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ORIGINAL ARTICLE

Factors Affecting Academic Staff's Research Performance in Vietnam's Universities

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ABSTRACT
This research study aims to determine the factors affecting the academic staff's research performance in Vietnam's higher education context. An online survey was conducted, achieving responses from 207 respondents who were lecturers of different scientific fields in Vietnamese universities. The SAS system was used to process both descriptive and inferential statistics. The study's results indicated that research competency was the main factor affecting Vietnamese university teachers' domestic and international research achievements. Meanwhile, English proficiency only had a significant impact at the international level. Additionally, social science academics were less skillful in researching and less productive in international research than other sciences. As a result, some implications for improving academic research performance are discussed in this paper.

1. INTRODUCTION

The responsibilities of most academics involve two main tasks: researching and teaching. Despite the dual nature of the work, generally, career advancement chiefly depends on research performance (Cadez et al., 2015). Research performance boosts the teaching quality and the university's standing, as it has been used as a key criterion in worldwide university rankings. Emphasis is placed on scholarly productivity and the publication output of academic staff, with less priority being given to teaching and service roles when rewarding performance (Shin et al., 2014).

However, the performance of Vietnamese researchers could have been better based on research output in the form of scientific papers. For instance, at the university level, among 150 lecturers at Can Tho University, 41,3% of them did not conduct any research, 48% did not have any scientific papers, 50% have not ever written articles for conferences or scientific seminars (Canh, 2018). At the international level, Vietnam was far behind neighboring countries in international publications. From 1 December 2021 to 30 November 2022, Vietnam had 97 articles, while Thailand and Singapore achieved 268 and 1187, respectively (Nature, 2023).

Several solutions have been implemented to motivate and improve the capacity of academics to conduct more valuable scientific research, especially publishing more articles in international journals. Some regulations have been placed in effect, such as giving more funds for research activities (2% GDP), requiring all lecturers to spend at least one-third of the total working time to conduct research (Circular No.47/2014/TT-BGDDT), etc. According to Vietnam's Higher Education Reform Agenda (HERA 2006-2020) for the comprehensive reform of the higher education system, Vietnam aims to develop an advanced research and development culture, with R&D activities accounting for 25% of the higher education system's revenue. The government plans to organize several universities into research-oriented institutions. Therefore, research productivity has become a priority at both university and national levels, aiming to change the culture from teaching-focused to research-oriented (Trinh & Vu, 2021).

As a result, the Vietnamese academic research performance has been improved. According to the Scopus database, the number of Vietnam's international publications has increased nearly five times, from 1,764 articles in 2009 to 8,234 in 2018. Additionally, the increase in research groups in universities is proportional to the increase in

international publications. However, this research performance is still far behind its potential level, and there are quite significant disparities between fields of science, focusing primarily on natural science, engineering and technology, social science and humanities (Nguyen Dinh Duc, 2019).

To boost research performance to its optimal level, solutions should emphasize the factors affecting academic research performance. There are several main factors, such as the researcher's motivation (Chen et al., 2006; Asmirin et al., 2020), the researcher's competency (Wasfi et al., 2020; Tinh et al., 2020), or institutional environment (Altbach, 2013), to name a few.

In that sense, this paper examines the factors affecting academics' research performance in Vietnam's higher education context with the aim of providing valuable suggestions for policy-makers and decision-makers at the university and national levels.

2. LITERATURE REVIEW

2.1. Studies on academic research performance

Research performance or research productivity can be measured qualitatively or quantitatively. While qualitative measures evaluate the influence or impact of a publication by counting the total number of references made to it by researchers globally, quantitative measures focus on the number of publications that academics produce in a period. World ranking systems use both measurements to rank universities annually (Nguyen, 2015). However, it is recognised that publishing outputs (publication) are commonly used to evaluate the research productivity of academics and researchers worldwide. Publication is the key channel of intellectual products that disseminate new knowledge, so it is essential (Cadez et al., 2015).

Kaya and Weber (2003) defined research performance as the output of a research process over a given period. It can be measured in various publishing outputs such as journal articles, theses, books and chapters in books, and patents. It is also measured in terms of professional activities such as conference presentations and research seminars; and the number of grant proposals submitted or the research grants received.

