Evaluation of the impact of motivation to work on the performance of lecturers using exploratory factor analysis and multi-linear regression model

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A R T I C L E   I N F O

A B S T R A C T

Motivation and performance are crucial factors regarding university success and students' achievements. The purpose of this study is to evaluate the impact of motivation to work on the performance of lecturers using exploratory factor analysis and multi-linear regression. Questionnaires were used to collect data from respondents. The data were analyzed by frequencies, percentages, means, Pearson' Linear Correlation Coefficient, exploratory factor analysis, and multi-linear regression model based on the survey data of 321 university lecturers at Vietnam National University, Hanoi. The research results show four factors that positively affect the performance of lecturers, including wages and other benefits, training and development, working environment, and working motivation. As a result, the study is the basis for making appropriate policies that contribute to enhance the motivation and performance of the lecturers.

1. Introduction

Education and training are important tools for every country and nation of all time. In universities, factors such as training environment, material resources, and faculty resources are critical for success. Especially, the quality of teaching and research of lecturers depends on their motivation. Consequently, the role of motivation for lecturers is crucially important to promote their efforts, arouse passion, creativity, the spirit of the constitution, and promote the quality of resources.

There have been many scholars studying various aspects of the work motivation and performance of lecturers, specifically clarifying the implication of motivation, motivational factors, factors influencing motivation or lecturer performance measurement criteria and methods (Nadeem et al., 2014; Negussie and Ranjan, 2014; Do and Canh, 2018). However, these studies have only been investigated in general or evaluated on one aspect only, such as improving work efficiency through an unworkable driving force. The relationship between motivation and performance of lecturers remained unstudied.

Vietnam National University, Hanoi (VNU), is known as one of the top universities in Vietnam for the quality of training and scientific research. For many years, VNU has a lot of motivational policies to attract and promote the efficiency of lecturers' work. Therefore, the purpose of this study is to evaluate the impact of motivation to work on the performance of lecturers at Vietnam National University, Hanoi. The results of the study are the basis for making appropriate policies that contribute to enhance the motivation and performance of the lecturers.

2. Literature review

2.1. Overview of research on motivation and work motivation theory

Work motivation is one of the factors that play an important role in the management of an organization's human resources. The concept of work motivation has been mentioned in many studies. Mitchell (1982) stated that motivation is the degree to which an individual wants to reach and choose to combine his or her behaviors. According to Steers and Porter (1983), work motivation is the desire and willingness of the employees to increase efforts towards achieving the organization's goals; is

the urge, persistence, and enduring in the process of work. Pinder's (2014) study shown that motivation is a set of two groups of factors deriving from both inside and outside an individual leading to behaviors related to the identification of the form, intensity, and duration of action. Similarly to Pinder (2014) and Gundry (2007) demonstrated work motivation includes internal motivation and external motivation. Internal motivation is the desire to work to demonstrate self-efficacy, and it motivates the desire to seek and experiment with new ones, and external motivation is the employee's longing for work because of the tangible or intangible rewards they receive (Leonard et al., 1999).

Researchers have given many theories of motivation to work; however, the main thesis given by most theories is that people are primarily acting on demand, and they will act to meet their needs. Therefore, demand became an important motivation to promote employees to work. The impact on demand will change their behavior. This is considered a significant point used by the manager of the organization to motivate employees by using measures to influence their needs. The first theory mentioned was Maslow's (1989) Needs-Based theory. This theory shows that human beings are motivated by needs ranking in order hierarchically, including physiological, safety, love/belonging, esteem, and self-actualization. Based on Maslow's demand hierarchy, Herzberg et al. (1959) developed the theory of two factors, including the group of factors that create the incentive and the group of factors that cause dissatisfaction among workers. The next theory is McGregor's X and Y theory (McGregor and Cutcher-Gershenfeld, 1960). This theory divides workers into two groups, the X theory group, and the Y theory group. The X theory group is the ones who do not like to work, so the way to maintain and increase productivity is attached discipline forms, to supervise their activities, or encourage them through financial incentives such as salaries and bonuses. The Y group is job-loving people who voluntarily work to achieve the goals of the organization and have self-employment and self-responsibility so that they have the spirit of mind and desire to learn. For this group, it is necessary to deliver challenging tasks, create opportunities for them to create and understand higher demands.

