

## Investigation of performance on forest products industry with performance appraisal system

Aytaç AYDIN<sup>1\*</sup>, Sebahattin TİRYAKİ<sup>1</sup>

<sup>1</sup>Karadeniz Technical University, Faculty of Forestry, Trabzon, TURKEY

\*Corresponding author: [aytac@ktu.edu.tr](mailto:aytac@ktu.edu.tr)

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### Abstract

*Aim of study:* The purpose of this study is to determine whether there is or not a difference depending on the demographic characteristics of the participants and in the sub sectors level of performance appraisal practices with productivity and motivational effects of the performance appraisal systems applied in the businesses. The study was applied to 432 people that work in 14 businesses operating in forest products industry (furniture, panel products, paper and paper products) throughout Turkey.

*Material and Methods:* For this purpose, the questionnaire prepared was administered to employees in businesses with face to face interviews. The collected questionnaires were entered to SPSS (Statistical Package for the Social Sciences) and tested by descriptive statistics, factor analysis and analysis of variance.

*Main results:* When the results were analyzed, it was seen that performance appraisal practices may be divided into six factors (performance appraisal's aim, criteria, interviews, applications, productivity impact and motivational impact). It was also determined that the performance appraisal system sub-sectors do not show a difference in terms of sub-factors of the forest products industry. In addition, according to the results of variance analysis carried out based on demographics characteristics, it was not observed a significant difference in terms of age groups, while significant differences were identified at the level of performance appraisal sub-factors in terms of education status, gender, marital status, position and total operating time.

*Research highlights:* Performance appraisal studies are very important for businesses since they include indicators of employee productivity.

**Keywords:** Factor analysis, Forest products industry, Performance appraisal, Analysis of variance

## Performans değerlendirme sistemi ile orman ürünleri endüstrisinde performans araştırması

### Özet

*Çalışmanın amacı:* Bu çalışma ile Türkiye genelinde orman ürünleri sanayi sektörlerinde (mobilya, levha ürünleri, kağıt ve kağıt ürünleri) yer alan 14 orman ürünleri işletmesinde çalışan 432 kişiye ulaşılarak işletmelerde uygulanan performans değerlendirme sistemlerinin verimlilik ve motivasyonel etkileri ile performans değerlendirme uygulamalarının alt sektörler düzeyinde ve katılımcıların demografik özelliklerine bağlı olarak farklılık gösterip göstermediği araştırılmıştır.

*Materyal ve Yöntem:* Bu amaçla hazırlanan anket formu, işletmelerdeki çalışanlara yüz yüze görüşme tekniği ile uygulanmıştır. Toplanan anketler, SPSS paket programına işlenerek açıklayıcı istatistikler, faktör analizi ve varyans analizi ile test edilmiştir.

*Sonuçlar:* Sonuçlar incelendiğinde, performans değerlendirme uygulamaların altı tane faktöre (performans değerlendirmenin; amacı, kriterleri, görüşmeleri, uygulamaları, verimlilik etkisi ve motivasyonel etkisi) ayrılabilceği belirlenmiştir. Performans değerlendirme sistemleri alt faktörleri bakımından orman ürünleri sanayi alt sektörleri bazında anlamlı bir farkın olmadığı belirlenmiştir. Ayrıca demografik özelliklere göre yapılan varyans analizi sonuçlarına göre yaş grupları bakımından anlamlı bir farklılık olmamakla beraber, eğitim durumu, cinsiyet, medeni durum, çalışılan pozisyon ve toplam çalışma süresine göre performans değerlendirme alt faktörleri düzeyinde anlamlı farklılıklar belirlenmiştir.

*Araştırma vurguları:* İşletmeler açısından performans değerlendirme çalışmaları çalışanların verimliliğine yönelik göstergeler içerdiğinden işletmeler için çok önemli uygulamalardır.

