-0.10, weak between 0.10-0.39, moderate between 0.40-0.69, strong between 0.70-0.89 and very strong between 0.90-1.00 [15]. In this framework, Table V shows that there is a positive, strong and statistically significant relationship between managerial support and employee creativity ( $r=0.736$ ;  $p < 0.01$ ).

*F. Regression Analysis*

A simple linear regression analysis was conducted to determine the effect of managerial support on employee creativity. The results of the regression model in which managerial support is considered as the independent variable and employee creativity as the dependent variable are presented in Table VI.

**TableVI.** Results of Simple Linear Regression Analysis

Independent Variable	Dependent Variable	$\beta$	t	p
Managerial Support	Employee Creativity	,736	20,625	,000

*F=425,323; R2=0,540; p=0,000*

The results of the regression analysis show that the model is statistically significant ( $F=425,373$ ;  $p<0,001$ ). The  $R^2$  value showing the explanatory power of the model was calculated as 0.540. The  $R^2$  value shows that 54.0% of the variance in employee creativity is explained by managerial support. Studies in the field of social sciences indicate that an  $R^2$  value above 0.50 indicates a high level of explanatory power [13].Regression coefficients indicate that managerial support has a positive and significant effect on employee creativity ( $\beta=0.736$ ;  $t=20.625$ ;  $p<0.001$ ). The regression coefficient ( $\beta=0.736$ ) shows that a one unit increase in managerial support leads to a 0.736 unit increase in employee creativity.

*G. Difference Analyses*

In this section, the differentiation of the data collected within the scope of the study according to demographic variables is examined. Statistical analyses were conducted to determine whether the levels of managerial support and employee creativity perceived by aircraft maintenance personnel differ significantly according to demographic characteristics such as gender, marital status, age and professional experience. In this context, independent sample t-test was applied for categorical variables with two groups and one-way analysis of variance (ANOVA) was applied for those with more than two groups.

*1) Examination of Managerial Support Level According to Demographic Characteristics*

In this sub-section, the differentiation of the level of managerial support perceived by aircraft maintenance personnel according to demographic characteristics is discussed.

*a) Findings Regarding Gender*

Independent sample t-test was conducted to examine whether the level of managerial support perceived by aircraft maintenance personnel working in the aviation sector differs according to gender. The results of the analysis are presented in Table VII.

**TableVII.** t-Test Results of Level of Managerial Support by Gender

Gender	n	Mean	sd	t	sd	p
Male	304	3,88	0,70	0,421	360	0,674
Female	58	3,84	0,70			

The results in Table VII show that the level of managerial support perceived by aircraft maintenance personnel does not show a statistically significant difference according to gender ( $t(360)=0.421$ ;  $p>0.05$ ). The average of male employees' perception of managerial support ( $\bar{x}=3.88$ ;  $ss=0.70$ ) and female employees' perception of managerial support ( $\bar{x}=3.84$ ;  $ss=0.70$ ) were quite close to each other.

*b) Findings Regarding Marital Status*

Independent sample t-test was applied to determine whether the level of managerial support perceived by aircraft maintenance personnel differed according to marital status. The results of the analysis are presented in Table VIII.

**TableVIII.** t-Test Results of Level of Managerial Support by Marital Status

Marital Status	n	Mean	sd	t	sd	p
Single	142	3,88	0,73	0,065	360	0,948

Married	220	3,87	0,68
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The results of the analysis presented in Table VIII show that the level of managerial support perceived by aircraft maintenance personnel does not show a statistically significant difference according to marital status ( $t(360)=0.065$ ;  $p>0.05$ ). The mean perception of managerial support of single employees ( $\bar{x}=3.88$ ;  $ss=0.73$ ) and the mean perception of managerial support of married employees ( $\bar{x}=3.87$ ;  $ss=0.68$ ) are almost at the same level.

c) Findings Regarding Age

One-way analysis of variance (ANOVA) was applied to determine whether the level of managerial support perceived by aircraft maintenance personnel differed according to age groups. The results of the analysis are presented in Table IX.

