

# Impact of Performance Appraisal on Employee Motivation and Productivity in Turkish Forest Products Industry: A Structural Equation Modeling Analysis

Utjecaj ocjene rada na motivaciju i produktivnost zaposlenika u turskoj industriji proizvoda na bazi šuma: analiza strukturnih jednadžbi modela

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**ABSTRACT** • *The present study investigates the influence of performance appraisal on employee motivation and productivity in Turkish forest products industry using a structural equation model. The questionnaires prepared for this purpose were applied to 432 people that work in 14 forest products industry businesses operating throughout Turkey. A total of nine hypotheses were established to determine the relationship between performance appraisal and employee motivation and productivity. The results indicated that five hypotheses were accepted, while four of them were rejected. In the light of the findings of this study, it may be generally said that the effect of performance appraisal on employee motivation and productivity was high. In other words, performance appraisal was found to be a major factor on employee motivation and productivity. The present study is expected to help managers and decision makers in selecting suitable motivating factors in order to retain and satisfy their employees. Consequently, this study will fill an important gap in the area of performance appraisal in the forest products industry by structural equation modeling and presents the opportunity for further studies.*

**Keywords:** *employee performance, forest product industry, organizational performance, structural equation modeling*

**SAŽETAK** • *Studija je prikaz istraživanja utjecaja ocjene rada na motivaciju i produktivnost zaposlenika u turskoj industriji proizvoda na bazi šuma primjenom modela strukturnih jednadžbi. Na upitnike pripremljene za tu namjenu odgovarale su 432 osobe zaposlene u 14 tvrtki u sektoru industrije na bazi šuma diljem Turske. Pritom*

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je postavljeno devet hipoteza za utvrđivanje odnosa ocjene rada i motiviranosti i produktivnosti zaposlenika. Rezultati su pokazali da je pet hipoteza prihvatljivo, a četiri su odbijene. U svjetlu nalaza ove studije može se reći da je učinak ocjenjivanja na motiviranost zaposlenika i produktivnost vrlo visok. Drugim riječima, ocjena rada najviše utječe na motiviranost zaposlenika i na njihovu produktivnost. Očekuje se da će rezultati studije pomoći menadžerima i donositeljima odluka u odabiru odgovarajućih motivacijskih čimbenika kako bi zadržali i zadovoljili svoje zaposlenike. Stoga će ova studija ispuniti jaz koji postoji u području ocjenjivanja rada u drvnoj industriji modeliranjem strukturalnih jednadžbi te će otvoriti mogućnosti daljnjeg istraživanja.

**Ključne riječi:** uspješnost zaposlenika, drvna industrija, organizacija, modeliranje strukturalnih jednadžbi

## 1 INTRODUCTION

### 1. UVOD

Employee performance plays an important role in achieving organizational goals. In other words, employee performance is directly linked to the success of any organization. Therefore, organizations try to improve their productivity by providing an improvement in employee performance throughout the world. In this regard, various strategies have been developed to measure employee performance; one of them is performance appraisal (PA) (Wholey, 1999; Gichuhi *et al.*, 2013).

The PA can be defined as a strategic and important approach that requires a regular inspection of the performance of employees in the organizations for performing the assigned tasks and responsibilities (Salau *et al.*, 2014). This strategy aims to measure, assess and improve the performance of employees to achieve various objectives (Singh *et al.*, 2010). The majority of organizations also use the PA approach to determine the factors such as salary increases, promotions, the need for individual development and training of employees (Gürbüz and Dikmenli, 2007). PA is thus accepted to be an important tool in order to improve both organizational performance and individual performance of employees. Such advantages of PA make it an important tool to reach organizational goals in many sectors (Vasset *et al.*, 2011).

It is also important to emphasize that human capital (employees) in the organizations is considered as one of the most critical factors in gaining sustainable competitive advantage in the competitive situation of today's world. The organizations that have skilled and motivated employees may be regarded as advantageous in reaching such goals. Thus, many organizations endeavor to improve the human resource management and its functions (Chang and Han, 2006; Fakhimi and Raisy, 2013). In this respect, PA may be regarded as one of major functions of human resources managers.

PA intends to evaluate the performance of employees as objectively as possible. Kumbhar (2011) 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). On the other hand, some researchers have pointed out that a rewarding system, applied as a result of PA, contributes to an increase in employee mo-

tivation through influencing directly the performance of employees (Prowse and Prowse, 2009; Ochoti *et al.*, 2012). Ali and Ahmed (2009) mentioned that rewards are managerial tools that help to reach organizational goals by affecting individual or group behavior. Therefore, most organizations use various types of rewards such as pay, promotion, bonuses in order to motivate employees and increase employees performance (Ali and Ahmed, 2009).