2.2. Overview of researches on motivation to work and performance evaluation criteria for lecturers

According to Dinham and Scott (2000), there are two groups of factors influencing the motivation of teachers are internal factors and external factors. Internal factors include the ability of the teacher, teacher performance, positive student attitude, promotion opportunities, workplace relationships, and recognition. These factors have a positive effect on job satisfaction, and the lack of these factors will lead to a decrease in job satisfaction among teachers. External factors include school policy, poor

supervision, a decline in the number of teachers in society, increased workload due to administrative duties, poor and negative working conditions. These factors influence the reduction of teachers' satisfaction (Dinham and Scott, 1997). In addition to these two factors, Tella et al. (2007) shown there are other factors influencing motivation, such as bonuses, training, and fostering regimes, and suggested that bonuses are seen as a motivational strategy to improve work productivity, commitment to work, and teachers' satisfaction. According to Shah et al. (2012), the positive effects of bonuses, recognition, satisfaction with leadership and job characteristics and motivation of teachers were shown. Based on the study by Dinham and Scott (1997) and Zembylas and Papanastasiou (2004) pointed out that teachers' motivation includes intrinsic motivations and extrinsic motivations related to job satisfaction.

External motivation such as the higher wages and working conditions, the more satisfied teachers are with their work. Additionally, the study by Seebaluck and Seegum (2013) investigated the factors in Maslow's need pyramid in creating the motivation for employees in an organizational environment. Seebaluck and Seegum (2013) analyzed the factors influencing teachers' motivation at a public elementary school in Mauritius. Research results show that seven factors strongly influence the motivation of teachers include: (1) sense of accomplishment; (2) ability to communicate and impart knowledge to students; (3) the fulfillment of desires in one's profession; (4) develop social relationships; (5) responsibility for teaching; (6) opportunities to improve career skills and (7) social status.

Evaluating the performance of lectures is one of the most important issues that are of interest to universities and researchers, so many studies offer the standards for evaluating the performance of lectures. Some researchers have pointed out that teaching capacity and research capacity are the two most important criteria for evaluating lecturer performance and providing criteria for evaluating the performance of the above-mentioned two areas, such as the study by Sampson et al. (2010). Based on inheriting previous studies on teacher assessment criteria, the topic will select appropriate criteria for inclusion in the research model to fully and accurately assess the performance of lectures.

2.3. Overview of research on the evaluation of the impact of work motivation on the lecturers' performance

Although there is a lot of research on creating work motivation and performance evaluation standards, there are not many detailed studies evaluating the impact of motivation on performance. Davidson (2007) examined the influence of organizational culture factors on the performance of teachers. Research has shown that the culture of the organization plays an important role in the

performance of the teacher. Only by creating an appropriate culture in the organization will the staff feel comfortable in communicating with colleagues and superiors, thereby making the job more effective. Negussie and Ranjan (2014) explored the five core needs in Maslow's theory of demand pyramid how they affect teachers' work. What are the main factors that influence the performance of teachers? At the same time, the study also investigated whether there is a difference in the impact of the 5 needs on job outcomes between public and private sector teachers. The study by Nadeem et al. (2011) showed the effectiveness of teachers' work influenced by social conditions and economic conditions of teachers. Teacher motivation will be reduced when working conditions been not well met, thereby reducing work efficiency. Research by Shahzadi et al. (2014) evaluated the impact of employees' motivation on work results, indicating there is a positive relationship between work motivation and employee performance. Research also indicates that internal factors, such as salary and bonuses, will have a positive impact on employee productivity and work efficiency.

