

Factors Affecting Scientific Research Results by Teachers of Universities Ho Chi Minh City, Vietnam

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Abstract: *This study analyzes the factors affecting the results of scientific research of university lecturers in Ho Chi Minh City in Vietnam. The study used Cronbach's Alpha test method and exploratory factor analysis (EFA) to test and build the scales. In addition, the linear regression method is used to find out the factors affecting the scientific research results. The results showed that factors affecting Scientific research results include: Working environment, Cognition, Personal competence, Motivation made, Age and Specialized fields of lecturers.*

Keywords: scientific research, lecturers, university

1. Introduction

In the current stage of science and technology development and integration, improving the quality of training is an important factor that needs to be taken seriously. The Ministry of Education and Training has prescribed that lecturers must spend at least 1/3 of the total working time in the school year on scientific research tasks [4].

Thus, scientific research (scientific research) is one of the important tasks to innovate and improve the quality of training. Research plays an important role in the development and dissemination of knowledge, research activities lead to the development of new knowledge as well as consolidate existing knowledge. Research is an important foundation to becoming a successful teacher, contributing to improving the quality of teaching and strengthening the many skills needed for effective teaching. In addition, scientific research and teaching work to complement each other, teaching and research should coexist in parallel, because there is a clear link between teaching and research that stimulates and support each other. In addition, participating in research also improves lecturers' confidence, contributes to career development and job advancement [18]. Recently, scientific research activities in the educational environment in Vietnam are being widely popularized. However, the participation in scientific research of lecturers is still limited, so the goal of this research is to analyze the factors affecting the scientific research results of lecturers in universities in Ho Chi Minh City in Vietnam. , thereby proposing some solutions to promote scientific research activities among university lecturers in Vietnam.

2. Research Methods

2.1 Theoretical basis and research model

This study is based on Azjen's theory of planning behavior (1991) to explain the reasons that motivate university lecturers to participate in scientific research. This theory was developed from the theory of rational action (TRA, Ajzen &

Fishbein, 1975), the theory of planning behavior that assumes that a behavior can be predicted or explained by motives to perform that behavior. The intentions are assumed to include the factors and motives that influence the behavior, and are defined as the level of effort that people try to perform that behavior (Ajzen, 1991). For example, job advancement is one of the motivations for lecturers to participate in research (Cargile & Bublitz, 1986; Hadjinicola & Soteriou, 2006; Tien, 2000). Thus, the theory of planning behavior shows that the intention to lead to human behavior is predicted by the following factors: awareness of behavior, subjective standards and perceptions of behavioral control. In particular, perception, subjective standards and perceived behavioral control are thought to be gathered by many factors such as demographics, society, culture, personality and external factors [1].

Awareness on the implementation of scientific research is the views and perspectives of lecturers on research implementation. According to Chen, Gupta & Hoshower (2006) conclude that an individual appreciates and thinks that conducting research is a good behavior, beneficial to himself and society, that individual will be more motivated to carry out scientific research. Conversely, if an individual thinks that conducting scientific research is not important or necessary for themselves, they will be less motivated or not even intending to conduct research. Besides the attitude, subjective standards for the implementation of scientific research include factors beyond the control of scientific research implementers such as administrative procedures, funding for implementing scientific research projects [10]. In addition, Perceptions of behavioral control in scientific research include personal factors used to assess their ability to succeed such as: individual competence (Azad & Seyyed, 2007), working conditions and environment. (Blackburn & Lawrence, 1995; Sax et al., 2002; Chen et al., 2006; Azad & Seyyed, 2007; Lertputtarak, 2008).

Thus, scientific research results of lecturers are influenced by factor groups: Awareness and motivation for conducting scientific research; Subjective standards of scientific research implementation (Procedures and funding for

scientific research implementation); Perception of behavioral control in scientific research (Personal capacity; working conditions and environment). In addition, to test the relationship of demographic factors (control variables) with the lecturers's ability to participate in scientific research, factors such as gender, age, education level, experience and field of working are included in the research model. In addition, the inheritance of previous studies, qualitative research steps and expert interviews are conducted to adjust the scales to suit the research conditions in universities in Ho Chi Minh City. At that time, the proposed research hypothesis and research model were as follows:

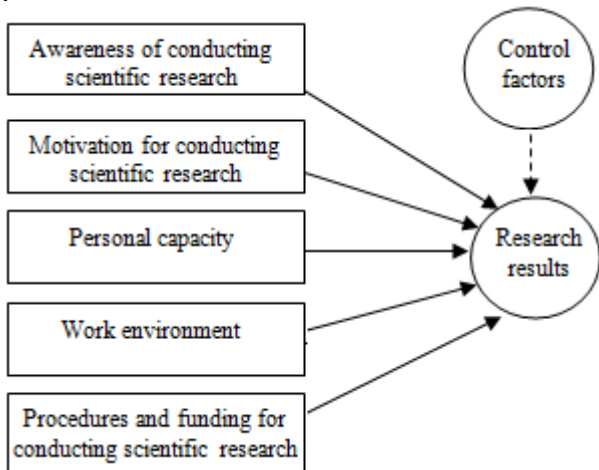


Figure 1: Proposal of research model

- H1: Awareness on the implementation of scientific research positively affects the scientific research results of lecturer.
- H2: Motivation to implement scientific research positively affects scientific research results of lecturer.
- H3: Personal capacity has a positive impact on the scientific research results of lecturers.
- H4: Working environment has a positive impact on the scientific research results of lecturers.
- H5: Procedures and costs of conducting scientific research have a positive impact on the results of scientific research of lecturers.

2.2 Scale description

The observed variables in the scientific research scales are synthesized from relevant studies and qualitative research. Results of observed variables from qualitative research were conducted by expert interview method to correct and supplement the observed variables in the scale. Specifically, the observed variables in the scales are described in Table 1. In particular, the observed variables are measured by a 5-level Likert scale, with 1: "Strongly disagree", to 5: "Totally agree".

Besides, the scale of scientific research results of lecturers is formed from qualitative research results, including 04 observed variables: NCKH1 (The results of scientific research enhance the reputation and brand for ourselves and the university); NCKH2 (The results of scientific research reflect the research capacity of yourself); NCKH3 (The results of scientific research confirm the nature of the research problem); NCKH4 (The results of scientific research reflect the school's investment policy for scientific

research).

Table 1: Scale description

Symbol	Observed variables	Source
1. Awareness for conducting scientific research		
NTHUC1	Scientific research helps to gain a deeper understanding of theory / expertise	Robert C. Bogdan and Sari Knopp Biken (2012)
NTHUC2	Research helps to better understand practices	Qualitative research
NTHUC3	Scientific research is a condition for self-development and the career	Chen, Gupta & Hoshower (2006)
NTHUC4	You always want to participate in scientific research	Azad & Seyyed (2007)
2. Motivation for conducting scientific research		
DLTH5	Mandatory mission	Yining Chen, Ashok Gupta and Leon Hoshower (2010)
DLTH6	Improving reputation for lecturers	Chen, Gupta & Hoshower (2006)
DLTH7	Serving teaching	Yining Chen, Ashok Gupta and Leon Hoshower (2010)
DLTH8	Scientific research benefits lecturers's themselves	Azjen (1991)
3. Personal capacity		
NLCN9	In terms of professional field, conducting scientific research is not too difficult for a lecturer	Azad & Seyyed (2007)
NLCN10	In terms of time, conducting scientific research is not too difficult for for a lecturer	Qualitative research
NLCN11	You can collaborate on scientific research with colleagues	Melin (2000)
NLCN12	You have a lot of ideas for the upcoming scientific research	Azad & Seyyed (2007)
NLCN13	You are confident that all proposals for your new scientific research topic will be approved easily	Azad & Seyyed (2007)
NLCN14	You can easily recruit many students to take part in your research	Qualitative research
4. Work environment		
MTLV15	You always have many colleagues who can collaborate on research	Azad & Seyyed (2007)
MTLV16	You can easily access references	Yining Chen, Ashok Gupta and Leon Hoshower (2010)
MTLV17	Sources full reference information you need	Qualitative research
MTLV18	Facilities (laboratories, computers, internet systems, etc.) that meet your scientific research implementation	Jacob & Lefgren (2011)
5. Procedures and funding		
TT&KP19	Simple administrative procedures when implementing scientific research topics	Qualitative research

TT&KP20	Funds for scientific research are reasonable	Jacob & Lefgren (2011)
TT&KP21	Easy scientific research transfer process	Qualitative research
6. Scientific research results		
NCKH1	The results of scientific research enhance the reputation and brand for ourselves and the university	Qualitative research
NCKH2	The results of scientific research reflect the research capacity of yourself	Qualitative research
NCKH3	The results of scientific research confirm the nature of the research problem	Qualitative research
NCKH4	The results of scientific research reflect the school's investment policy for scientific research	Qualitative research