Kyvik (1995) examined the relationship between the size of departments and research productivity in Norway's four universities in five fields of study (i.e. humanities, social sciences, natural sciences, medical sciences, and technology), in which research productivity was measured with the number of publications between 1989 and 1991. The publications were journal articles, articles in research books, textbooks and conference proceedings, research books published by book companies, and reports published in report series.

The publication types used for measuring research productivity are different among disciplines. Refereed journal articles are essential for natural sciences because the research findings need to be quickly disseminated worldwide. However, books and book chapters are often the popular sources of publishing outputs in social sciences and humanities. Although there are different selections between the areas, refereed journal articles are increasingly used in all fields (Nguyen, 2015).

In short, the choice of a specific type of publication and the type of measurement to evaluate a university depends on the purpose of the evaluation or the organization. In the scope of the present study, articles published in domestic and international journals will be used to measure the research performance.

2.2. Studies on factors that affect research performance

Viteles (1953) used a basic conceptual model of performance to explain what factors affect employee performance: Performance = f (Motivation, Ability). Performance is a function of ability and motivation. Motivation differs from performance. Motivated staff do not imply that they trigger good performance as a consequence. It depends on their knowledge as well. According to this principle, only a task can be performed successfully if the person has the knowledge and the motivation to complete the job.

In more recent studies, job performance is viewed as a function of three factors: motivation, ability, and environment (Porter & Lawler, 1968). Motivation is one of the forces that lead to performance. Motivation is the desire to achieve a goal or performance level, leading to goal-directed behavior. When we refer to someone as being motivated, we mean that the person is trying hard to accomplish a specific task. Motivation is essential if someone is to perform well; however, more is needed. Ability - or having the skills and knowledge required to complete the job - is also essential and is sometimes the key determinant of effectiveness. Finally, environmental factors such as having

the resources, information, and support to perform well are critical to determining performance. One of these three factors may be the key to high performance at different times.

2.3. Motivation factors affecting research performance

Chen et al. (2006) found 12 common motivational factors (rewards) associated with the research productivity of academics. They are divided into two categories: intrinsic motivation (peer recognition, respect from students, discovering unknown insights, personal need to contribute to the field, to collaborate with others, to stay in the field) and extrinsic motivation (receiving tenure, better salary, promotion, managerial position, getting chaired professorship, reduction of teaching load). These motivational factors were validated in another study by Chen et al. (2010), which found that they are still significant but vary according to the academic's gender, rank and tenure. Although Chen et al. (2006) and Chen et al. (2010) indicated that people might be either intrinsically or extrinsically motivated, it was previously noted by Tien and Blackburn (1996) that motivation to do research is neither purely intrinsic nor purely extrinsic. Instead, the two types operate mutually, depending on the individuals' circumstances, values, and institutional environment.

Accordingly, this research expects good motivation to lead to better research performance.

Hypothesis 1: Extrinsic motivation factors positively impact academic research performance.

Hypothesis 2: Intrinsic motivation factors positively impact academic research performance.

2.4. Competence factors affecting research performance

Competence or capacity combines knowledge, skills and attitude required to perform a job. Competence = knowledge + skills + attitude (KSAs). Research capacity or competence contribute to the highest influence on performance (Wasfi et al., 2020).

The goal of the research is to produce new knowledge. Thus, the scientist must have profound knowledge to discover the boundary between the known and the unknown science. Additionally, to be able to conduct research, the researcher must master a variety of research methods, depending on the nature of the topic, research objectives, and research approach. The researcher is expected to possess various research skills, including building a research project, creating a research design, collecting data, analyzing data and using different analysis tools, criticizing, arguing, and writing a scientific report. Moreover, a scientist needs to communicate in a global environment; the ability to express scientific ideas in a foreign language, especially English, is crucially important.

Accordingly, this study expects that research proficiency and an excellent foreign language level, especially English, will improve research performance.

Hypothesis 3: Research competency has a positive impact on academic research performance.

Hypothesis 4: Foreign language proficiency has a positive impact on academic research performance.

2.5. Environment factors affecting research performance

Numerous studies show that the characteristics of the research environment are the most critical factor that allows the prediction of the productivity and quality of research. In a broad sense, the research environment consists of many elements such as state policy and regulations related to scientific research; the development of society, social capital and financial resources; technical infrastructure such as a laboratory or library; institution's research policy (Altbach, 2013). In a narrow sense, the research environment is the atmosphere of relationships inside research organizations, including collaboration with peers, peer review mechanisms, the leadership of the academic leader, and the leader's support.