Furthermore, PA is a continuing procedure that measures expertise and achievements of employees based on an acceptable accuracy and equality. The employees are subjected to an appraisal process periodically after they are hired. The appraisal activities serve as a guide for managers in making a decision on employees' current job performance, awards, career goals and other job-related actions based on performance (Gürbüz and Dikmenli, 2007). However, the factors such as differences in the level of education, hiring temporary workers, employment, work experience, time pressures, and shift work might affect the appraisal process as well as employee motivation and productivity (Vasset *et al.*, 2011).

Jelačić *et al.* (2008) found that the factors such as employment assurance, job organization and workplace activity affect employee motivation in forest products industry. In another study, no differences were found in terms of motivation factors among employees of Slovenian and Croatian wood industry companies. Besides, it was stated that managers should ensure the safety of employees and pay attention to their mutual relations (Kropivšek *et al.*, 2011). Hitka and Štupalova (2011) compared the motivation of employees in the wood industry and other manufacturing enterprises for various categories throughout Slovakia. It was observed that the diversity of the importance of motivational factors is less significant in the category of employees. In another study on the impact of the economic crisis period on the motivation of forest products industry employees, it concluded that employee motivation does not differ in the period before and after the crisis (Hitka *et al.*, 2014). Lorincova (2016) mentioned that increasing professional satisfaction of employees in the furniture industry may lead to an increase in motivation and business productivity.

In addition to the above mentioned investigations, a comprehensive analysis that considers the influence of PA on employee motivation and productivity is needed. Structural equation modeling (SEM) is an appropriate approach for this purpose. SEM is a versatile multivariate statistical approach that enables re-

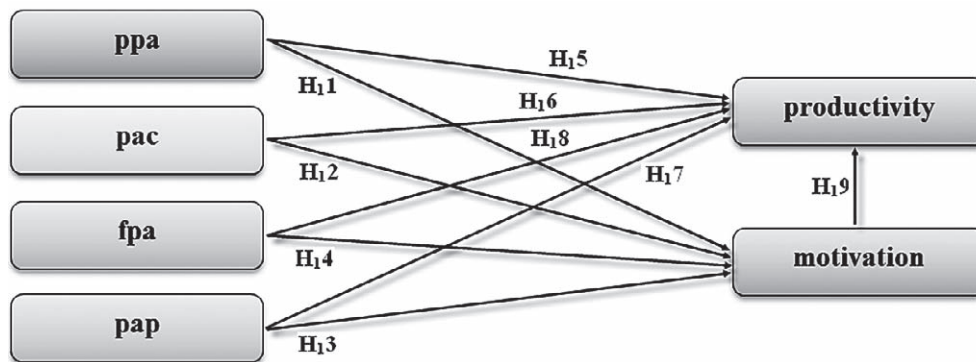


Figure 1 Conceptual model  
Slika 1. Konceptualni model

searchers to effectively evaluate the relationships between observed and latent (unobserved) variables (Chan *et al.*, 2007). The emergence of this approach has been regarded as a significant development and it has been widely employed in various scientific disciplines (Xiong *et al.*, 2015). SEM is a combination of regression analysis, correlation, factor analysis, and path analysis. In comparison to other multivariate techniques, SEM is capable of estimating multiple and interrelated relationships and representing unobserved concepts in these relationships. This method also considers measurement errors in estimation. Further, it defines a model explaining an entire set of relationships (Xiong *et al.*, 2014). Because of these advantages, SEM has been increasingly employed in many disciplines, such as banking industry (Osibanjo *et al.*, 2014), education sector (Phin, 2015), service sector (Suki, 2014), business safety (Hsu *et al.*, 2012), tourism sector (Hallak *et al.*, 2012), food industry (Booth *et al.*, 2013), and health sector (Bazarganipour *et al.*, 2013), for uncovering the relationships among different kinds of variables.

### 1.1 Objectives and hypotheses

#### 1.1. Ciljevi i hipoteze

Although there are many applications to examine the effect of PA on motivation and productivity in various disciplines, limited information is available to investigate the influence of PA on employee motivation and productivity in forest products industry by the SEM. This study, therefore, analyses the relationships among various factors that affect motivation and productivity of employees of Turkish forest products industry by means of SEM to create a model of factors that both directly and indirectly affect employee motivation and productivity.

Additional objectives of this study were:

- to detect the factors that increase employee motivation and productivity;
- to investigate the relationship between employee motivation and productivity;
- to assess the effect of the PA on the motivation and productivity of employees.

In this regard, the following hypotheses were established based on independent and dependent variables.

H<sub>1</sub> 1, 2, 3, 4: There is a relationship between employee motivation and the purpose of PA (ppa), PA criteria (pac), PA practices (pap), Feedback in PA (fpa);

H<sub>1</sub> 5, 6, 7, 8: There is a relationship between employee productivity and the purpose of PA (ppa), PA criteria (pac), PA practices (pap), Feedback in PA (fpa);

H<sub>1</sub>9: There is a relationship between employee motivation and employee productivity.

In this perspective, we proposed the model composed of all the hypotheses that describe the relationships between two variables, as depicted in Figure 1.