Source: Compiled from related studies, 2019

2.3 The method of data collection

Primary data was collected by the method of random sampling according to the list of lecturers of universities in Ho Chi Minh City. For the research using exploratory factor analysis method, the minimum sample size is 50 and the number of survey/observed variables is 5:1, so 1 observation variable needs 5 surveys. [18]. Thus, with 21 observed variables of the independent variables proposed in Table 1, this study should be conducted with a sample size of 105 surveys. However, to ensure representation, this study surveyed 125 lecturers at universities in Ho Chi Minh City.

2.4 Methods of analysis

Cronbach's Alpha reliability testing method is used to test for each scale, unsatisfactory observation variables will be removed. According to Peterson (1994) a scale with a Cronbach's Alpha coefficient greater than 0.6 will be accepted, observed variables with a total correlation coefficient less than 0.3 will be removed from the scale. Next, the exploratory factor analysis (EFA) method was carried out in order to find suitable scales. With the following conditions: (1) The factor load factor of the observed variables is greater than 0.5, indicating that these observed variables are reliable. (2) KMO coefficient satisfies the appropriateness of factor analysis if $0.5 \leq KMO \leq 1$ [9]. (3) Sig coefficient. = 0.000 < 0.005 of Bartlett's test that the observed variables correlated with each other in the population with statistical significance, so the observations are suitable for factor analysis. (4) The value of extracted or incremental variance > 50% is suitable for factor analysis [9]. Eigenvalue index > 1, this value allows us to determine the number of factors extracted.

In addition, to test the correlation between factors and control variables for the scientific research results of the lecturers, the multiple linear regression method was implemented through 02 steps. Step 1: The regression model consists of extracted factors. Step 2: The regression model consists of control factors and variables.

Regression models with independent variables are factors:

$$Y = \beta_0 + \beta_1F1 + \beta_2F2 + \beta_3F3 + \beta_4F4 + \beta_5F5 + \varepsilon \quad (1)$$

Regression models with independent variables are factors and control factors.

$$Y = \beta_0 + \beta_1F1 + \beta_2F2 + \beta_3F3 + \beta_4F4 + \beta_5F5 + \beta_iX_i + \varepsilon \quad (2)$$

Include:

Y: dependent variable (scientific research results of lecturers)

β_i : estimated coefficient

F1 → F5: independent variable, formed from Awareness factors for conducting scientific research; Motivation to participate in scientific research; Personal capacity; Work environment; Procedures and funding.

X_i : The independent variables under control factors include: gender (male = 1; female = 0), age (age of lecturer), level (Postgraduate degrees = 1; university degrees = 0), seniority (years of work at the school) and subject area of expertise. In particular, the professional field includes socio-economic; engineering - agriculture and medicine. This factor is coded into 02 variables:

LVKTXH: socio-economic fields = 1, other fields = 0

LVKTNN: technical - agriculture = 1, other fields = 0

ε : Error

3. Research Results

3.1 Sample characteristics of the survey

Survey form with 125 lecturers working at universities in Ho Chi Minh City, the statistical results are described in Table 2.

Table 2: Descriptive statistics of survey sample characteristics

Characteristics	Frequency	Ratio (%)
Gender	125	100,00
Male	63	50,40
Female	62	49,60
Age	125	100,00
22-30	30	24,00
31-40	64	51,20
41-50	19	15,20
> 50	12	9,60
Level	125	100,00
University degrees	48	38,40
Postgraduate degrees	77	61,60
Working seniority	125	100,00
1 - 5	40	32,00
6-10	39	31,20
11-20	39	31,20
21-30	6	4,80
> 30	1	0,80
Areas of expertise	125	100,00
Economy - Society	50	40,00
Technology - Agriculture	38	30,40
Pharmacy	37	29,60

Source: Processing from survey data of 125 lecturers at universities in Ho Chi Minh City, 2019

Statistical results show that the proportion of male and female in the sample is quite similar, with the proportion of 50.4% male and 49.6% female. Regarding age, most

lecturers aged 31 - 40 years old, accounting for 51.2%, 24% of lecturer aged 22 - 30 years old, aged 41 - 50 years old with 15.2% and only 9,6% of lecturers are over 50 years old. The level of expertise in the sample is quite high, with 61.6% of lecturers having postgraduate degrees and 38.4% of lecturers having university degrees. Besides, lecturers with 6 - 20 years of seniority account for a relatively high proportion (62.4%), 32% of lecturers have 1- 5 years of seniority, 4.8% lecturers. seniority of 21-30 years, and only 0.8% of lecturers have more than 30% seniority. In terms of specialization, the socio-economic field accounts for the majority with 40%, medicine and pharmacy accounting for 29.6% and technical and agricultural fields accounting for 30.4%.