There has been an emphasis on the contribution of doctoral students to research productivity (Lee & Boud, 2009). Graduate students have been argued to play the most important role in university research output, and according to Song (2001), an increase in the number of doctoral students significantly positively correlates with their professors' productivity.

Accordingly, this study expects that a good research environment and the supervision of doctoral students will lead to better research performance.

Hypothesis 5: Good research environment has a positive impact on academic research performance.

Hypothesis 6: The number of doctoral students has a positive impact on academic research performance.

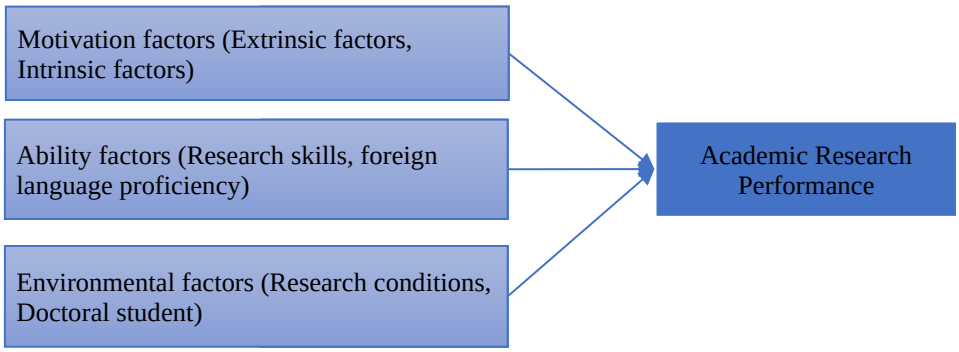

Figure 1. The Research Model

3. MATERIALS AND METHODS

The study used a quantitative approach to collect and analyze data. The online survey questionnaire was designed and distributed to participants who are lecturers working at different universities in Vietnam (from 20 February 2022 to 15 April 2022). The questionnaire consists of 3 parts. Part 1 collects demographic data, including gender, education level, academic rank, discipline and international education background. Part 2 aims to record the lecturers' feedback on the motivation, ability and environmental factors. Part 3 concerns the number of articles published in domestic and international journals over the last five years (2017-2021).

The research sample included lecturers working in different fields of science at Vietnam universities. As it is hard to apply random sampling from a population of more than 85,000 lecturers (MOET, 2021), snowball sampling was used for data collection, and the process achieved 207 respondents eventually. The data from the questionnaire were analyzed through descriptive statistics and inferential statistics based on the SAS (Statistical Analysis Software) system. Descriptive analysis was used to describe the study sample in terms of the distribution and pattern of data. The inferential analysis makes references or predictions about the whole population that the sample represents (Field, 2013).

To generate these inferences and predictions, several tests of significance were undertaken. Principal components analysis, correlation analysis, and robust regression analysis were employed in this research. The Principal Components Analysis (PCA) aims to reduce many variables in the data into a small number of factors used for the regression analysis. The number of factors should be extracted naturally based on the correlations between items. The eigenvalues-greater-than-one rule was set as default for all PCAs in this study because if a factor has a low eigenvalue, it contributes little to explain variances in the variables (Kaiser, 1960). The reliability evaluation examines the internal consistency of variables contained in a factor. A reliability coefficient (Cronbach's alpha) greater than 0.7 is acceptable, while a value between 0.6 and 0.7 might be questionable (Cronbach, 1951).