**TableIX.** ANOVA Results of Level of Managerial Support by Age

Age	n	Mean	sd	F	p
18-25 years	83	3,86	0,70	0,442	0,723
26-35 years	106	3,91	0,69		
36-45 years	134	3,83	0,71		
46 and overyears	39	3,95	0,68		

The results of the analysis presented in Table IX show that the level of managerial support perceived by aircraft maintenance personnel does not show a statistically significant difference according to age groups ( $F(3,358)=0.442$ ;  $p>0.05$ ). It is seen that employees in the 46 and over age group have the highest mean perception of managerial support ( $\bar{x}=3.95$ ;  $ss=0.68$ ), while employees in the 36-45 age group have the lowest mean ( $\bar{x}=3.83$ ;  $ss=0.71$ ). However, the mean perceptions of manager support of all age groups were quite close to each other.

d) Findings Regarding Professional Experience

One-way analysis of variance (ANOVA) was applied to determine whether the level of managerial support perceived by aircraft maintenance personnel differed according to their professional experience. The results of the analysis are presented in Table X.

**TableX.** ANOVA Results of Managerial Support Level by Professional Experience

Professional Experience	n	Mean	sd	F	p
1-5 years	93	3,87	0,71	1,039	0,355
6-10 years	152	3,93	0,68		
11 and more years	117	3,81	0,72		

The results of the analysis presented in Table X show that the level of managerial support perceived by aircraft maintenance personnel does not show a statistically significant difference according to their professional experience ( $F(2,359)=1,039$ ;  $p>0,05$ ). It is seen that employees with 6-10 years of experience have the highest mean perception of managerial support ( $\bar{x}=3,93$ ;  $ss=0,68$ ) and employees with 11 years of experience and above have the lowest mean ( $\bar{x}=3,81$ ;  $ss=0,72$ ).

2) Examination of Employee Creativity Level According to Demographic Characteristics

In this sub-section, the differentiation of creativity levels according to demographic characteristics is examined.

a) Findings Regarding Gender

Independent sample t-test was applied to determine whether the level of employee creativity of aircraft maintenance personnel differs according to gender. The results of the analysis are presented in Table XI.

**Table XI.** t-Test Results of Employee Creativity by Gender

Gender	n	Mean	sd	t	p
Male	304	4,08	0,65	0,591	0,555
Female	58	4,03	0,74		

The results of the analysis presented in Table XI show that the level of employee creativity of aircraft maintenance personnel does not show a statistically significant difference according to gender ( $t(360)=0.591$ ;  $p>0.05$ ). The mean creativity level of male employees ( $\bar{x}=4.08$ ;  $ss=0.65$ ) and the mean creativity level of female employees ( $\bar{x}=4.03$ ;  $ss=0.74$ ) were quite close to each other.

*b) Findings Regarding Marital Status*

Independent sample t-test was applied to determine whether the level of employee creativity of aircraft maintenance personnel differs according to marital status. Prior to the analysis The results of the analysis are presented in Table XII.

**Table XII.** t-Test Results of Level of Employee Creativity by Marital Status

Marital Status	n	Mean	sd	t	sd	p
Single	142	4,02	0,72	-1,216	0,225	4,02
Married	220	4,11	0,62			4,11

The results of the analysis presented in Table XII show that the level of employee creativity of aircraft maintenance personnel does not show a statistically significant difference according to marital status ( $t(360)=-1,216$ ;  $p>0,05$ ). There is no significant difference between the mean creativity level of single employees ( $\bar{x}=4.02$ ;  $ss=0.72$ ) and married employees ( $\bar{x}=4.11$ ;  $ss=0.62$ ).

*c) Findings Regarding Age*

One-way analysis of variance (ANOVA) was applied to determine whether the level of employee creativity of aircraft maintenance personnel differed according to age groups. The results of the analysis are presented in Table XIII.

**Table XIII.** ANOVA Results of Level of Employee Creativity by Age

Age	n	Mean	sd	F	p
18-25 years	83	3,86	0,70	0,442	0,723
26-35 years	106	3,91	0,69		
36-45 years	134	3,83	0,71		
46 and over years	39	3,95	0,68		

The results of the analysis presented in Table XIII show that the level of employee creativity of aircraft maintenance personnel does not show a statistically significant difference according to age groups ( $F(3,358)=0.442$ ;  $p>0.05$ ). It is seen that the employees in the age group of 46 and above have the highest mean of employee creativity ( $\bar{x}=3,95$ ;  $ss=0,68$ ) and the employees in the age group of 36-45 have the lowest mean ( $\bar{x}=3,83$ ;  $ss=0,71$ ). However, the average employee creativity scores of all age groups were very close to each other.

