

The Internationalization of Educational and Research Activities of Japanese University Academic Staff: Present conditions and determinants

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Introduction

The globalization of economic activities progresses worldwide. The internationalization of higher education institutions is required to adapt itself to the situation. Particularly, the top universities of each country are expected to produce very significant research achievements and to recruit and educate excellent students from all over the world. Furthermore, in the general university, it is necessary to create a learning environment conducive to training which increases the rate of employment of globally-talented graduates. It is necessary to internationalize the educational and research activities of university academic staff to accept foreign students, send Japanese students to foreign universities and conduct an educational program in the English language.

The purpose of this study is to determine the determinants of internationalizing the educational and research activities of the university academic staff by clarifying the attributes, consciousness, and environment of university academic staff which are related to the internationalization of educational and research activities of academic staff in Japanese universities.

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The internationalization level of educational or research activities

Table 1 is the result of having confirmed whether Japanese university academic staff performed eight kinds of international educational or research activities. When the implementation conditions of the eight educational activities were examined, the percentages of “yes” responses to each presented seriatim were: 4.9%, 16.7%, 1.7%, 34.3%, 66.0%, 28.6%, 46.1%, and 70.0%.

Table 1. Internationalization of educational or research activities

	Yes	No
	1	0
Educational activities		
① Are you teaching any courses abroad ?	51 4.9%	997 95.1%
② Are you teaching any courses in a language different from the language of instruction at your current institution ?	175 16.7%	873 83.3%
③ Do you primarily employ foreign language in teaching?	18 1.7%	1013 98.3%
Research activities		
④ Do you collaborate with international colleagues on any of your research projects?	341 34.3%	654 65.7%
⑤ Did you publish in a language different from the language of instruction at your current institution in the last three years?	614 66.0%	317 34.0%
⑥ Did you co-author with colleagues located in other (foreign) countries in the last three years?	257 28.6%	641 71.4%
⑦ Did you publish in a foreign country in the last three years?	416 46.1%	486 53.9%
⑧ During the past three years, did you attend any disciplinary/scientific conferences outside Japan?	664 70.0%	284 30.0%

From the aforementioned results, it is clear that Japanese university academic staff perform the internationalized research activities more positively than the internationalized educational activities.

Principal component of the internationalized educational or research activities

Subsequently, by using these eight questions about the internationalized educational and research activities, principal component analysis was performed. As a result, two principal components were confirmed (Table 2). The left column of Table 2 shows the five questions in decreasing order of the loading of first principal component. From this result, the first principal components were called as “the internationalization level of research activities”. Subsequently, the right column of Table 2 shows the other three questions in decreasing order of the loading of the first principal component. From this result, the second principal component was called “the internationalization level of educational activities”.

Table 2. The result of the principal component analysis using eight variables about the internationalized educational or research activities

	First principal component	Second principal component
	Internationalization level of research activities	Internationalization level of educational activities
①Are you teaching any courses abroad?	.267	.544
②Are you teaching any courses in a language different from the language of instruction at your current institution?	.363	.576
③Do you primarily employ in teaching, first language/mother tongue or others?	.167	.638
④Do you collaborate with international colleagues on any of your research projects?	.685	.064
⑤Did you publish in a language different from the language of instruction at your current institution in the last three years?	.715	-.299
⑥Did you co-author with colleagues located in other (foreign)countries in the last three years?	.745	-.019
⑦Did you publish in a foreign country in the last three years ?	.707	-.306
⑧During the past three years, did you attend any disciplinary/scientific conferences outside Japan?	.632	-.094

According to Table 2, the first principal component score can be calculated by using Formula 1 (Figure 1). The second principal component score can be calculated by using Formula 2.