From the model in Fig. 1, it can be seen that the purpose of the PA (ppa), PA criteria (pac), feedback in PA (fpa), and PA practices (pap) are considered as independent variables.

## 2 MATERIALS AND METHODS

### 2. MATERIJALI I METODE

#### 2.1 Population and sample

##### 2.1. Populacija i uzorak

The participants of the present investigation are composed of businesses that have ISO 9001:2008 Quality Management System (QMS) certifications and operate in forest products industry throughout Turkey. A previous study conducted by Serin (2004) has revealed that businesses that employ more than 100 employees give more significance to total quality management applications because they have a more institutional structure. Fourteen companies that meet these criteria agreed to implement the study. The survey was conducted between March 2015 and December 2015.

Among the 14 participating businesses, 7 deal with furniture, 6 with board products and 1 with paper. Surveys were administered to 432 people, including senior, middle and lower level employees.

#### 2.2 Data collection instruments

##### 2.2. Način prikupljanja podataka

A questionnaire prepared by compiling data from the surveys found in the literature was used in this study (Tarlığ, 2006; Yılmaz, 2006). The survey is comprised of two sections. The first section contains 7 questions related to personnel information, while the other section includes Likert-type (5 scales) 51 questions related to the PA, employee motivation and employee productivity.

After the surveys were completed, the data obtained were entered into SPSS (Statistical Software for Social Sciences). Analyses for reliability and validity were then performed by AMOS (Analysis of Moment Structures) package program.

**3 RESULTS AND DISCUSSION**

**3. REZULTATI I RASPRAVA**

**3.1. Demographic characteristics**

**3.1. Demografska obilježja ispitanika**

In this section, demographic information of the participants such as age, education, gender, marital status, wages, working experience and position in the company were determined. Results regarding demographic information for participant employees are given in Table 1.

Table 1 shows that 49.4 % of the participants had vocational school and higher education levels. The majority of participants (82 %) were male, while 70.4 % were married. In addition, 43.8 % of the participants were employees, 49.1 % of them had 6 years and over of working experience.

**3.2 Validity and reliability**

**3.2. Vrijednost i pouzdanost**

For the present study, Cronbach alpha coefficient was used for reliability analysis. According to the results of the analysis conducted, general Cronbach alpha coefficient was found to be 0.950. This coefficient varies within a range of 0 to 1, and a value over 0.90 means an excellent agreement (Kalaycı, 2009).

Moreover, factor analysis was carried out to measure structural validity. However, it is important to state that conformity of the data set for the factor analysis is tested with Kaiser-Meyer-Olkin (KMO) measure

of sampling adequacy prior to the analysis. KMO should be over 0.5 for validity (Sharma, 1996). This value was found to be 0.917 for this study (Bartlett’s Test of Sphericity Sig.:0.001). Thus, it can be said that the study was suitable for performing factor analysis. In the application of the factor analysis, varimax orthogonal rotation method and basic components analysis were considered. In this respect, factors that include less than three variables and variables that load on more than one factor were discarded. Furthermore, eigenvalues statistics was used in order to determine the number of factors. Dunteman (1989) reported that factors with an eigenvalue higher than 1 are considered significant. Table 2 presents the results of exploratory factor analysis related to the scale.

Upon application of factor analysis, from the scale consisting of 51 items, 18 items that do not match the structure of the scale or load on more than one factor were discarded. The remaining 33 items formed a structure that consists of 6 sub-factors with eigenvalues higher than 1. Total expressiveness of this six-factored structure was found to be 59.942 %.

**3.3 Measurement model**

**3.3. Model mjerenja**

Measurement model structure obtained as a result of factor analysis was tested by confirmatory factor analysis for investigating the structure validity. In order to test the conformity of the model, confirmatory factor analysis was performed by the AMOS. Standard prediction values, *t* values and reliability level of the variables in the model are given in Table 3.

In analyzing the standard prediction values of the variables, it was shown that the values vary between 0.491 and 0.846. Besides, the *t* values of these predic-