The researcher developed the questionnaire based on issues raised in the literature review. Some questions use a five-option Likert scale, and others use numeric measurement or dummy variables, as summarized in the table below:

Table 1. Summary of variables and its measurements

Variables	Type	Measurement
Dependent Variables		
Research performance 1 (P1)	Number	Number of domestic publications (2017-2021)
Research performance 2 (P2)		Number of international publications (2017-2021)
Independent Variables		
Motivation factors	5-point Likert scale	1 - Totally disagree; 2 - Disagree; 3 - Partially agree; 4 - Agree; 5 - Totally agree
Ability factors		1 - No experience; 2 - Little experience; 3 - Average; 4 - Good; 5 - Excellent
Languages (AL1 English, AL2 five languages, AL3 others)		1 - Don't know; 2 - Limited; 3 - Average; 4 - Fairly good; 5 - Good

Environment factors		1 - Totally disagree; 2 - Disagree; 3 - Fairly agree; 4 - Agree; 5 - Totally agree
Es1	Number	
Es2		
Time for research per week (Et)	Category	
Control Variables		
Gender	Dummy variable	Female = 0; Male = 1
Education		Bachelor = 1; Master = 2; PhD = 3
Academic rank		Lecturer = 1; Senior Lecturer = 2; Superior Lecturer = 3
Discipline		Social Sciences = 1; Others = 2
Studying abroad		Yes = 1; No = 0

4. RESULTS AND DISCUSSION

4.1. Descriptive analysis

The study has a participant pool of 207 university teachers in Vietnam: 66.18% of the participants represented female respondents, while the remaining 33.82% represented males. Furthermore, 74.40% of the participants were within the age range of 31-45, 16.43% were at the ages under 30, and the remaining 9.18% aged 46 or above. Additionally, 50.24% of the 207 academics had worked at university for 11 years or more, 35.75% had worked for 6-10 years, and 14.01% between 0-5 years.

Regarding education qualifications, more than half of the respondents got a Master's degree (56.52%), the second largest proportion was PhD qualification at 40.10%, and the remaining 3.38% represented a bachelor's. In addition, the majority of the academic rank among 207 respondents was the lecturer level, accounting for 71.98%, while senior lecturer and superior lecturer accounted for 16.43% and 11.59%, respectively. Furthermore, among five disciplines, Social Sciences got the highest percentage of respondents with 62.32%; the four remaining disciplines, including Medicine and Pharmacy Science, Engineering and Technology Science, Natural Science, and Agricultural Science, had a smaller proportions of 14.49%, 12.56%, 6.76%, 3.86% respectively.

The results of independent samples T-test:

There was no significant difference in domestic research performance between males (M = 7.28, STD = 6.80) and females (M = 9.31, STD = 10.68) in the independent samples T-test: t = -1.45, p = 0.1512, but there was a statistically significant difference at the $p < 0.05$ level in international publications between males (M = 2.73, STD = 5.24) and females (M = 1.09, STD = 2.44) in the independent samples T-test: t = -2.49, p = 0.015. In brief, there was no significant difference in domestic research performance between genders, but males got a higher research performance at the international level.

Regarding disciplines, the independent samples T-test showed that there was no significant difference at the $p < 0.05$ level in domestic research productivity between Social Science (M = 7.37, STD = 6.41) and Others (Medicine and Pharmacy Science, Engineering and Technology Science, Natural Science, Agriculture Science) (M = 8.96, STD = 10.80), recorded t = 1.18 and p = 0.24. However, in terms of international performance, there was a statistically significant difference between social sciences (M = 0.74, STD = 2.23) and others (M = 3.13, STD = 4.98) in the independent T-test: t = 3.99, p = 0.0001. Social Science was still behind other disciplines in international research performance, while there was no significant difference at the domestic level.

Principal Components Analysis (PCA)

This Principal Components Analysis (PCA) aimed to reduce many variables in the data into a small number of factors used for the regression analysis. Three PCAs were conducted to determine extracted factors for research motivation, ability, and environment.

PCA on Motivation factors

PCA was run with six measured variables (items of the questionnaire) related to motivation, M1 to M6. Two factors were extracted based on rotation converged in 2 iterations, accounting for 66.32% cumulative variance. All items had an excellent loading (> .5), as indicated in Table 2.

Factor 1 gets an eigenvalue of 2.63 > 1, accounting for 43.79% variance. This extracted factor includes M4_peer recognition, M5_contribution, and M6_curiority. They are also elements of intrinsic motivation, so factor 1 was renamed into intrinsic motivator (EM2).