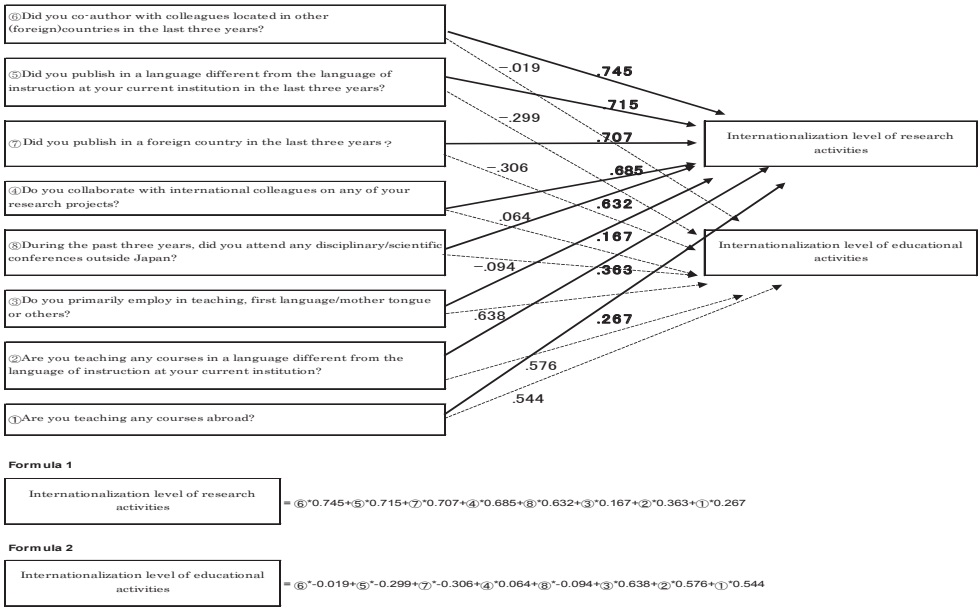


Figure 1. Two principal components

Dependent and independent variables

Based on the research results on the factors of their internationalization of educational and research activities of academic staff, the factors of the internationalization of educational and research activities of the university academic staff were extracted (Burdick et al., 2012; Cate et al., 2014; Constantinou et al., 2011; Dewey & Duff, 2009; DeZure et al., 2012; Foxcroft, 2011; Friesen, 2013; Gopal, 2011; Huang, Finkelstein & Rostan, 2014; Jepsen et al., 2014; Kim et al., 2012; Lahiri, 2012; Rhoads & Hu, 2012; Spraggins, 2010; Van Raan, 1998). The dependent variables and independent variables which were used in the analysis of this study are shown in Table 3.

The dependent variables are: the internationalization levels of educational activities and research activities which were shown in the Table 2. Independent variables are three: personal attribution; features of graduate education that the respondent experienced; and features of the university to which the respondent belongs. Personal attribute variables include: gender, field of specialty, age composition, location of interests, and research productivity.

Table 3. Dependent and independent variables

Variables	Category
Dependent variables	
① Internationalization level of educational activities	Principal component scores
② Internationalization level of research activities	
Independent variables	
Attributes	
① Gender	Male=1, Female=0
② Field of specialty	
②-1 Humanities	Discipline of current academic unit which faculty belong to is Humanities=1, Others=0
②-2 Social sciences	Discipline of current academic unit which faculty belong to is Social sciences=1, Others=0
②-3 Natural sciences	Discipline of current academic unit which faculty belong to is Natural sciences=1, Others=0
②-4 Engineering or Agriculture	Discipline of current academic unit which faculty belong to is Engineering or Agriculture=1, Others=0
③ Age composition	
③-1 Age4049	40-49 years of age=1, Others=0
③-2 Age5059	50-59 years of age=1, Others=0
③-3 Age6099	60 years of age or older=1, Others=0
④ Location of interests	In research activities=1, In teaching activities=0
⑤ Research productivity	Logarithm of the number of articles published in an academic book or journal
Feature of graduate education	
⑥ Obtained highest degree	Doctor degree=1, Others=0
⑦ Earned Master or Doctor degree outside the country of current employment or not	Yes=1, No=0
Feature of university to which respondents belong	
⑧ Institutional type	Research university=1, Non-research university=0
⑨ Quality of the students currently enrolled	Good=3, Neutral=2, Poor=1
⑩ Internationalization level of the university institutions which the university academic staff belong to	Principal component scores
⑪ Management style	
⑪-1 Supportive management	factor scores
⑪-2 Collegial (Cooperative) management	factor scores
⑪-3 Top-down management	factor scores

The features of graduate education that the respondent experienced include: obtained highest degree and earned master or doctorate degree in the country of current employment or not. Features of the university to which respondents belong include: institutional type; the quality of the students currently enrolled; level of internationalization of institution to which academic staff belongs; and management style.

