# Results

This section of the article is dedicated to the outputs of the research, which, given the quantitative approach chosen, focuses on statistical analyses using SPSS software version 26. The table below provides an overview of the five fundamental variables of the research in this area.

Table 1: Four Main variables of the research

Row	The dependent variable	Independent variables				
1	salary	Sex	total number of publications			
		total number of citations	number of years since obtaining PhD			

In this section, based on the assumptions considered by Dr. Lang and the understanding of the determining factors of his colleagues' salary at the university, it is essential to take two steps in this regard:

1. Establishing the initial correlation between the research variables.

2. Performing linear regression using both integrated and stepwise methods.

The following presents the results of the correlation between the research variables and type of influential relationships between the determining variables of the salaries received by Dr. Lang's colleagues, using multiple linear regression analysis. According to the Kolmogorov-Smirnov test, all independent variables, except the dependent variable, have a non-normal distribution due to the low significance coefficient (SIG) falling below the minimum threshold (p > 0.005). Therefore, the Spearman correlation test is recommended in this context (See, Denis, 2021:287).

Table 2: The result of the one-sample Kolmogorov test.

One-Sample Kolmogorov-Smirnov Test

	number offotal number	r
	years since of	total number
sex	obtaining PhD publications	of citations safary

Ν			70	70	70	70	70
Normal Parameters <sup>a,b</sup>		Mean	.56	7.01	18.47	9.87	55705.60
		Std. Deviation	.500	4.516	14.120	8.482	9655.776
Most	Extrem	eAbsolute	.369	.144	.151	.124	.083
Differences		Positive	.310	.144	.151	.124	.083
		Negative	369	116	108	122	046
Test Statistic			.369	.144	.151	.124	.083
Asymp. Sig. (2-tailed)		.000°	.001°	.000 <sup>c</sup>	.010 <sup>c</sup>	.200 <sup>c,d</sup>	

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

d. This is a lower bound of the true significance.

The table below shows the degree of correlation between the research's fundamental variables as a prerequisite for the linear regression test.

Table 3: Results of the correlation test between the fundamental variables of the research.

**Correlations** 

			sex	number of years since obtaining PhD	f total number of publications	f total number of citations	f salary
Spearman's rho	sex	Correlation Coefficient	1.000	.130	.036	.082	.122
		Sig. (2-tailed)		.283	.765	.498	.316
		Ν	70	70	70	70	70
	number of years since obtaining	Correlation Coefficient	.130	1.000	.522**	.241*	.513**

PhD	Sig. (2-tailed)	.283		.000	.045	.000
	Ν	70	70	70	70	70
total number of publications	Correlation Coefficient	.036	.522**	1.000	.310**	.420**
	Sig. (2-tailed)	.765	.000		.009	.000
	Ν	70	70	70	70	70
total number of citations	Correlation Coefficient	.082	.241*	.310**	1.000	.341**
	Sig. (2-tailed)	.498	.045	.009		.004
	Ν	70	70	70	70	70
salary	Correlation Coefficient	.122	.513**	.420**	.341**	1.000
	Sig. (2-tailed)	.316	.000	.000	.004	
	Ν	70	70	70	70	70

\*\*. Correlation is significant at the 0.01 level (2-tailed).

\*. Correlation is significant at the 0.05 level (2-tailed).

As can be seen, all variables except the Sex variable have a statistically significant relationship with the salary variable. Therefore, it is possible to use regression testing for the 70 observed data points. The tables below also present the results of the linear regression test between the research variables using the Full Entry Regression method (Enter model).

Table 4: Regression model variables with the Enter model.

Variables Entered/Removed<sup>a</sup>

Model	Variables Entered	Variables Removed	Method
1	total number of citations, sex total number of publications number of years since obtaining PhD <sup>b</sup>	,. , 2	Enter

b. All requested variables entered.

## Table 5: Summary of the Regression Model with the (Enter) Model

Model Summary

Model	R	R Square	Adjusted R Square	Std. Estim	Error ate	of	the
1	.667 <sup>a</sup>	.445	.411	7411.	758		

a. Predictors: (Constant), total number of citations, sex, total number of publications, number of years since obtaining PhD

### Table 6: ANOVA Coefficient of the Regression Model with the Enter Model

ANOVA<sup>a</sup>

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2862426363.397	4	715606590.849	13.027	.000* <sup>b</sup>
	Residual	3570719767.403	65	54934150.268		
	Total	6433146130.800	69			

a. Dependent Variable: salary

Note. \* *p* < .05

b. Predictors: (Constant), total number of citations, sex, total number of publications, number of years since obtaining PhD

Table 7: Significance coefficient of the variables in the regression model with the (Enter) method.

*Coefficients*<sup>a</sup>

Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.