**Anahtar kelimeler:** Faktör analizi, Orman ürünleri sanayi, Performans değerlendirme, Varyans analizi



## Introduction

The success in the human factor that has to be considered from many aspects within production units can be achieved by analysis of the factors that will affect human work and by ensuring the proper conditions for these factors. In this context, performing the required performance analysis, taking the assessments and taking performance-improving measures are among indispensable events in today's world for businesses.

Performance Management System (PMS) is a system that helps organizations to achieve their organizational objectives (Chenhall, 2005; Ferreira & Otley, 2009). In practice, although many performance management systems are available, their basic principles are largely similar to each other. Among them, the most important factors linking the strategic management systems with PMS are performance criteria that determine the vision and strategy of the organization (Pirttimäki et al., 2006).

The performance of employees may be described as performing their work within acceptable limits, as defined by the business managers. Appraisal of performance revealed by employees is very important in achieving the objectives in the workplace and in determining the contribution of the employees in achieving these goals. These assessments contribute to personal and organizational development in the workplace (Akçakanat, 2009).

Performance appraisal (PA) intends to evaluate the performance of employees as objectively as possible. It was reported that a well-designed PA system helps develop employee performance-related criteria, provides a feedback mechanism and enables a more equitable reward system. It was also stated that employees' productivity increases when a fair system is available for PA in any organizations. In this regard, PA undertakes a critical task for organizations in order to reach their strategic objectives (Kumbhar, 2011). According to Atay (1990), PA helps business managers in taking important business decisions such as recruitment of new workers, supervision of employees at trial, making wage adjustments, training and development of employees, promotion and

job change, dismissal and hiring. PA also allows the managers to make these decisions easier.

Forest products industry has important role in manufacturing industry. This sector has sub-sectors such as paper, timber, furniture, particle board (Serin et al., 2014). Furniture industry is a part of secondary manufacturing that is one of the six sub-sectors of forestry (Serin & Şahin, 2016). Particle board is used in furniture, forestry enterprises, glue industry, timber factories, paper sector, construction, decoration, energy sector, and other fields (Şahin & Serin, 2016).

The best way to compare the effectiveness of the performance management systems implemented in businesses is the examination of the systems from the point of view of employees (Dewettinck & van Dijk, 2013; Mishra & Farooqi, 2013). This study aims to be evaluated by the employees in terms of sub-sectors and some demographics properties of the performance appraisal systems located in performance management system in forest products industry.

## Materials and Methods

The population of the study consists of forest products businesses operating in the forest products industry throughout Turkey. Identification of the study was made through reaching the businesses and they were informed about the procedure. 14 of these businesses have adopted the implementation of the study. Of the participant businesses, 7 operate in furniture, 6 operate wood based panel and 1 operates in paper production. As a result, a total of 432 assessable questionnaires were provided from these businesses.

A questionnaire prepared by benefiting from a previous PA study was used for in the present study (Tarlıg, 2006; Yılmaz, 2006). The questionnaire consists of 3 sections; the questions designed to determine the PA applications prepared in 5-point Likert-type, business information and personal information.

Completed questionnaires were entered into SPSS statistical software package, and then the frequency tables, reliability

analyses, validity analyses and analysis of variances were performed.

**Results**

**Scale reliability and validity**

Although there are many models used in reliability analyses, Cronbach alpha coefficient was employed for the present study. According to the analysis results, it was determined that Cronbach alpha coefficient was 0.950. This number varies between 0 and 1, and values over 0.90 mean excellent agreement (Kalaycı, 2009).

Moreover, a factor analysis was made in order to measure structural validity of the study. However, before moving on to factor analysis, it is essential to test conformity of the data set with Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy. KMO is an index that compares the magnitudes of observed correlations and partial correlations, and for validity, this rate should be over 0.5 (Sharma 1995). In this study, KMO value was found as 0.917 (Bartlett's

Test of Sphericity Sig.:0.001), and it was decided that the study was appropriate for factor analysis.