Below, two independent variables, internationalization level of the university to which academic staff belongs and management style of the institutions to which academic staff belongs, were explained.

(1) Internationalization level of institutions to which academic staff belongs

The current status of the internationalization of the university institution was confirmed using four questions. The result is Table 4-1.

Principal component analysis was employed using the four questions. As a result, one principal component, the level of the internationalization of the university, was confirmed (Table 4-2).

Table 4-1. The internationalization of the university to which academic staff belongs

	Frequently 4	Occasionally 3	Rarely 2	Never 1	Total number of respondent
Foreign academics have taught courses.	47.1%	32.3%	14.6%	6.0%	898
International conferences and seminars have been held.	39.1%	36.8%	15.5%	8.7%	919
Foreign students have been enrolled.	67.7%	24.5%	5.4%	2.4%	967
Our students have studied abroad.	57.5%	28.2%	9.2%	5.1%	928

Table 4-2. The result of factor analysis of internationalization of university

	First main component loading The internationalization level of the University institutions
Foreign academics have taught courses.	.565
International conferences and seminars have been held.	.988
Foreign students have been enrolled.	.988
Our students have studied abroad.	.988

Contribution ratio=81.1%

(2) Management style of the university to which academic staff belongs

Factor analysis was conducted using the nine questions to identify the university management style. The result is Table 5.

As a result, three factors, supportive management style; cooperative management style; and top-down management style, were confirmed. Subsequently, the relation between the dependent variable and each independent variable were analyzed, and in the following, a multiple regression analysis was calculated.

Table 5. Management style of the university to which academic staff belongs

	First factor	Second factor	Third factor
	Supportive management style	Cooperative management style	Top-down management style
A supportive attitude of administrative staff towards research activities	.931	.244	-.027
A supportive attitude of administrative staff towards teaching activities	.745	.225	-.101
Good communication between management and academics	.163	.780	-.258
A strong emphasis on the institution's mission	.094	.485	.062
Collegiality in decision-making processes	.103	.452	.002
Professional development for administrative / management duties for individual faculty	.188	.343	-.077
A strong performance orientation	.134	.196	.502
A cumbersome administrative process	-.203	-.085	.443
A top-down management style	-.042	-.134	.317

Factor extraction methods: Maximum

Rotation method: Varimax

Note: The numerical value in the table shows

Relation between dependent and independent variables

(1) Gender

The internationalization level of research activities of male academic staff was significantly higher at 0.1% of levels of significance than the female university academic staff (Figure 2-1).

Also, there is no meaningful differentiation of the internationalization level of the educational activities of academic staff by gender (Figure 2-2)