Table 2. Extracted factors of research motivation

Factored variables	Extracted factors	
	Factor 1 (Intrinsic motivator)	**Factor 2 (Extrinsic motivator)**
M1_Higher income		
M2_Promotion		0.54
M3_Performance requirements		0.88
M4_Peer recognition	0.65	0.75
M5_Contribution	0.92	
M6_Curiosity	0.91	
EigenValue	2.63	1.35
Variance accounted (%)	43.79	22.53
Cumulative % variance	43.79	66.32
Cronbach Coefficient Alpha	0.61	0.81

Factor 2 has an eigenvalue of 1.35 > 1, with a 22.53% variance. It includes M1_higher income, M2_promotion, and M3_performance requirements. These items also belong to extrinsic motivation, so factor 2 can be called an extrinsic motivator (EM1).

PCA on Ability factors

Next, CPA analysis was conducted on 16 items related to research ability, A1 to 11, AL1, AL2, and AL3. Factored variables, variables' loading, and extracted factors are presented in Table 3. There are two factors with eigenvalues greater than one, and the variance they explained was 43.61%, and 9.03%, respectively.

By checking Cronbach's Alpha for the two new factors, only factor 1's alpha is more significant than 0.7, while factor 2 gets a low coefficient of 0.4.

Factor 1 includes measured variables from A1 to A11; these items correlated with each other and all related to different aspects of research skills, so it can be renamed 'Research Competency', EA.

Table 3. Extracted factors of research ability

Factored variables	Extracted factors	
	Factor 1 (Research competency)	**Factor 2 (Foreign language competence)**
A1_defining research topic	0.78	
A2_literature review	0.71	
A3_peer review	0.83	
A4_designing research project	0.80	
A5_organizing research group	0.79	
A6_networking researchers	0.79	
A7_mastering research methods	0.77	
A8_collecting data	0.76	
A9_analyzing data	0.73	
A10_writing domestic articles	0.72	
A11_writing international articles	0.66	
AL1_English		0.62

AL2_French/Russian/C/G/J		0.56
AL3_Other		0.71
Eigenvalue	6.98	1.44
Variance accounted (%)	43.61	9.03
Cumulative % variance	43.61	52.64
Cronbach Coefficient Alpha	0.93	0.40

Regarding factor 2, it relates to foreign language proficiency. AL1 measured English proficiency, the most commonly used foreign language in Vietnam's education context. Most academics have a certain level of English, as it is often required in many educational contexts. AL2 measured Russian/German/French/Chinese/Japanese language proficiency; these are the second most used foreign languages in Vietnam. Finally, AL3 concerns other foreign languages. One person can be very good at English (AL1 high score) but does not master other foreign languages (low scores at AL2 and AL3). That is the reason why their relationships are weak and not strongly correlated with each other. Considering three measured variables, AL1, AL2, and AL3, AL1 or English proficiency is more important than the two other variables, AL2 and AL3, and it is predicted that the variable AL1 (English proficiency) will be meaningful in the context of this study, AL1 should be retained for analysis.

Eventually, considering the results from CPA analysis, ability factors consist of extracted factors 'research competency - EA' and 'English proficiency - AL1'.

PCA on Environmental Factors

Finally, the principal components analysis (PCA) was conducted on eight items on environmental factors (*Table 1, 2*). Two factors were extracted based on the MinEigen criterion, greater than 1. Factor 1 includes items from E1 to E6; accordingly renamed as 'research environment condition - EE'. The second factor, postgraduate students supervision', refers to the number of Master's and PhD students one is in charge of. However, factor 2's Cronbach alpha is 0.57 < 0.7, which is not high. It is not a solid internal consistency, or the items Est1 and Es2 are not closely related in one group.

Table 4. Extracted factors of research environment

Factored variables	**Extracted factors**	
	Factor 1 (Research environment conditions)	**Factor 2 (Supervision of graduate and postgraduate students)**
E1_fair teaching load	0.51	
E2_research policy	0.79	
E3_library	0.83	
E4_facility & equipment	0.89	
E5_research funds	0.83	
E6_colleague support	0.73	
Es1_number of PhD student supervised		0.85
Es2_number of Master student supervised		0.83
Eigenvalue	3.62	1.4
Variance accounted (%)	45.25	17.47
Cumulative % variance	45.25	62.72
Cronbach Coefficient Alpha	0.86	0.57

However, considering the two variables Es1 (number of PhD students supervised) and Es2 (number of Master students supervised), the variable Es1 has been viewed as significant in Vietnam, as PhD programs often link to in-depth research activities and journal publications. Moreover, the positive relationship between doctoral students and

research performance has been examined in several studies (Lee and Boud, 2009; Song, 2001). It is predicted that the number of doctoral students was meaningful in this study context, and Es1 will be retained for further analysis.