Basic components analysis and varimax rotation technique were used in factor analysis procedure. As a result of the analysis, from 51 items, 18 items which are nonconforming or which load on more than one factor were discarded. The remaining 33 items formed 6 sub-factors with eigenvalues bigger than 1. Total expressiveness of this six- factored structure was 59.942%. In the structure, the first factor was the purpose of PA with an expressiveness of 13.201%, the second factor was the criteria of PA with an expressiveness of 11.258 %; the third factor was PA interviews with an expressiveness of 11.178%; the fourth factor was the PA applications with an expressiveness of 9.555 %; the fifth factor was the productivity effect of PA with an expressiveness of 7.991 %; the sixth factor was The motivation effect of PA with an expressiveness of 6.753%

Some demographic characteristics of the participants are given in Table 1.

**Demographic characteristics**

Table 1: The findings belonging to demographic characteristics

<b>Age</b>	<b>n</b>	<b>%</b>	<b>Position</b>	<b>n</b>	<b>%</b>
19 and below	7	1.6	Senior	38	8.8
20-24	46	10.6	Middle-level	175	40.5
25-29	103	23.8	Employee	189	43.8
30-34	111	25.7	Unanswered	30	6.9
35-39	93	21.5	<b>Total</b>	<b>432</b>	<b>100</b>
40-49	67	15.5	<b>Educational status</b>	<b>n</b>	<b>%</b>
50 and above	5	1.2	Literate	4	0.9
Unanswered	0	0	Primary education	69	16.0
<b>Total</b>	<b>432</b>	<b>100</b>	High school	146	33.8
<b>Gender</b>	<b>n</b>	<b>%</b>	College	59	13.7
Male	357	82.6	University	149	34.5
Female	71	16.4	Graduate	5	1.2
Unanswered	4	1.0	<b>Total</b>	<b>432</b>	<b>100</b>
<b>Total</b>	<b>432</b>	<b>100</b>	<b>Total working time (year)</b>	<b>n</b>	<b>%</b>
<b>Marital status</b>	<b>n</b>	<b>%</b>	0-5	185	42.8
Married	304	70.4	6-10	143	33.1
Single	119	27.5	11-20	58	13.4
Other	1	0.2	21 and above	11	2.5
Unanswered	8	1.9	Unanswered	35	8.1
<b>Total</b>	<b>432</b>	<b>100</b>	<b>Total</b>	<b>432</b>	<b>100</b>

As Table 1 was examined, it was shown that 25.7% of participants were between 30 and 34 years of age, 82.6% were male, and 70.4% were married. Moreover, it was determined that approximately half of the participants were college and higher educational status, 43.8% were employee, and 42.8% had a working time of 0-5 year.

**Investigation of PA systems in terms of some variables**

In this part, it was investigated whether PA system factors (the purpose of PA, the criteria of PA, PA interviews, PA

applications, the productivity effect of PA, the motivation effect of PA) applied in the forest products industry vary depending on sector, age, gender, marital status, education level, position and the total working time or not.

**Investigation of the PA system in terms of sector**

The difference situation in terms of the sectors of PA system factors was tested with one way analysis of variance and the results were given in Table 2.

Table 2: The difference situation of PA system factors in terms of the sectors

Subgroups of the PA	Sectors	N	Average	F	p
<b>The purpose of PA</b>	Paper and paper products	25	3.60	0.582	0.559
	Panel products	190	3.74		
	Furniture	217	3.68		
<b>The criteria of PA</b>	Paper and paper products	25	3.42	2.092	0.125
	Panel products	190	3.46		
	Furniture	217	3.61		
<b>PA interviews</b>	Paper and paper products	25	3.44	2.664	0.071
	Panel products	190	3.53		
	Furniture	217	3.71		
<b>PA applications</b>	Paper and paper products	25	3.34	1.708	0.182
	Panel products	190	3.15		
	Furniture	217	3.32		
<b>The productivity effect of PA</b>	Paper and paper products	25	3.89	1.411	0.245
	Panel products	190	4.03		
	Furniture	217	4.10		
<b>The motivation effect of PA</b>	Paper and paper products	25	3.73	1.437	0.239
	Panel products	190	3.85		
	Furniture	217	3.95		

As a result of the analysis of variance carried out on the basis of forest products industry sub-sectors, a significant difference was not observed in terms of all the factors ( $p < 0.05$ ). According to this result, it is concluded that all sub-sectors of forest products industry exhibit a similar PA approach.