In this study, we will inherit and develop based on previous research to focus on the analysis and evaluation of dynamics, the measurement of the results of teaching, the impact of motivation to work on the performance of lecturers at VNU by using the linear structure analysis model. Therefore, the study is going to test four hypotheses as follows:

H1: Wages and other benefits have a positive effect on the performance of lecturers
H2: Training and development has a positive effect on the performance of lecturers
H3: Working environment has a positive effect on the performance of lecturers
H4: Working motivation has a positive effect on the performance of lecturers

3. Research methodology

Based on the literature review, this study examines the impact of four motivational factors (scales) on the performance of lecturers (PL), including Wages and other benefits (F1), training and development (F2), working environment (F3), and working motivation (F4). In particular, the factor F1 is measured by 06 observed variables (F1.1-F1.6), the factor F2 is measured by 07 observations (F2.1-F2.7), the factor F3 is measured by 06 observed variables (F3.1-F3.6), the factor F4 is measured by 06 observations (F4.1-F4.6), and the performance of lecturers is measured by 07 observed variables (PL1-PL7). Fig. 1 shows the theoretical framework of this study.

The completed questionnaire was sent to lecturers who are working at VNU. The number of valid questionnaires received is 321. According to Hair et al. (1998), in order to perform the Exploratory factor analysis (EFA), the sample size must be at least 5 times the total number of

observed variables. This study has 32 observed variables, so the minimum number of samples is $32 * 5 = 160$; for multivariate regression analysis: The minimum sample size is calculated by the formula of $50 + 8 * m$ (m: Number of independent variables) (Tabachnick and Fidell, 1996). The study has 04 independent variables, so the minimum sample size is $50 + 8 * 4 = 82$ observations.

This study utilizes the Cronbach Alpha (CA) analysis as the reliability test after all respondents' answers to observed variables are valid. This analysis is conducted by comparing the CA value with 0.7. A collection of convincing observed variables is reliable if the CA is higher than 0.7 (Ghozali, 2017). Then, EFA was used to check the convergent and discriminant values of the variables. EFA must satisfy the following requirements: Factor loading is over 0.5, KMO≤0.5≤1, Bartlett test the statistical significance (Sig. <0.05), Percentage of variance in Extraction Sums of Squared Loadings is over 50%.

4. The analysis result in the case of Vietnam National University, Hanoi

4.1. The statistics of the demographic characteristics

The statistic used is the frequency to capture the total lecturers categorized by units, degree, and working duration. Table 1 presents the categorized by the units.

Table 1: The categorized by the units

No.	Units
1	University of Social Sciences and Humanities (USSH)
2	University of Science (US)
3	University of Engineering and Technology (UET)
4	University of Languages and International Studies (ULIS)
5	University of Economics and Business (UEB)
6	University of Education (UED)
7	Vietnam Japan University (VJU)
8	School of Law (SoL)
9	International School (IS)
10	School of Medicine and Pharmacy (SMP)
11	School of Interdisciplinary (SIS)
12	Hanoi School of Business and Management (HSB)

Table 2 displays the number of lecturers by their degree. Table 2 shows that the number of lecturers having a master's degree is 38, a Ph.D. degree is 264, associate professor and professor is 19.

Table 2: The total lecturers categorized by degree

Degree	Number of lecturers	Percentage
Master	38	11.8
Ph. D	264	82.2
Associate Professor/Professor	19	5.9
Total	321	100.0

Table 3 displays the number of lecturers by their working duration. Table 3 shows that the number of lecturers having a working duration of fewer than 5

