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REGRESSION ANALYSIS OF RELATIONSHIP BETWEEN DEGREE OF WOOD PROCESSING AND BUSINESS RESULT

Pašić, M.; Šunje, A. & Karić, E.

Abstract: *In this paper results of the research of influence of degree of wood processing on business result are presented. The analysis is done using regression method. In developed mathematical model business result is defined as independent variable, while degree of wood processing is defined as independent variable. The research sample consists of organizations from Bosnia and Herzegovina from wood processing industry that was observed as the reference industrial branch for this research.*
Key words: *Business Result, Degree of Wood Processing, Regression, Variables.*

1. INTRODUCTION

This research was based on posture that related relationship exists between business result, as a dependent variable, and degree of wood processing as independent variable. As such, the construction of statistical models like linear regression can serve as a tool to verify or otherwise disprove the presence of relationships between interacting variables. The technical approach adopted here was constructed that represents anticipated relationship between business result and related independent variable of degree of wood processing. This model was tested by using statistical tools such ANOVA analysis (analysis of variance) and coefficient of determination, R^2.

Studies in this areas show relationship between dependent and independent variables. Study (Gautam et al. 2003) shows that, in some circumstances, adopting the effectiveness of business processes as a dependent variable may be more appropriate than adopting overall firm performance as a dependent variable. Results are consistent with resource-based expectations, and they show that distinctive advantages observable at the process level are not necessarily reflected in firm level performance. Creation (Yamaguchi et al. 2001) of a new business-model is considered to be one of the important factors of market growth. The creation of a new business-model means an appearance of new demand. Study (Evans 1987) on some aspects of firm dynamics finds that firm growth, the variability of firm growth, and the probability that a firm will fail decrease with firm age. It also finds that firm growth decreases at a diminishing rate with firm size even after controlling for the exit of slow-growing firms from the sample. Organizational characteristics, especially number of employees and amount of capital invested, and organizational strategies, especially businesses aiming at a national market, are the most important determinants of business survival (Bruderl et al. 1992). Research (Davidsson et al. 2002) shows that business age, beginning size, ownership form, industrial sector, and legal form are the most important factors related to growth. Although business growth differs among industrial sectors, youth, ownership independence, and small size are major factors that underlie growth across all industries. Empirical research (Kang & Sørensen 1999) based on the approach that shareholders are homogenous and that their influence on firm performance is directly proportional to the percentage of equity they hold has failed to produce definitive evidence. Influence of ownership structure, variables of external and organizational discipline on financial and economic performance suggests a non-linear relationship between ownership structure and performance (Séverin 2001).

Data used in mathematical analysis, for this research, were obtained through empirical methodology of polling organizations using carefully designated Questionnaire. Sample data consists of 48 organizations from wood processing industry in Bosnia and Herzegovina.

2. PROBLEM APPROACH AND MATHEMATICAL MODEL

Regression is perhaps the most widely used data analysis tool in statistics. Many fields used it as away to analyze simple or very complex models. The base of research is representing by dependent variable of business result, and degree of wood processing as independent variable. The specific definitions and units of measurement of these variables were defined as given below.

Variable	Symbol	Description
Business result	BR	Is continuous variable that represents the annual profit or loss of a company at the end of the financial year, measured in BAM (1€=1,9558BAM)
Degree of wood processing	DWP	Is categorical variable that represents degree of wood processing as shown below: 1.primary degree of wood processing; 2.final degree of wood processing; 3.primar and final degrees of wood processing

Table 1. Variable definitions and units of measurement

Linear regression model will be constructed and statistical tools such ANOVA analysis, coefficient of determination, R^2, F-test, t-test, and standardized coefficients will be applied to prove existence of relationship, and to research the influence of degree of wood processing influence on business result. Simple linear regression model used in this research is given by below equation:

$$BR=b_0+b_1DWP \quad (1)$$

Where b_0, and b_1 represents regression coefficients: b_0 is the intercept and b_1 is slope. The slope coefficient b_1 represents the change in BR (business result) for a unit change in DWP (degree of wood processing).