Moreover, when sector averages were examined, it was seen that paper and paper products industry was the sector that has the lowest average in terms of all the factors (excluding PA applications). On the other hand, the furniture industry had a higher average compared to other sectors.

**Investigation of the PA system in terms of age groups**

The difference situation in terms of age

groups of participants of PA system factors was analyzed with the analysis of variance and the results were given in Table 3.

Table 3: The difference situation of PA system factors in terms of participant age groups

Subgroups of the PA	Age groups	N	Average	F	p
<b>The purpose of PA</b>	24 and below	53	3.74	0.371	0.829
	25-29	103	3.71		
	30-34	111	3.71		
	35-39	93	3.74		
	40 and above	72	3.60		
<b>The criteria of PA</b>	24 and below	53	3.58	1.216	0.303
	25-29	103	3.65		
	30-34	111	3.54		
	35-39	93	3.46		
	40 and above	72	3.41		
<b>PA interviews</b>	24 and below	53	3.69	1.605	0.172
	25-29	103	3.74		
	30-34	111	3.59		
	35-39	93	3.64		
	40 and above	72	3.41		
<b>PA applications</b>	24 and below	53	3.30	1.143	0.336
	25-29	103	3.39		
	30-34	111	3.16		
	35-39	93	3.14		
	40 and above	72	3.25		
<b>The productivity effect of PA</b>	24 and below	53	3.95	1.504	0.200
	25-29	103	4.13		
	30-34	111	4.11		
	35-39	93	4.04		
	40 and above	72	3.93		
<b>The motivation effect of PA</b>	24 and below	53	3.91	0.664	0.617
	25-29	103	3.98		
	30-34	111	3.91		
	35-39	93	3.81		
	40 and above	72	3.83		

As a result of the analysis of variance carried out on the basis of age groups of forest products industry employees, a significant difference was not observed in terms of all the factors ( $p < 0.05$ ). According to this result, it is concluded that PA approaches in forest products industry does not differ in terms of age groups.

When the averages of age groups were examined, it was determined that 40 years

and older participants showed a lower participation for PA approaches. On the other hand, the furniture industry had a higher average value compared to other sectors. The highest participation was provided in the age group of 25-29.

**Investigation of the PA system in terms of educational status**

The difference situation in terms of the

educational status of participants of PA system factors has been tested with one-way analysis of variance and the results were given in Table 4.

Table 4: The difference situation in terms of participant educational status of factors

Subgroups of the PA	Educational status	N	Average	F	p
<b>The purpose of PA</b>	Primary education	73	3.47	3.218	0.023
	High school	146	3.82		
	College	59	3.72		
	University	154	3.69		
<b>The criteria of PA</b>	Primary education	73	3.35	5.294	0.001
	High school	146	3.73		
	College	59	3.52		
	University	154	3.43		
<b>PA interviews</b>	Primary education	73	3.33	3.830	0.010
	High school	146	3.73		
	College	59	3.73		
	University	154	3.61		
<b>PA applications</b>	Primary education	73	3.23	6.986	0.001
	High school	146	3.51		
	College	59	3.20		
	University	154	3.01		
<b>The productivity effect of PA</b>	Primary education	73	3.96	0.838	0.474
	High school	146	4.00		
	College	59	4.08		
	University	154	4.09		
<b>The motivation effect of PA</b>	Primary education	73	3.74	1.191	0.313
	High school	146	3.92		
	College	59	3.86		
	University	154	3.95		

As a result of the analysis of variance carried out on the basis of educational status of forest products industry employees, a significant difference in terms of all the factors except for productivity effect and motivation effect of the PA were determined ( $p < 0.05$ ).

According to this result, primary school graduates in terms of the purpose of the PA, the criteria of PA and PA interviews factors were separated from the other groups with

the lowest participation rate. With regard to the PA applications, university graduates exhibited a different approach from other groups with the lowest participation rate.