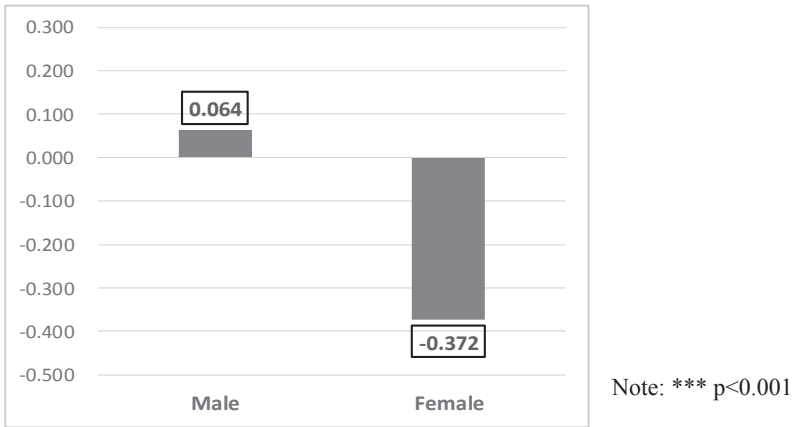


Figure 2-1. Average score of the first principal component by gender

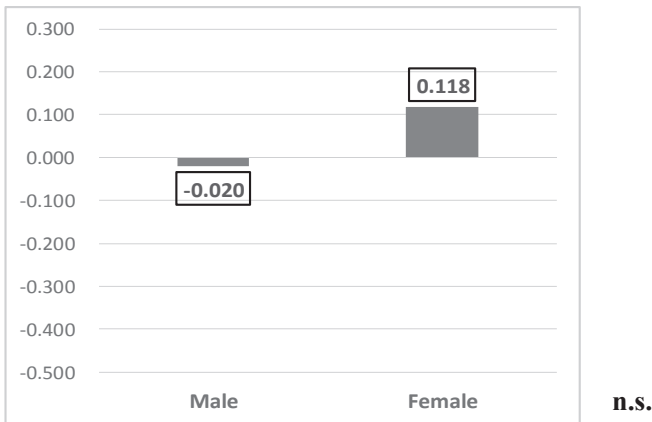
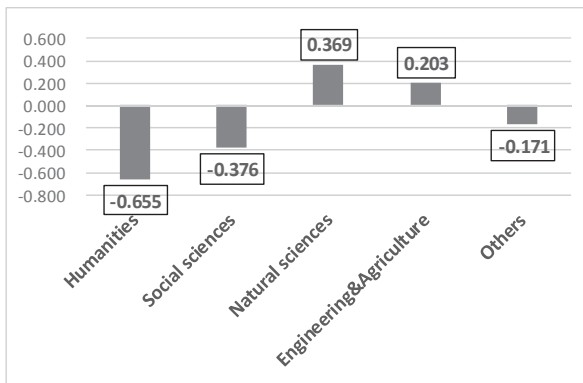


Figure 2-2. Average score of the second principal component by gender

(2) Field of specialty

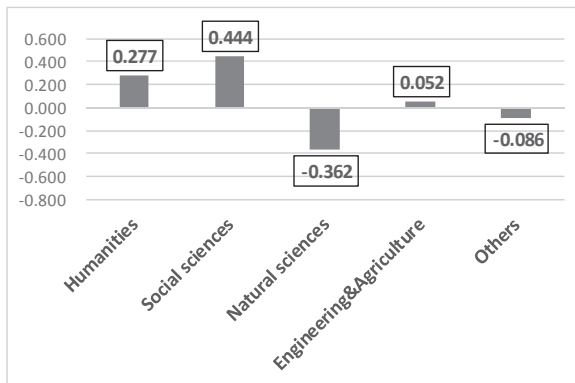
The internationalization level of the research activities of academic staff who majored in natural sciences or engineering/agricultural fields were significantly higher at 0.1% of levels of significance than the university academic staff who majored in humanities or social sciences (Figure 3-1).

And also, the internationalization level of the educational activities of the university academic staff who majored in humanities or social sciences was significantly higher at 0.1% of levels of significance than the university academic staff who majored in natural sciences (Figure 3-2).



Note: The first principal=The level of internationalization of research activities
 *** p<0.001

Figure 3-1. Average score of the first principal component by field of specialty



Note: The second principal=The level of internationalization of educational activities
 *** p<0.001

Figure 3-2. Average score of the second principal component by field of specialty

(3) Age composition

There is no meaningful differentiation of the internationalization level of research activities of academic staff by age (Figure 4-1).

The internationalization level of the educational activities of academic staff over sixty became significantly higher at 0.1% of levels of significance than the internationalization level of the educational activities of academic staff who are twenty to thirty-nine (Figure 4-2).