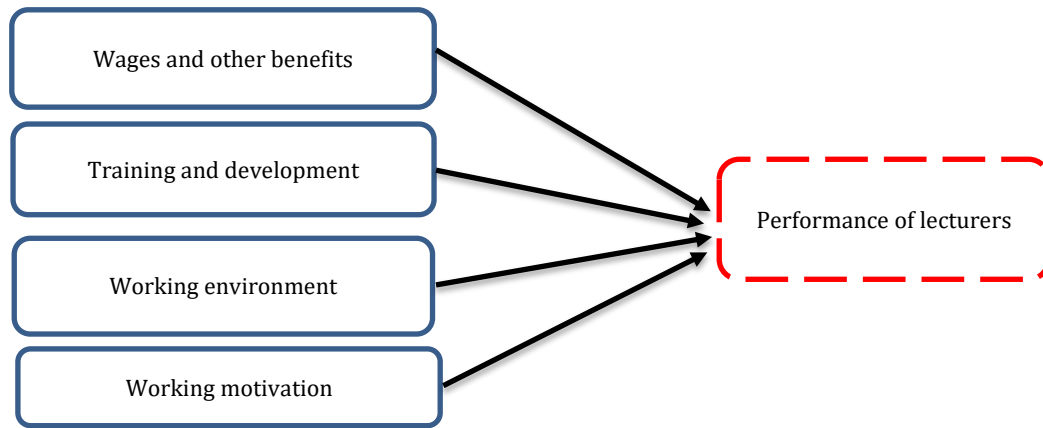years is 152, between 5 and 10 is 109, over 10 years   is 60.

Fig. 1: Theoretical framework of this study

4.2. Testing the reliability of the scales

This study uses the Cronbach Alpha (CA) analysis to determine the reliability of the valid variables for the scales (including wages and other benefits, training and development, working environment, and working motivation) as well as the performance of lecturers. The results are in Tables 4-8. Because all coefficients of CA are higher than 0.7 and the values of corrected item-total correlation are higher than 0.4, the reliability test stand reached. The variables which are not suitable are excluded from the model, including F2.5 and PL7.

4.3. Exploratory factor analysis

After analyzing Cronbach's Alpha, four factors (independent variables) with 24 observed variables were included for exploratory factor analysis (EFA). From Table 9, the KMO test coefficient calculated

from the sample is 0.895<1.0. Thus, the sample size of the survey is eligible to conduct EFA. Bartlett's Test of Sphericity value is significant with P_value=0,00. This value indicates that the observed variables are correlated with respect to the total number of observations. Table 10 indicates that 04 factors explain 56.664% is larger than 50% of the variation of the data set. All observed variables in Table 11 have Factor Loading is larger than 0.5. Therefore, the independent variables in the research model have converged and discriminant values.

Table 3: The total lecturers categorized by the working duration

Working duration	The number of lecturers	Percentage
<5 years	152	47.4
5_10	109	34.0
>10 years	60	18.7
Total	321	100.0

Table 4: Reliability of the scale wages and other benefits (Cronbach's alpha=0.841)

Variables of F1	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
F1.1	20.12	6.584	0.505	0.838
F1.2	19.99	6.237	0.637	0.811
F1.3	19.91	6.501	0.654	0.809
F1.4	19.90	6.461	0.621	0.814
F1.5	19.90	6.305	0.644	0.810
F1.6	19.98	6.274	0.661	0.806

Table 5: Reliability of the scale training and development (Cronbach's alpha = 0.835)

Variables of F2	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
F2.1	20.22	6.868	0.691	0.791
F2.2	20.26	7.297	0.620	0.806
F2.3	20.28	7.289	0.662	0.798
F2.4	20.38	7.637	0.555	0.819
F2.6	20.30	7.292	0.600	0.810
F2.7	20.35	7.623	0.529	0.824

Table 6: Reliability of the scale working environment (Cronbach's alpha=0.821)

Variables of F3	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
F3.1	20.93	6.801	0.486	0.818
F3.2	20.78	6.625	0.702	0.769
F3.3	20.79	6.842	0.616	0.786
F3.4	20.91	6.872	0.536	0.804
F3.5	20.86	6.931	0.590	0.792
F3.6	20.83	6.876	0.620	0.786

Table 7: Reliability of the scale working motivation (Cronbach's alpha=0.863)