		В	Std. Error	Beta		
1	(Constant)	44556.789	1935.950		23.015	.000
	sex	369.757	1810.971	.019	.204	.839
	number of years sir obtaining PhD	nce789.803	267.145	.369	2.956	.004*
	total number publications	of169.608	83.981	.248	2.020	.048*
	total number of citations	229.957	113.245	.202	2.031	.046*

Note. \* *p* < .05

According to the obtained results and considering the coefficient of determination (R Square), the independent variables have an impact of (0.445) in predicting the dependent variable or received salary, which overall means that they explain 45% of the variations in the dependent variable. Additionally, the overall significance of the model (SIG) in the ANOVA table is less than the threshold (p < 0.05), and the Durbin-Watson statistic is within the range of (1.5-2.5), indicating that the model is valid (See, Turner, 2020). Furthermore, the significance coefficients of the model variables are less than the threshold (p < 0.05) for all variables except for the gender variable.

The unstandardized beta coefficient (Beta) in the integrated regression model indicates the predictive superiority of the three variables: "number of years since obtaining PhD" with a coefficient of (0.369), "the total number of scientific publications by the professors" with a coefficient of (0.248), and "the number of citations to those publications" with a coefficient of (0.202).

The tables below also show the results of the linear regression test between the research variables using the stepwise method.

Table 8: Entered and removed variables in the stepwise regression model.

Variables Entered/Removed<sup>a</sup>

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1	number of years since obtaining PhD .	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F- to-remove >= .100).
2	total number of citations .	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F- to-remove >= .100).
3	total number of publications .	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F- to-remove >= .100).

## Table 9: Summary of the Regression Model with Stepwise Model

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.603 <sup>a</sup>	.363	.354	7761.275
2	.640 <sup>b</sup>	.410	.392	7526.173
3	.667°	.445	.419	7357.752

a. Predictors: (Constant), number of years since obtaining PhD

b. Predictors: (Constant), number of years since obtaining PhD, total number of citations

c. Predictors: (Constant), number of years since obtaining PhD, total number of citations, total number of publications

Table 10: The ANOVA coefficient of the regression model with the Stepwise model.

ANOVA<sup>a</sup>

Model	Sum of Squares df	Mean Square	F	Sig.

1	Regression	2337003737.61 1 5	2337003737.61 38.797 5	.000 <sup>b</sup>
	Residual	4096142393.18 68 5	60237388.135	
	Total	6433146130.80 69 0		
2	Regression	2638046292.49 2 9	1319023146.24 23.286 9	.000°
	Residual	3795099838.30 67 1	56643281.169	
	Total	6433146130.80 69 0		
3	Regression	2860136268.59 3 5	953378756.198 17.611	.000 <sup>d</sup>
	Residual	3573009862.20 66 5	54136513.064	
	Total	6433146130.80 69 0		

b. Predictors: (Constant), number of years since obtaining PhD

c. Predictors: (Constant), number of years since obtaining PhD, total number of citations

d. Predictors: (Constant), number of years since obtaining PhD, total number of citations, total number of publications

Table 11: Coefficients of the regression model with the Stepwise model.

## *Coefficients*<sup>a</sup>

		Unstandardiz	ed Coefficients	Standardized Coefficients		
Model		В	Std. Error	Beta	t	Sig.
1	(Constant)	46665.602	1722.483		27.092	.000

	number of years since obtaining PhD	e1288.798	206.913	.603	6.229	.000
2	(Constant)	45265.289	1777.322		25.468	.000
	number of years since obtaining PhD	e1119.329	213.688	.523	5.238	.000
	total number of citations	262.274	113.767	.230	2.305	.024
3	(Constant)	44716.226	1758.569		25.428	.000
3	(Constant) number of years since obtaining PhD	44716.226 e797.693	1758.569 262.409	.373	25.428 3.040	.000
3	(Constant) number of years since obtaining PhD total number of citations	44716.226 e797.693 231.106	1758.569 262.409 112.280	.373 .203	25.428 3.040 2.058	.000 .003 .044

# Table 12: Variables excluded in the three selected stepwise regression models.

#### Excluded Variables<sup>a</sup>

					Partial	Collinearity Statistics
Model		Beta In	t	Sig.	Correlation	Tolerance
1	sex	.016 <sup>b</sup>	.164	.870	.020	.975
	total number publications	of.281 <sup>b</sup>	2.275	.026	.268	.579
	total number of citations	.230 <sup>b</sup>	2.305	.024	.271	.882
2	sex	.007°	.074	.941	.009	.974
	total number publications	of.246 <sup>c</sup>	2.025	.047	.242	.568
3	sex	.019 <sup>d</sup>	.204	.839	.025	.970

a. Dependent Variable: salary

b. Predictors in the Model: (Constant), number of years since obtaining PhD

c. Predictors in the Model: (Constant), number of years since obtaining PhD, total number of citations

d. Predictors in the Model: (Constant), number of years since obtaining PhD, total number of citations, total number of publications

According to the obtained results, three significant regression models were identified by the software, with the third model having the greatest impact on prediction based on the coefficient of determination (R Square), which is (0.445). Further explanations will be provided in the discussion section of the article.

Considering Dr. Lang's recommendation and the creation of the fifth variable "Interaction," the coefficients change in the results of the linear regression accordingly.