3.2 Testing scales

The results of testing the scales with Cronbach's Alpha coefficient were performed with 5 scales. After the verification step, the scales have a change in the number of observed variables, namely the satisfactory scales described in Table 3

Table 3: Cronbach's Alpha results with accepted scales

Scale	Cronbach's Alpha coefficient		
	First	Last	
1. Awareness	0,638	0,717	
2. Motivation	0,643	0,690	
3. Personal capacity	0,642	0,729	
4. Work environment	0,737	0,787	
5. Procedures and funding	0,707	0,780	
Scale	Number of observed variables		The variable is disqualified
	First	Last	
1. Awareness	4	3	NTHUC2
2. Motivation	4	2	ĐCTH5; ĐCTH7
3. Personal capacity	6	4	NLCN12; NLCN13
4. Work environment	4	3	MTLV17
5. Procedures and funding	3	2	TT&KP21
Total	21	14	7

Source: Processing from survey data of 125 lecturers at universities in Ho Chi Minh City, 2019

The results of Table 3 show that, from 21 observed variables belonging to the first 05 groups of scales included in the study, after testing the reliability with Cronbach's Alpha coefficient, the remaining 14 observed variables belong to 05 scales. These scales are eligible for the next factor analysis step.

3.3 Results of factor analysis

The results of factor analysis in the final step (Table 4) show that: (1) The factor load factor of the observed variables is greater than 0.5, indicating that these observed variables are reliable; (2) KMO coefficient = 0.760 > 0.5 satisfies the suitability of factor analysis; (3) Sig coefficient. = 0.000 < 0.005 of Bartlett's test shows that there are statistically correlated observed variables in the population, so that the observations are suitable for factor analysis; (4) The value of extracted or cumulative variance = 69.56% which means that 69.56% of the total variance is explained by the factors

or the variation of the factors explained by observed variables. Eigenvalue criterion = 1.01 > 1, this value tells us the factor rotation result allows us to stop at the fifth factor (F1 - F5).

Table 4: Factor rotation matrix

Variables	Factor				
	F1	F2	F3	F4	F5
MTLV15					
MTLV16	0,841				
MTLV18	0,727				
NLCN9		0,747			
NLCN10		0,650			
NLCN11		0,571			
NLCN14		0,529			
NTHUC1			0,762		
NTHUC3			0,754		
NTHUC4			0,742		
TT&KP19				0,867	
TT&KP20				0,833	
ĐCTH6					0,808
ĐCTH8					0,803
Eigenvalue: 1,01					
Percentage of variance of each factor: 69,561					
KMO and Bartlett's Test: 0,760					
Sig. : 0,000					

Source: Processing from survey data of 125 lecturers at universities in Ho Chi Minh City, 2019

In summary, the analysis results have 05 new factors formed from 14 observed variables. Specifically, factor F1 (Working environment) includes 03 observed variables: MTLV15, MTLV16 and MTLV18; factor F2 (Personal capacity) includes 04 observed variables: NLCN9, NLCN10, NLCN11 and NLCN14; F3 (Awareness) factors include 03 observed variables: NTHUC1, NTHUC3 and NTHUC4; F4 factor (Procedures and funding) includes 02 observed variables: TT & KP19 and TT & KP20; and factor F5 (Motivation for conducting) includes 02 observed variables: DLTH6 and DLTH8.

Besides, the scale of Scientific research results is formed from 04 observed variables, the reliability test results by Cronbach's Alpha coefficient are shown in Table 5.