3. RESULTS AND INTERPRETATIONS

Tables numbered as 2. and 3. show statistical results of research. It is based on two-tailed test. Below tables are given

detailed interpretations of obtained results after which is given final equation. This equation determines relationship between business result and degree of wood processing.

	df	Sum of Squares	Mean Square	F	Sig. F	R^2
Regression	1	7,7561E+10	7,76E+10	7,997	0,006866	0,1454
Residual	47	4,5586E+11	9,7E+9			
Total	48	5,3342E+11				

Table 2. ANOVA table for linear regression

The ANOVA analysis shown in Table 2. shows that a computed value for the F-ratio is 7.997. The corresponding table value for F-ratio is 4.052 at 0.05 level of significance, where degrees of freedom are df_1=1 and df_2=47. F-ratio value shows that the linear regression was significant and valid. The R^2 value is 0.1454, indicating that regression model could explain 14,54 percent of the variation of business result by variable degree of wood processing.

	Coefficients	Standard Error	t Stat	P-value
Intercept (b_0)	-24989,67	33732,05	-0,741	0,462483
X Variable (b_1)	48828,62	17267,12	2,828	0,006866

Table 3. Coefficients of simple linear regression, t test and p-value

Table 3. shows that regression coefficients b_0, b_1 are 48828,62 and –24989,67 respectively. Results of the t-test indicate that regression coefficients b_0 and b_1 are statistically significant and not equal to zero at 0.05 level of significance (t-value for sample size greater than 30 is 1.96 at 0.05 level of significance). So, the simple linear regression equation of business result and degree of wood processing can be given by:

$$BR = 48828{,}62\ DW - 24989{,}67 \qquad (2)$$

Next figure shows graphical relationship of variables with the simple linear equation between them.

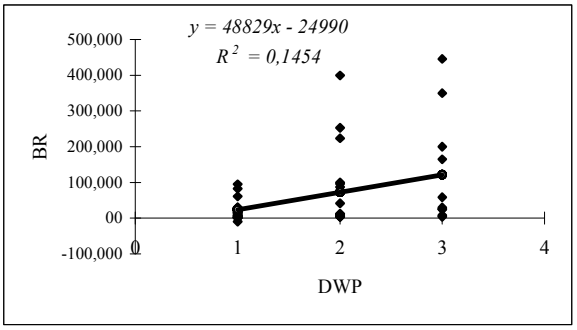

Fig.1. Scatter Plot of Business Result versus Degree of Wood Processing

The p-value shows the level of significance for the test. It is based on two-tailed test and shows the probability of finding a sample with an estimate slope given from the model when the real value is zero. Since the t value is sufficiently large (t=2,828) and p value is sufficiently small (p=0,006866), we can conclude that there is a linear relationship between the two variables. The residuals are an important part of regression. Residual analysis shows the fit of the model and violations in assumptions. We want a random pattern with residuals that are within ±3 standard deviations. Figure 2. proves this for the model developed in this paper.

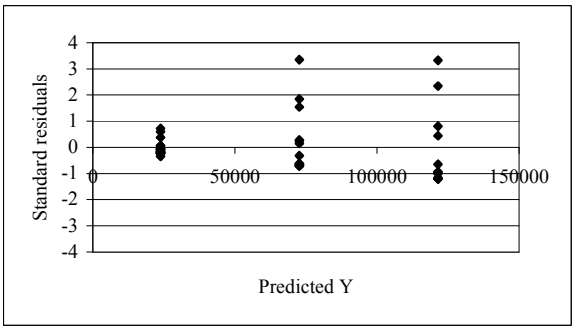

Fig.2. Scatter Plot of Standard Residuals vs. Predicted Y

4. CONCLUSION

This research proves that there is a relationship between business result and degree of wood processing. Results of simple linear regression show that significant relationship exists between business result and degree of wood processing. Positive sign related to degree of wood processing, or the slope in the equation (2), means that if independent variable (degree of wood processing) increases, dependent variable business result will also increase.