**Table 1** Demographic information

**Tablica 1.** Demografski podatci

Demographic variables <i>Demografske varijable</i>			N	%	Demographic variables <i>Demografske varijable</i>			N	%
<b>Educational status</b> <i>Obrazovanje</i>	Literate / <i>pismen</i>		4	0.9	<b>Salary (TL)</b> <i>Plaća</i>	≤ 999		58	13.4
	Primary education / <i>osnovno obrazovanje</i>		69	16.0		1000-1.499		165	38.2
	High school / <i>srednje obrazovanje</i>		146	33.8		1.500-1.999		87	20.1
	Vocational school / <i>stručno obrazovanje</i>		59	13.7		2.000-2.499		65	13.0
	University / <i>visoko obrazovanje</i>		149	34.5		≥ 2.500		56	13.0
Postgraduate / <i>poslijediplomsko obrazovanje</i>		5	1.2	<b>Total / Ukupno</b>		431	99.8		
<b>Total / Ukupno</b>			432	100	<b>Age</b> <i>Dob</i>	16-19		7	1.6
<b>Gender</b> <i>Spol</i>	Male / <i>muški</i>		357	82.7		20-24		46	10.6
	Female / <i>ženski</i>		71	16.4		25-29		103	23.8
<b>Total / Ukupno</b>			428	99.1		30-34		111	25.7
<b>Working experience</b> <i>Radni staž</i>	0-5		185	42.8		35-39		93	21.5
	6-10		143	33.1		40-49		67	15.5
	11-20		58	13.4	≥ 50		5	1.2	
	≥ 21		11	2.5	<b>Total / Ukupno</b>		432	100	
<b>Total / Ukupno</b>			397	91.9	<b>Marital status</b> <i>Bračni status</i>	Married / <i>oženjen/udana</i>		304	70.4
<b>Position</b> <i>Pozicija</i>	Upper level / <i>viša razina</i>		38	8.8		Single / <i>samac</i>		119	27.5
	Middle level / <i>srednja razina</i>		175	40.5		Other / <i>ostalo</i>		1	0.2
	Worker / <i>radnik</i>		189	43.8		<b>Total / Ukupno</b>		424	98.1
<b>Total / Ukupno</b>			402	93.1	<b>Total / Ukupno</b>			424	98.1

**Table 2** Results of scale's exploratory factor analysis

**Tablica 2.** Rezultati faktorske analize

	<b>Variables</b> <i>Varijable</i>	<b>Factor load</b> <i>Težina čimbenika</i>	<b>Eigen value</b> <i>Vlastita vrijednost</i>	<b>Announced variance</b> <i>Predviđena varijanica %</i>	<b>Cronbach's Alpha</b> <i>Cronbachov alfa</i>
	<b>PA purpose / Svrha ocjene rada</b>		4.358	13.201	0.873
q3	In PA studies, the employees' ability for own business regulation and planning is measured / <i>Pri ocjeni rada mjerena je sposobnost zaposlenika za samostalno reguliranje i planiranje poslovanja.</i>	0.73			
q2	In PA studies, the employees' ability to make decisions are measured / <i>Pri ocjeni rada mjerena je sposobnost zaposlenika da donose odluke.</i>	0.73			
q1	In PA studies, the employees' job information is measured / <i>Pri ocjeni rada mjerena je informiranost zaposlenika o poslu.</i>	0.71			
q4	In PA studies, the employees' labor and the ability to use correctly the resources are measured / <i>Pri ocjeni rada mjerena je rad zaposlenika i sposobnost ispravne uporabe resursa.</i>	0.69			
q5	In PA studies, the employees' ability to communicate effectively is measured / <i>Pri ocjeni rada mjerena je sposobnost zaposlenika da učinkovito komuniciraju.</i>	0.69			
q6	In PA studies, the employees' cooperation understanding is measured / <i>Pri ocjeni rada mjereno je razumijevanje suradnje zaposlenika.</i>	0.64			
q7	In PA studies, the employees' harmony with the environment and respectful behavior are measured / <i>Pri ocjeni rada mjerena je usklađenost zaposlenika s okolinom i njegovo ponašanje.</i>	0.63			
	<b>PA criteria / Kriteriji ocjene rada</b>		3.715	11.258	0.854
q26	My PA score significantly affects my salary. / <i>Ocjena moga rada znatno utječe na moju plaću.</i>	0.66			
q27	My PA score significantly affects my promotion / <i>Ocjena moga rada znatno utječe na moje promaknuće.</i>	0.64			
q16	PA system used in our business is generally sufficient. / <i>Sustav ocjenivanja rada koji se primjenjuje u našem poslovanju općenito je dovoljan.</i>	0.63			
q18	PA system used in our business is able to distinguish really successful staff from unsuccessful staff / <i>Sustavom ocjenivanja rada koji se primjenjuje u našem poslovanju moguće je razlikovati stvarno uspješne zaposlenike od neuspješnih.</i>	0.59			
q17	Getting high or low scores from PA is actually related to being successful or unsuccessful. / <i>Dobivanje visokih ili niskih ocjena rada stvarno je povezano s uspjehom ili neuspjehom.</i>	0.57			
q25	I need to work hard to go beyond a certain score in PA / <i>Moram naporno raditi kako bih postigao određene rezultate pri ocjenjivanju rada.</i>	0.56			
q20	My manager gives me a full score if I obtain an outstanding achievement in my work / <i>Moj menadžer daje mi najbolje ocjene ako postignem izvrsne rezultate u radu.</i>	0.56			
q14	PA criteria include necessary factors for me to succeed in my work. / <i>Kriteriji ocjenivanja obuhvaćaju čimbenike potrebne za uspjeh u mom poslu.</i>	0.52			
	<b>Feedback in PA / Povratne informacije o ocjeni rada</b>		3.689	11.178	0.878
q33	In PA meeting, my manager tells me in what I am good / <i>Na sastanku vezanome za ocjenu moga rada menadžer mi kaže u čemu sam dobar.</i>	0.73			
q32	In PA interview, my manager clearly points to what I am missing. / <i>Na sastanku vezanome za ocjenu moga rada menadžer mi jasno kaže koji su moji nedostaci.</i>	0.73			
q35	In PA interview, my manager tells me my mistakes and failures / <i>Na sastanku vezanome za ocjenu moga rada menadžer mi priopći koje su moje pogreške i konkretni nedostaci.</i>	0.73			