Table 5: Cronbach's Alpha results of the scale of scientific research results

Observed variables	Coefficient of correlation of total variables	Cronbach's Alpha if variable type
NCKH1	0,576	0,711
NCKH2	0,608	0,694
NCKH3	0,604	0,696
NCKH4	0,494	0,753
Cronbach's Alpha		0,769
Total observed variables		4

Source: Processing from survey data of 125 lecturers at universities in Ho Chi Minh City, 2019

Cronbach's Alpha coefficient of the scale of scientific

research results is 0.769 above the accepted level, the correlation coefficient of the total variables of the observed variables is also quite high, from 0.494 to 0.608. At the same time, the EFA analysis of this scale shows that the observed variables belong to 01 group of factors and the factor load factor of the observed variables is quite high from 0.773 to 0.797, the KMO coefficient is 0.749 and the Meaning Sig. = 0,000. Thus, this result is suitable for the next regression analysis. Then, the dependent variable Y is determined based on the calculation of the average score of the four observed variables NCKH1, NCKH2, NCKH3 and NCKH4.

3.4 Linear regression analysis

The method of multiple linear regression analysis was performed to test the correlation between factors and control factors to the scientific research results of lecturers. Regression results through 02 steps, step 1 regression with independent variables are extracted factors, step 2 regression with independent variables as factors and control factors.

Table 6: Regression results for factors and control factors

Variables	Regression with factors			Significance level Sig.	
	Regression coefficient not standardized		Standardized regression coefficient		
	B	Standard error	Beta		
F1	0,314	0,067	0,387	0,000	
F2	0,161	0,082	0,167	0,051	
F3	0,302	0,075	0,290	0,000	
F4	0,038	0,057	0,048	0,515	
F5	0,077	0,064	0,092	0,235	
Gender					
Age					
Level					
Seniority					
Economy - Society					
Technology - Agriculture					
Constant	0,527	0,378		0,166	
R²			50,70		
Level of significance			0,000		
Variables	Regression with factors and control factors			Significance level Sig.	VIF
	Regression coefficient not standardized		Standardized regression coefficient		
	B	Standard error	Beta		
F1	0,317	0,068	0,391	0,000	1,673
F2	0,159	0,084	0,165	0,060	1,787
F3	0,372	0,080	0,358	0,000	1,397
F4	0,055	0,057	0,070	0,338	1,263
F5	0,110	0,064	0,132	0,091	1,397
Gender	0,039	0,077	0,039	0,612	1,367
Age	-0,024	0,011	-0,364	0,035	6,849
Level	-0,075	0,089	-0,072	0,398	1,709
Seniority	0,015	0,012	0,200	0,201	5,665
Economy - Society	-0,083	0,087	-0,082	0,339	1,716
Technology - Agriculture	-0,172	0,103	-0,148	0,097	1,831
Constant	0,839	0,470		0,077	
R²		52,50			

Level of significance	0,000		
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Source: Processing from survey data of 125 lecturers at universities in Ho Chi Minh City, 2019

The regression results with the factors show that the model is significant at 1% (Sig. = 0,000) and the factors explain 50.7% of the scientific research results of lecturers at universities in Ho Chi Minh City. Factors that positively affect the research results of lecturers include F1 (Working environment); F2 (Personal capacity) and F3 (Awareness) factor. In particular, factors of Work Environment and Awareness impact level at 1% significance, personal capacity factor statistically significant at 5%. Beta coefficient (standardized regression coefficient) of F1 factor has the highest value (0.387), which shows that the working environment factor has the most influence on the faculty's ability to participate in scientific research.

Regression results for the factors and control factors show that the model is significant at 1% (Sig. = 0,000) and the factors explain 52.5% of the scientific research results of lecturers. In addition, the results of testing the multicollinearity phenomenon show that the variance magnification (VIF) of the variables are less than 10, so the independent variables are not correlated with each other. As such, the model used is appropriate. The analysis results show that there are 04 factors that positively impact the research results of lecturers, including: F1 (Working environment); F2 (Personal capacity), F3 (Awareness) and F5 (Performance motivation). In particular, the factors of work environment and awareness are statistically significant at the 1% level, the personal capacity factor is statistically significant at 10% and the motivational factor is statistically significant. at 10%. Factor F1 has the highest Beta coefficient (0,391), that is, the working environment factor has the most impact on faculty research results. In addition, variables under control factors such as the age of lecturers and the technical-agricultural field negatively impact the results of scientific research of lecturers, with significance levels of 5% and 10%, respectively. This negative correlation shows that the older the lecturers are, the lower the scientific research results are, which is quite consistent with reality. Because older lecturers often prefer to teach more than scientific research. At the same time, these trainers have little intention of improving their professional qualifications, or when they improve their qualifications, they are old, which may be the reason why the older lecturers have little scientific research results. In addition, the research results also show that lecturers in the fields of technical expertise - agriculture are less likely to participate in scientific research than in the field of socio-economy and medicine. This result is quite consistent with in fact, because scientific research activities in the field of technology - agriculture are often more difficult to implement than the field of economy - society. Some common difficulties such as costly time, funding and risks due to objective factors about natural conditions, weather and research environment.