 Table 13: Summary of the Regression Model with New Enter Model

Model Summary

Model	R	R Square	Adjusted R Square	Std. Estim	Error nate	of	the
1	.667ª	.445	.411	7411.	758		

a. Predictors: (Constant), Interaction, sex, total number of citations, number of years since obtaining PhD

|--|

*Coefficients*<sup>a</sup>

		Unstandardized Coefficients		Standardized Coefficients		
Model		В	Std. Error	Beta	t	Sig.
1	(Constant)	44556.789	1935.950		23.015	.000
	sex	369.757	1810.971	.019	.204	.839
	number of years sinc obtaining PhD	e789.803	267.145	.369	2.956	.004*
	total number of citations	145.153	126.162	.128	1.151	.254*
	Interaction	169.608	83.981	.281	2.020	.048*

Note. \* *p* < .05

## Table 15: Excluded Variables of the Regression Model with New Enter Model

Excluded Variables<sup>a</sup>

						Partial	Collinearity Statistics
Model			Beta In	t	Sig.	Correlation	Tolerance
1	total publicat	number ions	of. <sup>b</sup>				.000

a. Dependent Variable: salary

b. Predictors in the Model: (Constant), Interaction, sex, total number of citations, number of years since obtaining PhD

In the stepwise regression section, the changes are as follows:

Table 16: Summary of the Regression Model with New Stepwise Model

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error Estimate	of	the
1	.603ª	.363	.354	7761.275		
2	.658 <sup>b</sup>	.433	.416	7378.627		

a. Predictors: (Constant), number of years since obtaining PhD

b. Predictors: (Constant), number of years since obtaining PhD, Interaction

Table 17: Variables Entered/Removed of the Regression Model with New Stepwise Model

Variables Entered/Removed<sup>a</sup>

Model	Variables Entered	Variables Removed	Method
1	number of years obtaining PhD	since.	Stepwise(Criteria:Probability-of-F-to-enter<= .050, Probability-of-F-
2	Interaction		Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F- to-remove >= .100).

# Table 18: Coefficients of the Regression Model with New Stepwise Model

*Coefficients*<sup>a</sup>

	Unstandardized Coeffici		ed Coefficients	Standardized Coefficients		
Model		В	Std. Error	Beta	t	Sig.
1	(Constant)	46665.602	1722.483		27.092	.000
	number of years obtaining PhD	since1288.798	206.913	.603	6.229	.000*
2	(Constant)	45191.963	1716.184		26.333	.000
	number of years obtaining PhD	since787.756	263.017	.368	2.995	.004*
	Interaction	213.101	74.257	.353	2.870	.005*

a. Dependent Variable: salary

Note. \* *p* < .05

# Discussion

Initially, to compare four main regression models, the table below is presented to determine the explanatory power of each independent variable on the dependent variable, which is the salary of professors.

Table 17: Comparative Comparison of the Coefficient of Determination ofIndependent Variables in four Regression Models

Row	model	Model	Variable of name	The	Variable
	name	method		coefficient of	rank
				determination	
1	First	Enter	Number of Years	0.369	1
			Since Obtaining PhD		
			Total Number of	0.248	2
			Publications		
			Total Number of	0.202	3
			Citations		
2	Second	Stepwise	Number of years since	0.603	1
			obtaining PhD		
3	Third	Stepwise	Number of Years	0.523	1
			Since Obtaining PhD		
			Total Number of	0230	2
			Citations		
4	Fourth	Stepwise	Number of Years	0.373	1
			Since Obtaining PhD		
			Total Number of	0.246	2
			Publications		
			Total Number of	0.203	3
			Citations		

The comparability of the four models indicates the superiority of the factor " Number of Years Since Obtaining PhD " as the primary determinant of faculty salaries, with coefficients of determination of (0.369) and (0.603) in the Enter and Stepwise models, respectively. The second and third factors are the two variables "number of publications" and "number of citations," respectively. Additionally, the Sex variable does not have a significant coefficient in any of the five models, indicating that the university where Dr. Lang works is not gender-biased in favor of either gender group.

These findings suggest that, apart from the Sex variable, the ranking of other factors aligns with Dr. Lang's colleagues' assumptions regarding the possibility of this ranking and its effect on faculty salaries.

Furthermore, In the regression with 5 independent variables, using both the integrated and stepwise methods, the new variable "interaction" has gained significant importance, with its effect increasing to (0.281) (0.353) respectively and being promoted to the second rank. Additionally, the impact coefficients of the two variables, publications and citations, are also reduced.

The overall point to mention is that the coefficients of determination in both the four-variable and five-variable models are semi close to each other and do not exceed 45 percent totally.

# References

- Denis, DJ (2021). Applied univariate, bivariate, and multivariate statistics: Understanding statistics for social and natural scientists, with applications in SPSS and R. John Wiley & Sons.
- Turner, P. (2020). Critical values for the Durbin-Watson test in large samples. *Applied Economics Letters*, 27 (18), 1495-1499.