Table 2 Continue  
 Tablica 2. Nastavak

	Variables <i>Varijable</i>	Factor load <i>Težina čimbenika</i>	Eigen value <i>Vlastita vrijednost</i>	Announced variance <i>Predviđena varijanca %</i>	Cronbach's Alpha <i>Cronbachov alfa</i>
q36	In PA interview, my manager discusses with me about my mistakes I cannot correct. / <i>Na sastanku vezanome za ocjenu moga rada menadžer razgovara sa mnom o mojim pogreškama za koje ne znam kako ih ispraviti.</i>	0.70			
q34	In PA interview, my manager gives me the opportunity to express my ideas clearly. / <i>Na sastanku vezanome za ocjenu moga rada menadžer mi daje mogućnost da jasno izrazim svoje ideje.</i>	0.68			
q40	In PA interview, I identify common goals with my manager determining what I should do in future. / <i>Na sastanku vezanome za ocjenu moga rada zajedno sa svojim menadžerom identifikiram ciljeve i dogovaramo ono što bih trebao činiti u budućnosti.</i>	0.54			
	<b>PA practices / <i>Prakse ocjene rada</i></b>		3.153	9.555	0.830
q22	My manager uses PA as an element of threat. / <i>Moj menadžer koristi se ocjenom rada kao elementom prijetnje.</i>	0.83			
q21	I think my manager uses PA to reward some people he likes. / <i>Mislim da se moj menadžer koristi ocjenom rada kako bi nagradio neke ljude koje voli.</i>	0.78			
q28	I think that my manager uses PA to punish persons he dislikes. / <i>Mislim da se moj menadžer koristi ocjenom rada kako bi kažnjavao osobe koje mu se ne sviđaju.</i>	0.77			
q23	I think my manager evaluates my personality, not my performance. / <i>Mislim da moj menadžer procjenjuje moju osobnost, a ne moj posao.</i>	0.77			
q24	I think that people who obtain high PA score are the people who can present themselves well to the manager. / <i>Mislim da visoke ocjene dobivaju oni koji se menadžeru znaju prikazati dobrima.</i>	0.58			
	<b>Productivity / <i>Produktivnost</i></b>		2.637	7.991	0.793
q47	PA system planned upon reaching a consensus with my superior improves my working efficiency. / <i>Sustav ocjenjivanja rada kojim se planira postizanje dogovora s administratorom poboljšava moju radnu učinkovitost.</i>	0.79			
q48	Setting realistic goals and achievable targets for my work along with the company's goals and targets in my PA interview improves my working efficiency. / <i>Zadavanje realnih ciljeva i ostvarivih zadataka u skladu s ciljevima i zadaćama tvrtke poboljšava moju radnu učinkovitost.</i>	0.78			
q46	If feedback is high as a result of PA, it motivates employees and increases success. / <i>Ako je povratna informacija u skladu s ocjenom rada, ona motivira zaposlenike i povećava uspjeh.</i>	0.75			
q49	As a result of PA, eliminating my failures and determining my training needs in according with my deficiencies will improve my business efficiency. / <i>Ispravljanje mojih nedostataka kao rezultat ocjene rada i određivanje mojih potreba za izobrazbom radi uklanjanja mojih nedostataka poboljšava moju učinkovitost u poslovanju.</i>	0.61			
	<b>Motivation / <i>Motivacija</i></b>		2.228	6.753	0.788
q43	Motivation of a high performance person will be higher. / <i>Motivacija pojedinca s visokim učinkom bit će veća.</i>	0.80			
q44	Performance of a high motivation person will be higher. / <i>Produktivnost pojedinca s visokom motivacijom bit će veća.</i>	0.72			
q42	There is a positive effect of PA on motivation in terms of employees' self-expression, their regular communication, and sharing their problems / <i>Postoji pozitivan učinak ocjene rada na motivaciju u smislu samokritičnosti zaposlenika, njihove redovite komunikacije i dijeljenja njihovih problema.</i>	0.69			
	<b>Announced Total Variances, % / <i>Predviđena varijanca</i></b>	-	-	59.942	
	<b>Kaiser-Meyer-Olkin (KMO) value / <i>KMO vrijednost</i></b>	-	-	0.917	
	<b>Bartlett's Test of Sphericity (Sig.) / <i>Bartlettov test sferičnosti</i></b>	-	-	0.001	