In brief, environmental factors will include two variables: 'research environment condition - EE' and 'the number of PhD Student supervision - Es1'.

Correlation analysis

Correlation analysis was used to examine the correlation between the 13 variables, including six independent variables (EM1, EM2, EA, English, EE, Es1), two dependent variables (P1, P2), and five control variables (gender, education, academic rank, discipline, and studying abroad). Among them, the variables "EM1, EM2, EA, EE" were new aggregate variables created by computing the mean of the corresponding factored variables.

The correlation result showed that domestic research performance (P1) was positively correlated with Education ($r = 0.43^{***}$, $p < .0005$), Academic Rank ($r = 0.58^{***}$, $p < .0005$), Research competency ($r = 0.43^{***}$, $p < .0005$), and the number of supervised doctoral students ($r = 0.23^{***}$, $p < .0005$).

The international research performance (P2) was positively correlated with Gender ($r = 0.21^{**}$, $p < .005$), Education ($r = 0.27^{***}$, $p < 0005$), Academic Rank ($r = 0.39^{***}$, $p < .0005$), studying abroad ($r = 0.29^{***}$, $p < .0005$), Discipline ($r = 0.31^{***}$, $p < .0005$), Research competency ($r = 0.42^{***}$, $p < .0005$), English proficiency ($r = 0.31^{***}$, $p < .0005$), and number of supervised doctoral students ($r = 0.26^{****}$, $p < .0005$).

All five control variables had a significant positive relationship with international research performance (P2), whereas only three out of six main variables, including research competency, English proficiency, and supervised PhD students numbers, had a positive correlation with the number of international publications.

Regression analysis

The researchers conducted two regression models: model 1 for domestic research performance (P1) and Model 2 for international research performance (P2).

The Breusch-Pagan test for heteroscedasticity for P1 ($\chi 2 = 89.90$, $P = 0.0000$) and P2 ($\chi 2 = 177.64$, $P = 0.0000$) showed that the null hypothesis of constant variance was rejected at the .001 level. To resolve this heteroscedasticity problem, the robust regression option was used. Also, the variance inflation factor (VIF) was checked to detect multicollinearity. EA (research competency) was the variable with the highest VIF = 1.74 for both P1 and P2, meaning there is no severe concern about multicollinearity.

According to previous studies (Fiona Wood, 1990), demographic variables (e.g. gender, education, academic rank, studying abroad, and discipline) may affect research performance. After controlling the demographic variables, the six main independent variables were examined: extrinsic motivation 'EM1', intrinsic motivation 'EM2', research competency 'EA', English proficiency 'AL1', research environment conditions 'EE', and PhD student supervision 'Es1'.

The robust regression results were summarized in Table 5 with the beta coefficient and correspondent standard error in parentheses.

Table 5. Regression analysis for model 1 and model 2

Independent Variables	Dependent Variables	
	Model 1	**Model 2**
	Domestic Publications (P1)	**International Publications (P2)**
	Coefficient	Coefficient
	(Std. Err.)	(Std. Err.)
The main independent variables		
Extrinsic motivator (EM1)	-0.63	0.11
	(0.52)	(0.12)
Intrinsic motivator (EM2)	0.62	-0.03
	(0.55)	(0.12)
Research competency (EA)	1.73**	0.46**

	(0.67)	(0.15)
Research environment condition (EE)	0.4 (0.47)	-0.03 (0.12)
English proficiency	-0.05 (0.45)	0.25** (0.10)
PhD students supervision	-0.14 (0.15)	0.04 (0.03)
Control Variables		
Gender	0.16 (0.81)	-0.05 (0.19)
Education	1.86** (0.77)	0.05 (0.18)
Academic rank	4.69*** (0.61)	0.37** (0.14)
Studying abroad	-1.82* (0.87)	0.23 (0.20)
Discipline	0.06 (0.79)	0.94*** (0.18)
R-square	0.3825	0.3528
N	207	207