Thus, the regression results show that the factors have a positive correlation with the scientific research results of lecturers, this is consistent with the original hypothesis. At

the same time, the control factors that adversely affect the results of scientific research are consistent with the actual conditions at universities in Ho Chi Minh City.

4. Solution

4.1 Awareness raising and motivation to participate in scientific research of lecturers

Universities need to create many activities to apply scientific research into production, business and teaching activities, creating an atmosphere of creative labor emulation and scientific research emulation among lecturers.

Strengthen the propaganda and dissemination of science and technology strategies, Party and State policies on technology and scientific application activities so lecturers can see the benefits of participating in scientific research.

Issue regulations on mandatory number of annual articles and scientific research topics for lecturers with academic titles, academic degrees or in the form of emulation and commendation at the end of the school year.

There is a mechanism to encourage lecturers to participate in scientific research through material and spiritual rewards, to honor individuals who have achievements in scientific research activities, have outstanding research results or published scientific papers international, etc.

4.2 Improve scientific research capacity

Organize training courses to build research orientations and develop research proposals. Regularly providing information on domestic and foreign scientific research activities. Facilitate lecturers to participate in conducting research projects at school and provincial level for those with experience doing research.

Encourage conferences, seminars, professional activities in faculties and disciplines to organize exciting academic activities through the allocation of a reasonable annual scientific and technological expenditure to the organizational units. conferences and seminars. These meetings and seminars will focus on academic activities, sharing experience to improve foreign language skills to search for reference sources in the research.

Encourage the establishment of a scientific research club in the school and organize regular activities, in which young lecturers will have the opportunity to participate in the same topic with experienced people.

Strengthening sending lecturers to attend scientific conferences and seminars. Encourage lecturers to find and attend scientific research conferences and seminars on their own.

Strengthen facilities, expand investment in development and upgrade equipment in laboratories, experimental caps, libraries.

4.3 Improve the working environment

Library systems in schools should be well equipped with monographs, reference books, journals, electronic databases on scientific journals, theses and theses. At the same time, expand the Internet portal for lecturers to easily access information and access reference sources.

The university needs to strengthen facilities and equipment at laboratories and practice sites so that lecturers and students of engineering - agriculture sector will be able to participate in scientific research more.

5. Conclusions and Recommendations

5.1 Conclude

The research has discovered factors affecting scientific research results of lecturers, including: Working environment; Awareness; Personal capacity; Motivation for implementation; Age and area of expertise of the lecturer. In particular, the factor "Working environment" has the most influence on the results of scientific research of lecturers. The research results will provide scientific grounds for university leaders to develop plans to motivate faculty members to participate in scientific research, to teach and improve the quality of training for the university. In addition to the achieved results, the study also has some limitations such as the "Subjective standard" factor only refers to the variables "Procedures and funding for the implementation of the topic" not mention the variable "Capacity and expertise of the topic grading council". In addition, the research only stopped at the regression analysis step, not testing the difference in scientific research results of lecturers between universities.

5.2 Offer

For the concerned ministries and branches: It is necessary to raise spending levels for scientific research tasks, encourage enterprises to deduct a part of profit before tax to invest in scientific research and technological innovation. At the same time, it is necessary to renovate the selection of topics according to the competition principle and implement the contracting mechanism in the management and spending of research topics.

For universities: Universities need to clearly identify scientific research tasks as responsibilities and obligations for lecturers; encourage lecturers and students to participate in scientific research associated with teaching and learning tasks. At the same time, creating a position and prestige of the university to exploit capital sources for scientific research activities from the support of individuals, business organizations and international cooperation.

For lecturers: It is necessary to have a better awareness of scientific research activities, besides teaching, scientific research is also an important function to improve the quality of training and reputation of lecturers and schools. In addition, the topics that lecturers should incorporate between

theory and research practice, which help improve professional knowledge, improve the quality of education and practical applicability. of lecturers and students.

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