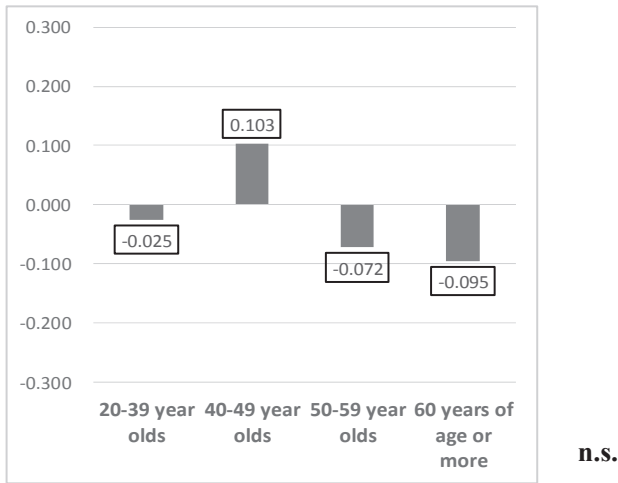


Figure 4-1. Average score of the first principal component by age composition

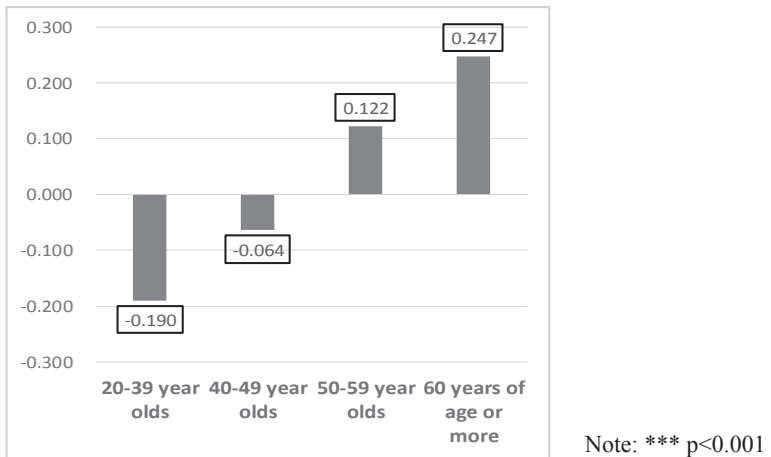
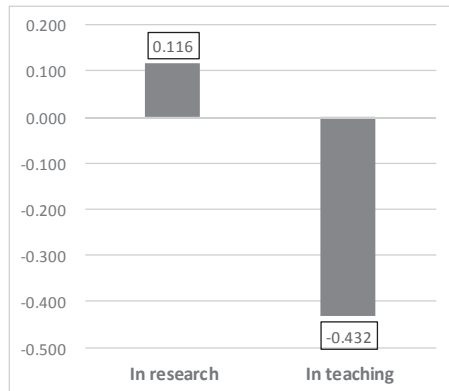


Figure 4-2. Average score of the second principal component by age composition

(4) Location of interests

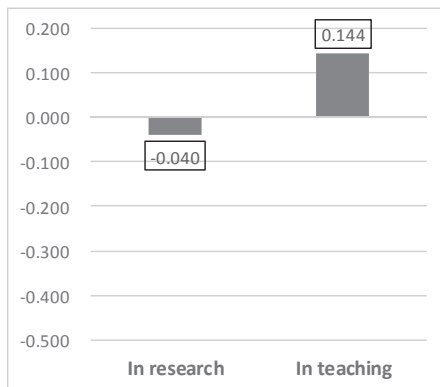
The internationalization level of the research activities of academic staff interested in research activities more than in teaching was higher at 0.1% of levels of significance than the internationalization level of the research activities of those who are interested in teaching activities more than in research (Figure 5-1).

The internationalization level of the educational activities of academic staff who are interested in teaching activities more than in research activities higher at 0.5% of levels of significance than the internationalization level of research activities of academic staff who are interested in research more than in teaching activities (Figure 5-2).



Note: *** p<0.001

Figure 5-1. Average score of the first principal component by subject of interest



Note: * p<0.05

Figure 5-2. Average score of the second principal component by subject of interest

(5) Research productivity & (10) internationalization level of institute

As the university academic staff produce more research papers, their internationalization level of research activities becomes higher (0.1% of levels of significance) (Table 6).

As the internationalization level of the university becomes higher so too does the internationalization level of the educational activities of academic staff (0.1% of levels of significance) (Table 6).

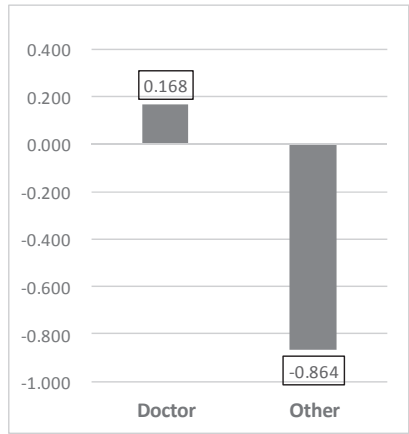
Table 6. Correlation coefficient between the first and second principal component and research productivity or internationalization of institution

	Internationalization level of research activities	Internationalization level of educational activities
⑤Research productivity	.447***	-.075*
⑩Internationalization of institution	.097*	.128***