*d) Findings Regarding Professional Experience*

One-way analysis of variance (ANOVA) was applied to determine whether the level of employee creativity of aircraft maintenance personnel differed according to professional experience groups. The results of the analysis are presented in Table XIV.

**Table XIV.** ANOVA Results of Employee Creativity Level by Professional Experience

Professional Experience	n	Mean	sd	F	p
1-5 years	93	3,87	0,70	1,039	0,355
6-10 years	152	3,93	0,69		
11 and more years	117	3,81	0,70		

The results of the analysis presented in Table XIV show that the level of employee creativity of aircraft maintenance personnel does not show a statistically significant difference according to the professional experience groups ( $F(2,359)=1,039$ ;  $p>0,05$ ). It is seen that employees with 6-10 years of experience have the highest mean of employee creativity ( $\bar{x}=3,93$ ;  $ss=0,69$ ) and employees with 11 and more years of experience have the lowest mean ( $\bar{x}=3,81$ ;  $ss=0,70$ ). However, the employee creativity averages of all professional experience groups were quite close to each other.

#### IV. DISCUSSION

The findings obtained in this study largely overlap with the results of similar studies in the literature. In a study conducted in the chemical industry, similar significant relationships were found [16]. Likewise, positive and significant relationships were found between managerial support and employee creativity in studies conducted in different sectors [17, 18]. In studies using variables similar to managerial support, a positive and significant relationship was found between perceived organizational support and employee creativity [19, 20] and between leader relationship support and employee creativity [21]. Regarding the moderating role of managerial support; in a study conducted in enterprises operating in different sectors in China [22], it was determined that managerial support has a moderating role in the relationship between psychological capital and employee creativity.

The findings regarding demographic variables revealed that the variables of managerial support and employee creativity did not differ significantly according to gender, age, marital status and professional experience groups. These findings are consistent with the results of the studies in the literature [22, 23]. In the mentioned studies, statistically significant relationships were not found between demographic variables (gender, age, tenure, education, job type and sector) and managerial support and employee creativity.

However, the findings of the current study contradict the findings of a study in which professional experience was found to have a moderating effect [17]. In the study, it was revealed that experienced employees were more affected by managerial support and exhibited higher creativity. This difference between the two studies may be due to the cultural characteristics of the samples. Indeed, the study was conducted in Kuwait and the authors emphasized the impact of collectivist culture on results.

From an engineering management perspective, the fact that demographic variables do not show significant differences indicates that managerial support and employee creativity are universal in the aviation industry. This finding of the study can be explained by the industry's standardized processes and high reliability requirements. The fact that demographic characteristics such as gender, age, marital status and professional experience are not determinative indicates that technical competencies and professional standards are at the forefront in the aviation industry.

#### V. CONCLUSION

This study found that managerial support strongly affects employee creativity in aircraft maintenance organizations (H1 - Accepted), this effect is valid for all employees regardless of demographic characteristics (H2 - Rejected) and both variables are at high levels. The results reveal the importance of managerial support in the aviation industry and indicate that engineering management practices should be shaped accordingly.

In line with the findings of the study, recommendations for practitioners and researchers can be developed. For practitioners, managers in aircraft maintenance organizations can be provided with systematic leadership trainings



covering creative thinking techniques and innovative maintenance practices. Formal mechanisms such as brainstorming meetings and suggestion systems that can evaluate the creative ideas of technical staff can be established and operated effectively. In terms of engineering management, performance appraisal systems can be structured to include criteria that encourage creative thinking. In addition, the regulations of the Directorate General of Civil Aviation can be amended to support the creative potential of technical staff while maintaining safety standards. For future research, comparative studies on the interaction of the relationship between managerial support and employee creativity with variables such as organizational culture and work safety climate can be conducted in aircraft maintenance organizations in different countries.

#### STATEMENT OF CONTRIBUTION RATE

Authors' contribution rates to the study are equal. / Author contributed 100%.

#### CONFLICTS OF INTEREST

They reported that there was no conflict of interest between the authors and their respective institutions.

#### RESEARCH AND PUBLICATION ETHICS

In the studies carried out within the scope of this article, the rules of research and publication ethics were followed.

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