*Note: * significant at 0.05 level; ** significant at 0.01 level; *** significant at 0.001 level; (two-tailed tests)*

The regression equations describe the relationship between the independent variables and the dependent variable for each model shown as follows:

Domestic Publications (P1) = 1.73*Research Competency (EA) + 1.86*Education + 4.69*Academic Rank - 1.82*Studying Abroad (1)

International Publications (P2) = 0.46*Research Competency (EA) + 0.25*English Proficiency + 0.37*Academic Rank + 0.94*Discipline (2)

In model 1, only research competency EA (beta = 1.73, $p<0.01$) was significant, while the five remaining variables (EM1, EM2, EE, English, and PhDstud) were not. In model 2, the two variables, research competency EA (beta = 0.46, $p<0.01$) and English proficiency (beta = 0.25, $p<0.01$), were significant. At the same time, the four remaining variables (EM1, EM2, EE, phDstud) did not show any significant impact at 0.05 level.

In both models, the motivation factors (intrinsic motivation EM2 and extrinsic motivation EM1), environmental factors, and PhD students supervision had no significant correlation with research performance at both domestic and international scales. The results did not support hypotheses 1, 2, 5 and 6. It means good motivation, environment, or supervising doctoral students did not lead to higher research performance.

On the contrary, 'research competency' EA showed a strong correlation with both domestic and international research performance. This result supports hypothesis 3 - Research competency positively impacts academic research performance. Moreover, research competency had a more substantial positive effect on domestic research performance than international one, $\beta = 1.73$ vs 0.46. This means that good research skills would improve research performance at both domestic and international levels, but the effect was much more substantial at the domestic level.

Finally, English proficiency strongly correlated with international research performance but had no significant correlation with domestic research performance. This result partially supports hypothesis 4 that Foreign language proficiency positively impacts academic research performance. This means that academics with a better English level would have more publications in international journals, but it had a different effect on a domestic level.

Regarding control variables, education positively correlated with domestic publication (β = 1.86) but did not affect international publication. A higher education level only led to higher performance at the domestic level. Academic Rank also positively correlated with both research performance levels, but much stronger at the domestic level, β = 4.69 vs 0.37. Discipline positively correlated with the number of international publications (β = 0.94). This means that compared to social science, the other sciences (natural science, engineering, technology science, pharmacy and medicine, and agriculture science) had a more significant research performance internationally. Finally, studying abroad negatively correlated with domestic research performance (β = - 1.82). Academics who studied abroad tended to have fewer domestic journals compared to academics who did not study abroad.

5. CONCLUSION

The study investigated the relative effects of three group factors - research motivation (intrinsic and extrinsic motivation), research ability (research competency and English proficiency), and research environment (research conditions and doctoral students supervision) - on research performance, including five control variables: gender, education, academic rank, discipline, and studying abroad.

The results showed that the predictor variable 'research competency' significantly impacted both domestic and international research performance. Good research skills and experience would trigger a more excellent performance. Research skills become the critical factor that determines one person's performance. It includes the ability to define a scientific topic, do a literature review, master different research methods, collect and analyze data, write articles according to the journal's requirements, etc. Motivated lecturers cannot conduct valuable research if they do not have skills and experience, especially at the international level. Similarly, a good research environment can only facilitate researchers in conducting research; it cannot guarantee a high research performance for inexperienced and unskillful researchers. Therefore, by considering three factors: motivation, ability, and environment, the universities and government should focus more on building up research capability for lecturers by providing regular research skills training and workshops, for instance.

The result also indicated that social science was more critical than other sciences regarding poor research skills and performance, especially international publishing. Academics working in social science would need more attention and training for better research performance. Also, a further study related to this problem should be conducted to answer the cause of the performance disparity between social science and other scientific research.

The result also pointed out the critical role of English proficiency, which positively impacts international research performance. It is the common language among scientists all over the world. Good English skills would help researchers analyze and discuss scientific issues with international authors. It is a critical skill that needs regular training and self-learning.

Finally, regarding motivation and environmental factors, even though this study does not show their significant impacts on academic research performance, they have been important factors that predict research performance in some other research. The same level of research skills, experience, motivation, and environment would promote one's research performance higher than others. It might serve as a moderator or mediator on the relationship between research ability and performance. Future studies could raise this suspect as a research question.

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