Variables of F4	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
F4.1	20.21	8.276	0.682	0.835
F4.2	20.08	8.435	0.702	0.832
F4.3	20.12	8.505	0.698	0.833
F4.4	20.14	8.483	0.703	0.832
F4.5	20.30	8.737	0.602	0.850
F4.6	20.31	8.945	0.558	0.857

Table 8: Reliability of the scale performance of lecturers (Cronbach's alpha=0.881)

Variables of PL	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
PL1	20.36	9.075	0.578	0.881
PL2	20.17	8.770	0.694	0.860
PL3	20.02	9.003	0.749	0.852
PL4	20.01	9.147	0.698	0.860
PL5	20.02	8.840	0.699	0.859
PL6	20.07	8.699	0.741	0.852

Table 9: KMO and bartlett's test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.895
Bartlett's Test of Sphericity	Approx. Chi-Square	3311.874
	df	276
	Sig.	0.000

Table 10: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.675	31.981	31.981	7.675	31.981	31.981	3.541	14.753	14.753
2	2.660	11.084	43.064	2.660	11.084	43.064	3.467	14.444	29.197
3	1.753	7.303	50.367	1.753	7.303	50.367	3.327	13.862	43.059
4	1.511	6.297	56.664	1.511	6.297	56.664	3.265	13.605	56.664
5	0.904	3.767	60.431						
6	0.874	3.643	64.074						
7	0.815	3.396	67.471						
8	0.779	3.244	70.715						
9	0.689	2.870	73.585						
10	0.626	2.607	76.192						
11	0.579	2.411	78.603						
12	0.577	2.403	81.005						
13	0.537	2.236	83.241						
14	0.500	2.084	85.325						
15	0.471	1.962	87.288						
16	0.460	1.917	89.204						
17	0.427	1.781	90.985						
18	0.397	1.652	92.638						
19	0.347	1.446	94.083						
20	0.314	1.310	95.394						
21	0.310	1.290	96.683						
22	0.294	1.226	97.909						
23	0.273	1.139	99.048						
24	0.228	0.952	100.000						

Extraction Method: Principal Component Analysis

4.4. Correlation analysis

Table 12 shows a linear correlation between the independent and dependent variables because the value of P_value is less than 5%. In addition, the Pearson coefficient between these variables is positive, indicating a positive relationship. This means that the increase in the value of the independent variable increases the value of the dependent variables.

4.5. Regression analysis

Based on the result of Table 11, the study analyzes the impact of independent variables F1, F2, F3, F4 on the dependent variable PL. The results of multiple regression analysis using the least-squares method in Tables 13-15 show there are 04 factors affecting the dependent variable PL at a 1% significance level.

The value of adjusted R Square is =0.637 indicates that the independent variables F1, F2, F3, F4 explained 63.7% of the variation of the dependent variable PL. The VIF values of all independent variables are less than 10, and Durbin-Watson is 1.709. The results show that the model does not have multi-collinearity, and there is no superlative autocorrelation between adjacent errors. The regression model reflects the impact of the independent variables on the dependent variable PL is as follows:

$$PL = -0.473 + 0.172 * F1 + 0.388 * F2 + 0.107 * F3 + 0.343 * F4$$

Table 11: Rotation Component matrix-measuring scales of factors

Variables	Component			
	1	2	3	4
F1.1		0.598		
F1.2		0.727		
F1.3		0.755		
F1.4		0.732		
F1.5		0.750		
F1.6		0.781		
F2.1				0.724
F2.2				0.650
F2.3				0.740
F2.4				0.635
F2.6				0.719
F2.7				0.642
F3.1			0.652	
F3.2			0.802	
F3.3			0.708	
F3.4			0.600	
F3.5			0.653	
F3.6			0.739	
F4.1	0.684			
F4.2	0.711			
F4.3	0.723			
F4.4	0.768			
F4.5	0.689			
F4.6	0.643			