#### Investigation of the PA system in terms of gender

The difference situation in terms of the gender of participants of PA system factors was analyzed with t-test and the obtained results were given in Table 5.

Table 5: The difference situation of PA system factors in terms of participant gender

Subgroups of the PA	Gender	N	Average	F	p
<b>The purpose of PA</b>	Male	357	3.74	0.001	0.042
	Female	71	3.53		
<b>The criteria of PA</b>	Male	357	3.57	0.003	0.008
	Female	71	3.30		

Table 5. (continued)

<b>PA interviews</b>	Male	357	3.66	2.781	0.019
	Female	71	3.39		
<b>PA applications</b>	Male	357	3.27	1.993	0.090
	Female	71	3.06		
<b>The productivity effect of PA</b>	Male	357	4.06	0.542	0.523
	Female	71	4.01		
<b>The motivation effect of PA</b>	Male	357	3.91	0.063	0.222
	Female	71	3.78		

As a result of t-test carried out on the basis of gender of forest products industry employees, a significant difference in terms of the purpose of PA, the criteria of PA, PA interviews factors were determined ( $p < 0.05$ ).

It was seen that female showed a lower participation than male to these subgroups. Furthermore, similar averages were obtained for other subgroups. However, there was no

statistically a significant difference.

#### Investigation of the PA system in terms of marital status

The difference situation in terms of the marital status of participants of PA system factors has been analyzed with t-test and the results were given in Table 6.

Table 6: The difference situation of PA system factors in terms of participant marital status

Subgroups of the PA	Marital status	N	Average	F	p
<b>The purpose of PA</b>	Married	304	3.69	1.865	0.478
	Single	119	3.74		
<b>The criteria of PA</b>	Married	304	3.54	0.605	0.943
	Single	119	3.53		
<b>PA interviews</b>	Married	304	3.61	7.101	0.523
	Single	119	3.66		
<b>PA applications</b>	Married	304	3.22	1.350	0.737
	Single	119	3.25		
<b>The productivity effect of PA</b>	Married	304	4.08	0.127	0.090
	Single	119	3.96		
<b>The motivation effect of PA</b>	Married	304	3.94	0.182	0.030
	Single	119	3.76		

As a result of t-test carried out on the basis of marital status of forest products industry employees, only a significant difference in terms of the motivation effect of PA were determined ( $p < 0,05$ ).

According to this result, it is possible to say that married employees showed a higher participation regarding the motivation effect of PA. On the other hand, statistically

significant differences did not appear in terms of other sub-groups.

#### Investigation of the PA system in terms of position

The difference situation in terms of the position of participants of PA system factors were tested the analysis of variance and the results were given in Table 7.

Table 7: The difference situation of PA system factors in terms of participant position

Subgroups of the PA	Position	N	Average	F	p
<b>The purpose of PA</b>	Senior	38	3.76	0.281	0.755
	Middle-level	175	3.68		
	Employee	189	3.65		
<b>The criteria of PA</b>	Senior	38	3.63	0.569	0.567
	Middle-level	175	3.49		
	Employee	189	3.47		
<b>PA interviews</b>	Senior	38	3.75	1.575	0.208
	Middle-level	175	3.63		
	Employee	189	3.51		
<b>PA applications</b>	Senior	38	3.38	3.186	0.042
	Middle-level	175	3.06		
	Employee	189	3.28		
<b>The productivity effect of PA</b>	Senior	38	4.07	0.092	0.912
	Middle-level	175	4.03		
	Employee	189	4.05		
<b>The motivation effect of PA</b>	Senior	38	3.98	1.205	0.301
	Middle-level	175	3.93		
	Employee	189	3.82		

As a result of the analysis of variance carried out on the basis of position of forest products industry employees, only a significant difference in terms of PA applications were observed ( $p < 0.05$ ).

According to this result, it was understood that middle-level employees showed the lowest participation into PA applications. Statistically significant differences did not

appear in terms of other sub-groups.