So, best business result can be expected if degree of wood processing is on high level, including primary and final wood processing. In our case, as presented in Table 1, degree of wood processing variable is set as categorical variable, with the categories as follows: 1. Primary degree of wood processing, 2. Final degree of wood processing and finally 3. Primary and final degree of wood processing. In our model it is represented by category number three. So, from the results it is obvious that the business result corresponds with the degree of wood processing. The higher degree of wood processing the better business result.

Future research should be focused on multivariate analysis with the aim to determine the most important variable that influences business results of a company.

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DAAAM AUTHOR QUESTIONNAIRE

PAPER DATA

Name and email address of corresponding author: prof. dr. Mugdim Pasic, pasicm@sgsb.edu.ba
This paper will be presented (oral presentation / poster): oral presentation
This paper will be NOT presented at Symposium please send the Proceedings to following address: Skenderija 70/II, 71000 Sarajevo, Bosnia and Herzegovina
Please send PDF Offprints of Paper to following e-mail address: pasicm@sgsb.edu.ba

AUTHORS DATA

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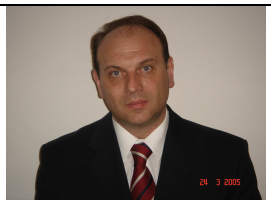
1.Digital Photo: 
2.First / Middle / Family Name: Mugdim Pašić
3.Titles: Dr.
4.Position / Since: Associate Professor / 2005
5.Institution: University of Delaware, University of Sarajevo – Sarajevo Graduate School of Business
6.Place and Date of Birth (yyyyy-mm-dd): Gacko, 1961-04-08
7.Nationality / Citizenship: Bosnia and Herzegovina
8.Field of interests (key words): Management, Industrial Engineering, Organization, Operations Management, Data Analysis
9.Hobbies: Basketball, Football
10.E-mail address: pasicm@sgsb.edu.ba
11.Site: www.sgsb.edu.ba, www.mef.unsa.ba
12.Phone & Fax #: 00 387 61 158 020
13.Postal address: Skenderija 70/II, 71000 Sarajevo, Bosnia and Herzegovina
14.I am interested in the following DAAAM activities (We have many of possibilities such as: publishing of paper, to be active member of one of our international committees, official photograph of daaam international, reviewer of papers and manuscripts, supporter, sponsor, organizer…): I fully support all DAAAM activities and I am ready for cooperation.

1.Digital Photo: 
2.First / Middle / Family Name: Aziz Šunje
3.Titles: Dr.
4.Position / Since: Associate Professor / 2002
5.Institution: University of Delaware, University of Sarajevo – Sarajevo Graduate School of Business
6.Place and Date of Birth (yyyyy-mm-dd): Murska Sobota, 1956-11-1956
7.Nationality / Citizenship: Bosnia and Herzegovina
8.Field of interests (key words): Management, Organization, Human Resources Management, Cross Cultural Management
9.Hobbies: Reading
10.E-mail address: sunjea@sgsb.edu.ba
11.Site: www.sgsb.edu.bs, www.efsa.unsa.ba
12.Phone & Fax #: 00 387 61 131 066
13.Postal address: Skenderija 70/II, 71000 Sarajevo, Bosnia and Herzegovina
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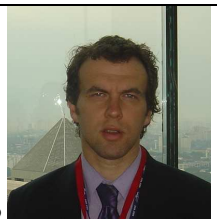
1. Digital Photo 
2. First / Middle / Family Name: Ensad Karić
3. Titles: M.Sc.
4. Position / Since: Senior Assistant
5. Institution: Mechanical Engineering Faculty in Sarajevo, University of Sarajevo
6. Place and Date of Birth (yyyyy-mm-dd): 1970-01-08
7. Nationality / Citizenship: Bosnian
8. Field of interests (key words): management and organization
9. Hobbies: sport
10.E-mail address: ensad.karic@lok.ba
11.Site:
12.Phone & Fax #: +387 33 444 650
13.Postal address: 71000 Sarajevo, Bosnia and Herzegovina
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