Note: * p<0.05, *** p<0.001

(6) Obtained highest degree

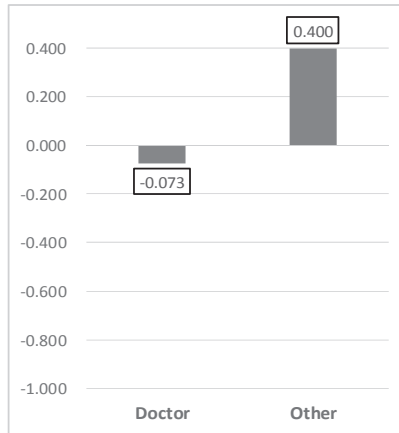
As the internationalization level of the academic staffs' research activities became higher, those possessing the doctoral degree became significantly higher, at 1% levels of significance, than those who did not have the doctoral degree (Figure 6-1).



Note: *** p<0.001

Figure 6-1. Average score of the first principal component by obtained highest degree

And also, the internationalization level of the educational activities of academic staff who did not have the doctoral degree became significantly higher at 0.1% of levels of significance than those who had the doctoral degree (Figure 6-2).



Note: *** $p < 0.05$

Figure 6-2. Average score of the second principal component by obtained highest degree

(7) Master or doctor degree earned or not earned outside country of current employment

The internationalization level of the research activities of academic staff who earned a master or doctor degree outside the country of current employment became significantly higher at 1% of levels of significance than those who did not these degrees outside the country of current employment (Figure 7-1).

And also, the internationalization level of the educational activities of academic staff who earned a master or doctor degree outside the country of current employment became significantly higher at 0.1% of levels of significance than those who did not earn these degrees outside the country of current employment (Figure 7-2).

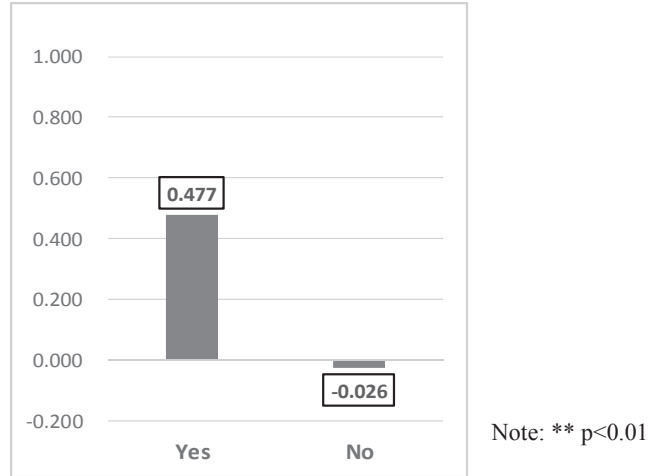


Figure 7-1. Average of the first principal component score by earned or not earned master or doctor degree outside the country of current employment

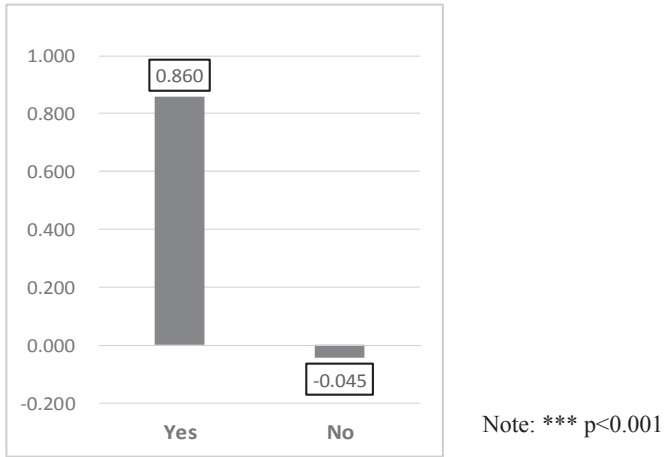


Figure 7-2. Average of the second principal component score by earned or not earned master or doctor degree in the country of current employment

(8) Institutional type

The internationalization level of the research activities of academic staff who belonged to the research university became significantly higher at 0.1% levels of significance than those who did not (Figure 8-1).

In addition, there was no meaningful difference in the significance at the 5%

level between the internationalization level of educational activities of the university academic staff who belonged to the research university and the internationalization level of educational activities of the university academic staff who did not (Figure 8-2).