Extraction Method: Principal Component Analysis; Rotation Method: Varimax with Kaiser Normalization
a. Rotation converged in 5 iterations

Table 12: Correlations between an independent variable and dependent variables

		F1	F2	F3	F4	PL
F1	Pearson Correlation	1	0.404**	0.225**	0.386**	0.486**
	Sig. (2-tailed)		0.000	0.000	0.000	0.000
	N	321	321	321	321	321
F2	Pearson Correlation	0.404**	1	0.420**	0.548**	0.691**
	Sig. (2-tailed)	0.000		0.000	0.000	0.000
	N	321	321	321	321	321
F3	Pearson Correlation	0.225**	0.420**	1	0.515**	0.486**
	Sig. (2-tailed)	0.000	0.000		0.000	0.000
	N	321	321	321	321	321
F4	Pearson Correlation	0.386**	0.548**	0.515**	1	0.678**
	Sig. (2-tailed)	0.000	0.000	0.000		0.000
	N	321	321	321	321	321
PL	Pearson Correlation	0.486**	0.691**	0.486**	0.678**	1
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	
	N	321	321	321	321	321

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

Table 13. Model summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	0.798[a]	0.637	0.632	0.35799	0.637	138.607	4	316	0.000	1.709

a. Predictors: (Constant), F4, F1, F3, F2
b. Dependent Variable: PL

Table 14. ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	71.052	4	17.763	138.607	0.000[b]
	Residual	40.497	316	0.128		
	Total	111.549	320			

a. Dependent Variable: PL
b. Predictors: (Constant), F4, F1, F3, F2

Table 15. Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	-0.473	0.214		-2.212	0.028					
	F1	0.204	0.045	0.172	4.543	0.000	0.486	0.248	0.154	0.798	1.254
	F2	0.430	0.047	0.388	9.104	0.000	0.691	0.456	0.309	0.632	1.582
	F3	0.123	0.046	0.107	2.660	0.008	0.486	0.148	0.090	0.707	1.414
	F4	0.351	0.046	0.343	7.685	0.000	0.678	0.397	0.260	0.576	1.737

a. Dependent Variable: PL

5. Conclusion and recommendations

The purpose of this research was to examine and analyze the impact of wages and other benefits, training and development, working environment, and working motivation on the performance of lecturers by EFA and multi-linear regression model. The results of the study confirm the significant positive influence of these factors on the performance of lecturers at a 1% significance level.

Among these variables, training, and development (F2) is the most effective factor due to its high beta coefficient value (+0.388). According to Rasheed et al. (2016), lecturers' training and development are very important to enhance their knowledge, skills, and to give them the confidence to compete in the industry. Therefore, in order to improve the performance of lecturers, VNU-affiliated universities need to promote short-term training programs, as well as create favorable conditions for lecturers to exchange research and teaching in foreign countries.

Working motivation (F4) with β=+0.343 has the second strongest influence on the performance of lecturers at VNU. This implies that when lecturers are well encouraged, this impacts their performance. This finding is supported by Ai et al. (2019) and Narasuci et al. (2018). Working environment (F3), wages, and other benefits (F1) are also two significant factors that affect the performance of lecturers at VNU. These factors can encourage an increase in the performance of lecturers while working. These factors indicate that lecturers are not really satisfied with the current salary and working environment.

The impact of these factors on the performance of lecturers needs to be understood by VNU-affiliated universities' management to improve the performance of lecturers. These results are supported by several previous studies. Narasuci et al. (2018) also found that there is a positive and significant effect of the work environment on lecturer performance and work motivation. Ai et al. (2019) indicated that wages and other benefits and working environment has positively affected the work motivation of lecturers.

It is a fact that very few studies have been conducted on the impact of motivational factors on the performance of lecturers. This study is an attempt to understand how do wages and other benefits, training and development, working environment, and working motivation affect the performance of lecturers at VNU.

Compliance with ethical standards

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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