**Table 3** Reliability values of the model

**Tablica 3.** Pokazatelji pouzdanosti modela

	<b>Variables</b> <i>Varijable</i>	<b>Std Loading</b> <i>Standardna devijacija</i>	<b>t*</b>
Purpose of performance appraisal <i>Cilj procjene rada</i> (CR=0.88, AVE=0.50)	q3	0.710	14.217
	q2	0.737	-
	q1	0.728	14.593
	q4	0.726	14.554
	q5	0.698	13.972
	q6	0.695	13.913
	q7	0.646	12.896
Performance appraisal criteria <i>Kriteriji ocjene rada</i> (CR=0.90, AVE=0.51)	q26	0.795	12.754
	q27	0.696	12.945
	q16	0.729	-
	q18	0.715	14.207
	q17	0.660	13.103
	q25	0.648	10.851
	q20	0.661	13.134
	q14	0.592	11.732
Feedback in performance appraisal <i>Povratna informacija o ocjeni rada</i> (CR=0.88, AVE=0.55)	q33	0.800	-
	q32	0.723	15.800
	q35	0.725	15.872
	q36	0.692	14.991
	q34	0.765	16.934
	q40	0.730	16.001
Performance appraisal practices <i>Prakse u ocjeni rada</i> (CR=0.83, AVE=0.51)	q22	0.847	-
	q21	0.710	15.293
	q28	0.735	15.924
	q23	0.714	15.392
	q24	0.502	10.250
Productivity / <i>Produktivnost</i> (CR=0.80, AVE=0.50)	q46	0.710	12.724
	q47	0.724	-
	q48	0.754	13.295
	q49	0.629	11.463
Motivation / <i>Motivacija</i> (CR=0.84, AVE=0.63)	q42	0.753	-
	q43	0.766	13.818
	q44	0.718	13.209

\* P values belonging to all t values is determined as 0.000. / Vrijednosti P koje pripadaju svim vrijednostima t jednakima 0,000.

tions were significant at 0.05 significance level. Therefore, it can be concluded that the validity of the model was provided.

Two types of reliability measures were used in the measurement model: the announced variance of the factors and the reliability coefficients of the factors. While the announced variance estimates of the factors show the total variance value explained by the observed variables of each factor, the reliability coefficients of the factors show the intrinsic reliabil-

ity of the factors. As shown in Tables 2 and 3, the announced variance values of the factors are above the required lower limit (0.50 %) and the reliability coefficients of the factors are again above the lower limit (0.70).

The correlations among the purpose of performance appraisal, performance appraisal criteria, feedback in performance appraisal, performance appraisal practices, productivity and motivation are presented in Table 4 along with a discriminant validity test.

**Table 4** Correlation matrix for the measurement model

**Tablica 4.** Korelacijska matrica za model mjerenja

<b>Scales</b> <i>Ljestvice</i>	<b>ppa</b>	<b>pac</b>	<b>fpa</b>	<b>pap</b>	<b>Productivity</b> <i>Produktivnost</i>	<b>Motivation</b> <i>Motivacija</i>
ppa	1					
pac	0.737	1				
fpa	0.595	0.771	1			
pap	0.253	0.408	0.336	1		
Productivity / <i>Produktivnost</i>	0.466	0.443	0.393	0.181	1	
Motivation / <i>Motivacija</i>	0.497	0.562	0.553	0.134	0.576	1

**3.4 Structural model**  
3.4. Strukturni model

Table 5 gives the fit indexes belonging to the resulting findings as a result of the testing with the structural equation modeling analysis of the developed model.