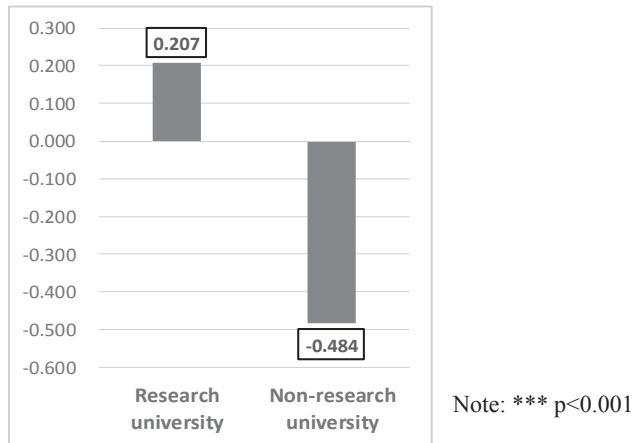


Figure 8-1. Average of the first principal component score by institutional type

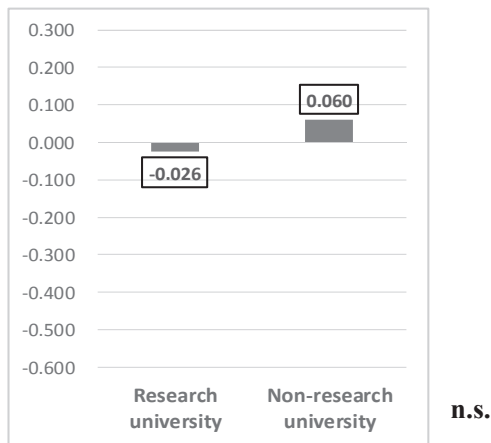


Figure 8-2. Average of the second principal component score by institutional type

(9) Quality of students

No meaningful difference was confirmed in the internationalization level of research activities of academic staff by quality of students at the significance 5% level (Figure 9-1).

No meaningful difference was confirmed in the internationalization level of educational activities of academic staff by quality of students in the significance 5% level (Figure 9-2).

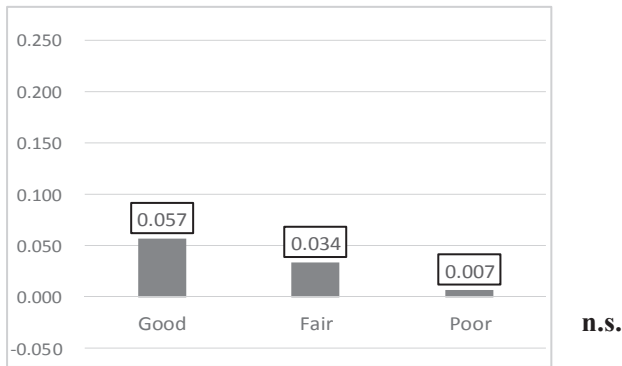


Figure 9-1. Average of the first principal component score by quality of students

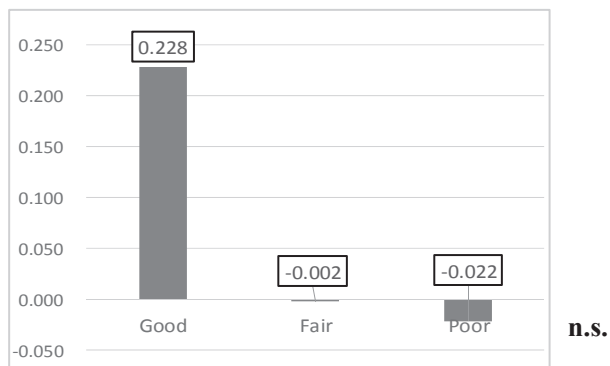


Figure 9-2. Average of the second principal component score by quality of students

(11) Management style

The internationalization level of research activities of academic staff whose university adopted more strongly a top-down management style became higher (1% level of significance) (Table 7).

There was no meaningful difference confirmed in the internationalization level of educational activities of academic staff by management style of institutions at the significance 5% level (Table 7).

By using the explanation variables used in the above-mentioned analysis, multiple regression analysis was conducted to assume the internationalization level of research activities and the level of research activities as a dependent variable.