#### Investigation of the PA system in terms of total working time

The difference situation in terms of the total working time of participants of PA system factors has been tested with one way analysis of variance and the results were given in Table 8.

Table 8: The difference situation PA system factors in terms of participant working time

Subgroups of the PA	Working time	N	Average	F	p
<b>The purpose of PA</b>	0-5	185	3.59	2.192	0.088
	6-10	143	3.69		
	11-20	58	3.80		
	21 and above	11	4.09		
<b>The criteria of PA</b>	0-5	185	3.44	0.844	0.471
	6-10	143	3.54		
	11-20	58	3.54		
	21 and above	11	3.73		
<b>PA interviews</b>	0-5	185	3.52	0.794	0.498
	6-10	143	3.65		
	11-20	58	3.61		
	21 and above	11	3.83		
<b>PA applications</b>	0-5	185	3.02	4.971	0.002
	6-10	143	3.30		

Tablo 8. (continued)

	11-20	58	3.43		
	21 and above	11	3.72		
<b>The productivity effect of PA</b>	0-5	185	4.05	1.685	0.170
	6-10	143	3.98		
	11-20	58	4.08		
	21 and above	11	4.43		
<b>The motivation effect of PA</b>	0-5	185	3.95	0.843	0.471
	6-10	143	3.81		
	11-20	58	3.86		
	21 and above	11	3.96		

As a result of the analysis of variance carried out on the basis of total working time of forest products industry employees, a significant difference in terms of PA applications were observed ( $p < 0.05$ ).

According to this result, the participants that have 21 years and over working time provided a higher level of participation regarding the PA applications. A statistically significant difference in terms of working time regarding other PA subgroups has not been determined. However, when Table 8 was analyzed, it was observed that the level of participation increased depending on the increased working time for all groups.

### Discussion and Conclusion

In the present study, the evaluation by employees of PA system applied in the forest products industry was aimed. In addition, differences in appraisals based on the sub-sectors and demographic characteristics were investigated. Accordingly, the following conclusions were drawn from this study:

As a result of validity and reliability analyses of the questionnaire implemented, the questionnaire was reduced to 33 from 51 judgments. With this operation, structure validity of the scale was achieved (% 59.942).

It was detected that 25.7% of participants were between 30 and 34 years of age, 82.6% were male, 70.4% were married, nearly 50% were college or higher education level, 43.8% were employee, and 42.8% had a total working time of 0-5 year.

It was detected that PA systems do not differ statistically on the basis of forest

products sub-sectors. This result means that PA applications applied in all sub-sectors are perceived in a similar manner in terms of employees.

Statistically significant differences did not occur in terms of age groups of the participants in the perception of the PA systems. This result shows that PA applications are perceived at the same level in terms of age groups.

A difference on basis of educational status in the perception of the PA systems was determined. Primary school graduates were separated from the other groups with the lowest participation rate in terms of the purpose of the PA, the criteria of the PA and PA interviews. The university graduates had a different approach from other groups with the lowest participation rate in terms of PA applications. According to these results, it is possible to say that the reasons and goals of making the PA cannot be explained completely to primary school graduates. Moreover, it was concluded that university graduates observed shortcomings at the point of PA applications.

It was seen that there were significant differences in terms of gender in the perception of the PA systems. In this context, it was detected that female showed a lower participation to the subgroups of the PA compared to male. According to these results, it was concluded that female were not satisfied with the PA applications.

A significant difference on basis of marital status in the perception of the PA systems was determined. The married employees showed a higher rate of

participation with regard to the motivation effect of PA.

A significant difference depending on the position in the perception of the PA systems studied was determined. In this regard, middle-level employees showed the lowest participation to the judgments about PA applications. According to this result, it is possible to say that middle-level employees as PA practitioners see their work unsatisfactory.

Based on the total working time, significant differences were identified in the perception of the PA systems. It was determined that the participants with 21 years and over working time provided a higher level of participation to the judgments about the PA applications. According to this result, the experienced employees consider that PA applications have sufficient qualifications.

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