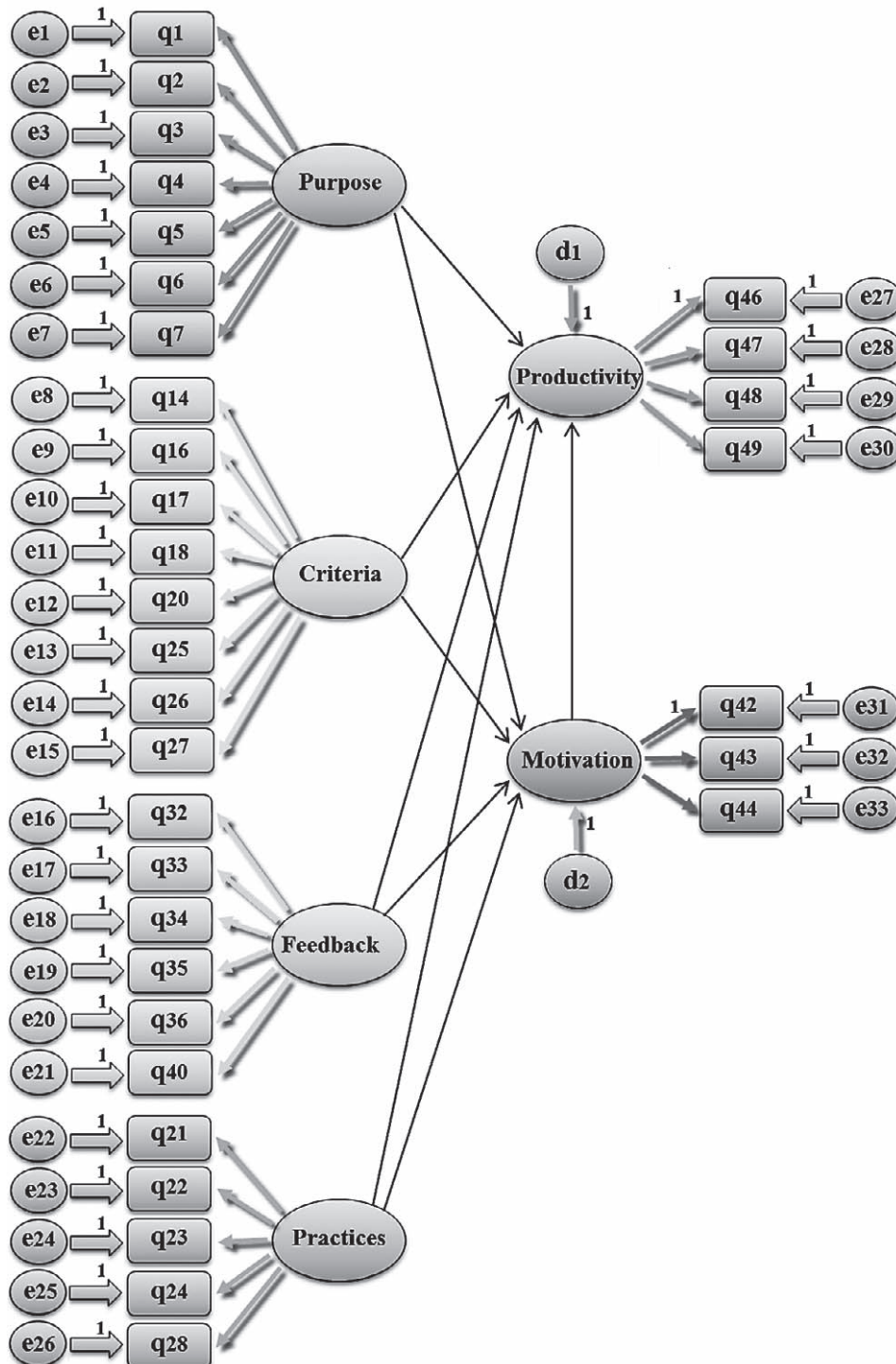
As the fit indexes of the structural model were analyzed, it was seen that the model is within acceptable limits determined by the following literature (Anderson and Gerbing, 1984; Hancock and Mueller, 2006; Al-Refaie, 2015). AMOS program output of the model is shown in Figure 2.

**Table 5** Fit indexes belonging to the results of the structural equation model

**Tablica 5.** Indeksi koji pripadaju rezultatima modela strukturne jednačbe

Model	$\chi^2$	df	P-value	$\chi^2/df$	GFI	RMSEA
Default model	1026.554	480	0.001	2.139	0.877	0.051

Hypothesis was examined after the validity of the model was provided. The results of hypothesis tests are given in Table 6.



**Figure 2** AMOS program output of the analyzed model  
**Slika 2.** Rezultat programa AMOS za analizirani model



**Table 6** Results of hypothesis tests  
**Tablica 6.** Rezultati testiranja hipoteza

Hypothesis / Hipoteza		Estimate (r) Procjena (r)	Decision Odluka
H <sub>1</sub> 1:	Purpose of PA and employee motivation <i>Svrha ocjene rada i motivacija zaposlenika</i>	0.156	Rejected <i>odbijeno</i>
H <sub>1</sub> 2:	Criteria of PA and employee motivation <i>Kriteriji ocjene rada i motivacija zaposlenika</i>	0.276**	Supported <i>podržano</i>
H <sub>1</sub> 3:	Practices of PA and employee motivation <i>Prakse ocjene rada i motivacija zaposlenika</i>	-0.157*	Supported <i>podržano</i>
H <sub>1</sub> 4:	Feedback of PA and employee motivation <i>Povratne informacije o ocjeni rada i motiviranost zaposlenika</i>	0.278**	Supported <i>podržano</i>
H <sub>1</sub> 5:	Purpose of PA and employee productivity <i>Svrha ocjene rada i produktivnost zaposlenika</i>	0.187*	Supported <i>podržano</i>
H <sub>1</sub> 6:	Criteria of PA and employee productivity <i>Kriteriji ocjene rada i produktivnost zaposlenika</i>	0.005	Rejected <i>odbijeno</i>
H <sub>1</sub> 7:	Practices of PA and employee productivity <i>Prakse ocjene rada i produktivnost zaposlenika</i>	0.074	Rejected <i>odbijeno</i>
H <sub>1</sub> 8:	Feedback of PA and employee productivity <i>Povratne informacije o ocjeni rada i produktivnost zaposlenika</i>	-0.022	Rejected <i>odbijeno</i>
H <sub>1</sub> 9:	Employee motivation and employee productivity <i>Motivacija i produktivnost zaposlenika</i>	0.365*	Supported <i>podržano</i>

Note: \* $p < 0.05$ , \*\* $p < 0.01$

When the results of the model were analyzed, it was seen that five of the nine hypothesis ( $p < 0.05$ ) were accepted, while four of them were rejected.