Table 7. Correlation coefficient between the first and second principal components and research productivity or internationalization of the institution

	The internationalization level of research activities	The internationalization level of educational activities
㊦-1 Supportive management	0.083*	0.023
㊦-2 Collegial management	0.060	0.068
㊦-3 Top-down management	0.095**	-0.044

Note: * $p < 0.05$, ** $p < 0.01$

Results of the multiple regression analysis

Academic staff who are significantly high in the internationalization level of research activities at the level of significance less than 1%, are interested in research activities; publish many theses; obtained the doctorate degree; acquired the best degree in a foreign country; belong to a research university; and belong to a more internationalized institution (Table 8-1).

Academic staff who significantly high in the level of internationalization of their educational activities at the level of significance less than 1%, are sixty or older; acquired the best degree in a foreign country; and belong to a more internationalized university (Table 8-2).

Table 8-1. Determinants the level of internationalization of research activities

	standardized regression coefficients (β)	level of significance	t-value
Attributes			
① Gender	0.032		0.846
② Field of specialty			
②-1 Humanities	-0.114	*	-2.231
②-2 Social sciences	-0.020		-0.413
②-3 Natural sciences	0.126	*	2.512
②-4 Engineering or Agriculture	-0.008		-0.148
③ Age composition			
③-1 Age4049	0.026		0.522
③-2 Age5059	0.000		-0.004
③-3 Age6099	-0.008		-0.178
④ Location of interests	0.115	**	3.039
⑤ Research productivity	0.314	***	7.742
Feature of graduate education			
⑥ Obtained highest degree	0.135	**	2.996
⑦ Earned Master or Doctor degree outside the country of current employment or not	0.145	***	3.900
Feature of university to which respondents belong			
⑧ Institutional type	0.121	**	3.004
⑨ Quality of the students currently enrolled	0.006		0.157
⑩ Internationalization level of the university institutions which the university academic staff belong to	0.108	**	2.790
⑪ Management style			
⑪-1 Supportive management	-0.027		-0.725
⑪-2 Cooperative management	0.074		1.909
⑪-3 Top-down management	0.033		0.843

Note: $R^2=0.355$

* $p<0.05$, ** $p<0.01$, *** $p<0.001$

Table 8-2. Determinants of the level of internationalization of educational activities

	standardized regression coefficients (β)	level of significance	t-value
Attributes			
① Gender	-0.015		-0.332
② Field of specialty			
②-1 Humanities	0.037		0.633
②-2 Social sciences	0.133	*	2.368
②-3 Natural sciences	-0.094		-1.633
②-4 Engineering or Agriculture	0.105		1.723
③ Age composition			
③-1 Age4049	0.037		0.663
③-2 Age5059	0.128	*	2.258
③-3 Age6099	0.181	***	3.364
④ Location of interests	-0.026		-0.599
⑤ Research productivity	0.024		0.505
Feature of graduate education			
⑥ Obtained highest degree	-0.094		-1.799
⑦ Earned Master or Doctor degree outside the country of current employment or not	0.147	***	3.423
Feature of university to which respondents belong			
⑧ Institutional type	0.062		1.341
⑨ Quality of the students currently enrolled	0.029		0.656
⑩ Internationalization level of the university institutions which the university academic staff belong to	0.127	**	2.834
⑪ Management style			
⑪-1 Supportive management	-0.005		-0.122
⑪-2 Cooperative management	0.031		0.689
⑪-3 Top-down management	0.020		0.448

Note: $R^2=0.141$ * $p<0.05$, ** $p<0.01$, *** $p<0.001$

Conclusion

Common factors which promote the internationalization of research and educational activities at the 1% level of significance are: earned master or doctorate degree in country of current employment; and level of internationalization of institution to which academic staff belong.

For research and educational activities of academic staff to internationalize, their training must be internationalized and their institutions likewise must be.

Other factors to promoting the internationalization of research activities at the 1% level of significance are: interests in research and teaching; research productivity; obtained highest degree; and institutional type.

The internationalization of research activities of academic staff are accomplished by promoting research activities. Another factor which promotes the internationalization of educational activities at the 1% level of significance is age sixty or older. The internationalization of educational activities of university faculty is accomplished by having sufficient educational experiences for them.

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