H<sub>1</sub>1 examines the relationship between the purpose of PA and employee motivation. According to the model, there is no significant effect of the purpose of PA on employee motivation (estimate=0.156;  $p > 0.05$ ). Therefore, H<sub>1</sub>1 hypothesis is rejected.

H<sub>1</sub>2 examines the relationship between the criteria of PA and employee motivation. According to the model, there is a positive and significant impact of the criteria of PA on employee motivation (estimate=0.276;  $p < 0.05$ ). Therefore, H<sub>1</sub>2 hypothesis is accepted. Accordingly, an increase of a standard unit in the criteria of PA constitutes an increase of 0.276 standard unit on employee motivation.

H<sub>1</sub>3 examines the relationship between the practices of PA and employee motivation. According to the model, there is a negative and significant impact of the practices of PA on employee motivation (estimate=-0.157;  $p < 0.01$ ). Therefore, H<sub>1</sub>3 hypothesis is accepted. Accordingly, an increase of a standard unit in the practices of PA constitutes a decrease of 0.157 standard unit on employee motivation.

H<sub>1</sub>4 examines the relationship between the feedback of PA and employee motivation. According to the model, there is a positive and significant impact of the feedback of PA on employee motivation (estimate=0.278;  $p < 0.05$ ). Therefore, H<sub>1</sub>4 hypothesis is accepted. Accordingly, an increase of a standard unit in the feedback of PA constitutes an increase of 0.276 standard unit on employee motivation.

H<sub>1</sub>5 examines the relationship between the purpose of PA and employee productivity. According to the model, there is a positive and significant impact of the purpose of PA on employee productivity (estimate=0.187;  $p < 0.01$ ). Therefore, H<sub>1</sub>5 hypothesis is ac-

cepted. Accordingly, an increase of a standard unit in the purpose of PA constitutes an increase of 0.187 standard unit on employee productivity.

H<sub>1</sub>6 examines the relationship between the criteria of PA and employee productivity. According to the model, there is no significant effect of the criteria of PA on employee productivity (estimate=0.005;  $p < 0.05$ ). Therefore, H<sub>1</sub>6 hypothesis is rejected.

H<sub>1</sub>7 examines the relationship between the practices of PA and employee productivity. According to the model, there is no significant effect of the practices of PA on employee productivity (estimate=0.074;  $p < 0.05$ ). Therefore, H<sub>1</sub>7 hypothesis is rejected.

H<sub>1</sub>8 examines the relationship between the feedback of PA and employee productivity. According to the model, there is no significant effect of the feedback of PA on employee productivity (estimate=-0.022;  $p < 0.05$ ). Therefore, H<sub>1</sub>8 hypothesis is rejected.

H<sub>1</sub>9 examines the relationship between employee motivation and employee productivity. According to the model, there is a positive and significant impact of employee motivation on employee productivity (estimate=0.365;  $p < 0.01$ ). Therefore, H<sub>1</sub>9 hypothesis is accepted. Accordingly, an increase of a standard unit in employee motivation constitutes an increase of 0.365 standard unit on employee productivity.

## 4 CONCLUSIONS

### 4. ZAKLJUČAK

In this study, the effects of PA applications applied in businesses that operate in the forest products industry on employee motivation and productivity were examined by means of a structural equation model. Upon analyzing the obtained results, it could be seen that the PA had a positive impact on employee productivity, while it did not have a significant impact

on employee motivation. There was a positive effect of the criteria of PA on employee motivation, while there was no significant impact on employee productivity. There was a negative effect of the practices of PA on employee motivation, while there was no significant impact on employee productivity. The feedback studies in PA have been found to have a positive impact on employee motivation. However, it was shown that its impact on employee productivity was not significant. Besides, it was determined that employee motivation had a positive effect on employee productivity.

In the light of these results, the following suggestions have been made for the forest products sector.

- The purpose of the employee PA should be explained to the employees very thoroughly and thus their hesitations should be reduced or avoided. It should take into consideration that an increase in the employee motivation can be provided by using PA.
- PA criteria are required so that employees can reach achievable targets. Besides, it should be explained how to help the employees to provide the criteria. It should be noted that in this way an increase in employee productivity together with employee motivation can also be provided.
- In order to achieve the purpose of the PA, in making any decision about the employees, appraisal results should be used as the data source for education, career, job rotation, pricing, etc.
- By sharing the results of the PA studies with the employees, elimination of errors and deficiencies can be provided. In-service training activities can also be organized to solve employee errors.

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